

Critical Success Factors for Private and Public-Private Partnership Investments in Renewable Energy Development in Kenya

A Dissertation
presented to

The **Development Finance Centre (DEFIC)**
Graduate School of Business
University of Cape Town

In partial fulfilment
of the requirements for the Degree of
Master of Commerce in Development Finance

by

Jectone, Achieng

ACHJEC001

October, 2018

Supervisor: Dr. Mundia, Kabinga

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

PLAGIARISM DECLARATION

Declaration

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the APA convention for citation and referencing. Each contribution to, and quotation in, this project from the work(s) of other people has been attributed, and has been cited and referenced.
3. This project is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.
5. I acknowledge that copying someone else's assignment or essay, or part of it, is wrong, and declare that this is my own work.

Signature

Signature here

ACHIENG Jectone Tocho

ABSTRACT

Drivers or Critical Success Factors (CSFs) for IPPs and PPPs in renewable energy have been well researched and documented in many developed countries and significant literature exist. In Africa, studies on drivers of renewable energy development have focused on North Africa and South Africa.

This study sought to identify the drivers of renewable energy in a developing or middle- income country like Kenya. Further, while previous studies have adopted various methodologies, this study employed a three-stage survey approach focusing on the context of the renewable energy investments as reflected by the prevailing conditions in the macro-business environment, the structure of the electricity sector and project profiles or characteristics as determinants.

The study relied on the views of project developers (including consultants and contractors), Development Financial Institutions; Commercial Financial Institutions, Government and Government Agencies, various professional groups and academic researchers, who were the main target groups for the study.

On the macro-business environment level, two key macro-level determinants of renewable energy development in Kenya were identified as political goodwill and quality of the country's development plans. Political support was viewed as a key ingredient for any investment in the country as it serves to reduce political risk and secures investors' interest while the country's development plans provide a benchmark against which developers based their investment decisions.

Regarding the influence of the structure of the electricity sector, independence of the regulator was ranked as the leading driving factor for renewable energy investments in Kenya followed by the Government support to the off-taker.

Project profiles determinants for renewable energy development in Kenya had interesting results. Environmental and social issues was identified as major project factor influencing private players' participation in the sector. Stakeholder management in Kenya was rated as excellent and supports projects success in Kenya.

However, quality of environmental laws and standard, local population support and ease of obtaining access and way-leaves remains of concern for renewable energy developers. Other project profiles considerations identified as driving renewable energy development in Kenya included participation of Development and Financial Institutions and Multi-Lateral Institutions

in the Kenya Energy Market, growing demand for electricity, adequacy of tariffs and proven technology and availability of local capacity.

TABLE OF CONTENTS

PLAGIARISM DECLARATION	i
ABSTRACT	ii
TABLE OF CONTENTS	iv
LIST OF TABLES	v
LIST OF FIGURES.....	vi
GLOSSARY OF TERMS	vii
ACKNOWLEDGEMENT	viii
1 INTRODUCTION	1
1.1 Research Area.....	1
1.2 Problem Statement	3
1.3 Research Questions and Scope.....	4
1.4 Purpose and Significance of the Research.....	4
1.5 Assumptions, Rationale and Summary.....	5
2 LITERATURE REVIEW	7
2.1 Public – Private Partnership Development Model & Renewable Energy.....	12
2.2 Critical Success Factors and Drivers for Private Investments and PPPs for Renewable Energy Development.....	13
2.3 Overview of Renewable Energy Development in Kenya	20
3 RESEARCH METHODOLOGY.....	24
3.1 Research Design.....	24
3.2 Variables.....	24
3.3 Population and Sampling	25
3.4 Data Collection Method	28
3.5 Data Analysis	28
3.6 Reliability of the data collection instrument	29
3.7 Validity of the data collection instrument.....	29
4 RESEARCH FINDINGS, ANALYSIS AND DISCUSSION	30
4.1 Introduction	30
4.2 Respondents Background Information and Statistics.....	30
4.3 Research Questions and Study Findings	37
4.4 Study Findings and Literature Review	57
5 RESEARCH CONCLUSIONS.....	59
6 RECOMMENDATIONS FOR FUTURE RESEARCH.....	62
7 REFERENCES	63
8 APPENDICES	65

LIST OF TABLES

Table 2.4-1: Summary of Sample studies on CSF for PPPs	17
Table 3.3-1: Respondents Field of Expertise.....	27
Table 3.3-1: Respondents Field of Expertise.....	27
Table 4.2-1: Respondents Nature of organization.....	30
Table 4.2-2: Respondents Field of Expertise.....	31
Table 4.2-3: Respondents No. of Years of Experience	32
Table 4.2-4: Respondents Position in the Company	32
Table 4.2-5: Respondents Involvement in Infrastructure Development Projects	33
Table 4.2-6: Nature of Projects of Sample Respondents.....	33
Table 4.2-7: Shareholding Structure of Sample Companies	34
Table 4.2-8: Respondents Experience with PPP Transactions	34
Table 4.2-9: Respondents Years of Experience with PPP Transactions	35
Table 4.2-10: Number of PPP Projects involved by Respondents	35
Table 4.2-11: Sectors of the PPP projects Sampled for the study.....	36
Table 4.2-12: Respondents Involvement in PPP Transactions	36
Table 4.3-1: Macro-drivers for renewable energy.....	37
Table 4.3-2: Macro-drivers and structure of electricity factors	37
Table 4.3-3: Respondents Results for Macro-Drivers.....	38
Table 4.3-4: Structure of Electricity Sector	43
Table 4.3-5: Environmental and Social Standards	48
Table 4.3-6: Bankability Considerations	52
Table 8-1: Kenya Installed Electricity Statistics by source of generation, 2006-2015.....	65
Table 8-2: Kenya Installed Electricity Statistics (public and Private Sector), 2006-2015	66
Table 8-3: Planned Sources of Electricity Generation, 2015-2020.....	66
Table 8-4: Cross Tab Results - Nature of Organisation and Political Support.....	73
Table 8-5: Cross-Tab Results - Nature of Organisation and Country Development Plans	73
Table 8-6: Cross Tab Results - Respondents' Field of Expertise and Political Support.....	73
Table 8-7: Cross-Tab Results - Field of Expertise and Political Support	74
Table 8-8: Cross-Tab Results – Position in organisation and Political Support.....	74
Table 8-9: Cross-Tab Results – Position in organisation and Country Development Plans.....	74
Table 8-10: Cross-Tab Results – Nature of Organisation and Independence of the Regulator	75
Table 8-11: Cross-Tab Results – Electricity Sub-sector and Independence of the Regulator	75
Table 8-12: Cross-Tab Results – Shareholder structure and Independence of the Regulator.....	75
Table 8-13: Cross-Tab Results – Nature of Organisation and Government Support to Off-taker	75
Table 8-14: Cross-Tab Results Shareholding and Government Support to Off-taker.....	76
Table 8-15: Cross-Tab Results – Nature of Organisation and Stakeholder Management.....	76
Table 8-16: Cross-Tab Results – Nature of Organisation and Environmental Standards	76
Table 8-17: Cross-Tab Results – Nature of Organisation and Local Population Support.....	77
Table 8-18: Cross-Tab Results – Nature of Organisation and Role of MFIs and DFIs	77
Table 8-19: Cross-Tab Results – Nature of Organisation and Electricity Demand	77
Table 8-20: Cross-Tab Results – Nature of Organisation and Electricity Tariffs.....	78
Table 8-21: Cross-Tab Results – Nature of Organisation and Financial Strength of Off-taker	78
Table 8-22: Cross-Tab Results – Nature of Organisation and Quality of Reports and Studies	78

LIST OF FIGURES

Figure 1: Conceptual Framework for the Study..... 22
Figure 2: Technology and Capacity issues and Renewable Energy Development 56

GLOSSARY OF TERMS

AfDB	African Development Bank
AHP	Analytical Hierarchical Processes
CSFs	Critical Success Factors
CSP	Concentrated Solar Power
DFI	Development Financial Institutions
GDC	Geothermal Development Company Limited
GHG	Green House Gases
GW	Gigawatt
GWH	Gigawatt Hour
IEA	International Energy Agency
IFC	International Financial Corporation
IPPs	Independent Power Producers
IRP	Integrated Resource Plan
KenGen	Kenya Electricity Generating company Limited
KWH	Kilowatt Hour
MFI	Multi-Lateral Financial Institutions
MW	Megawatts
NEMA	National Environmental Management Authority
OECD	Organisation for Economic Co-operation and Development
PFI	Project Finance Initiative
PPA	Power Purchase Agreement
PPP	Public Private Partnership
RES	Renewable Energy Sources
SE4ALL	Sustainable Energy for All
UK	United Kingdom
USA	United States of America
US\$	United States Dollar

ACKNOWLEDGEMENT

I dedicate this thesis to the Almighty God for knowledge and wisdom endowment and to my family; Agnetta Adiedo, Devane Austin, Kristen Amondi and Jessica Kendi for your support and understanding during this academic pursuit.

I also wish to sincerely thank my Supervisor, **Dr. Mundia Kabinga** for the academic rigour, patience, professionalism and words of encouragement during the undertaking and finalisation of this piece of academic research work. You made balancing work and academics an interesting and worthy undertaking and always spurred me on. May God richly bless you.

Finally, sincere thanks to Geothermal Development Company Limited for the financial support towards pursuing the Masters of Development Finance degree course at the University of Cape Town and to all those who participated in the study through provision of information by completing the questionnaire.

1 INTRODUCTION

1.1 Research Area

Kenya is well endowed with significant renewable energy potential which remains largely unexploited. For the last fifteen years, private sector participation in the energy sector in Kenya has been largely limited to investments in the thermal energy sources. Since the inception of energy sector reforms in Kenya, out of the first four Independent Power Producers (IPPs) that participated in the Kenyan energy sector, only one ventured into the renewable energy space.

However, of recent, private sector participation targeting renewable energy investments has taken an upward trend with majority of the generation licenses being issued by the regulator (Energy Regulatory Commission) and Power Purchase Agreements (PPAs) being entered into with the off-taker..

Further, a notable shift is being observed from IPPs to Public Private Partnerships (PPPs) in the development of renewable energy projects in Kenya especially geothermal energy development.

The above developments have been bolstered with the reforms in the energy sector in Kenya, which resulted in the creation of independent regulator, increased private sector participation, partial-privatization of two dominant government utility players in the sector and creating an independent agency for rural electrification and a Special Purpose Company for Geothermal Development. Further reforms continue to occur in the Kenyan Energy Sector following the adoption of the new constitution and review of the energy sector policy resulting in the development of the National Energy and Petroleum Policy.

On realization of the huge renewable energy potential and attendant economic impact, the Government of Kenya, in its energy development plans, targets to add approximately 5,000 MW of new energy sources by 2020 out of which approximately 2,318 MW (representing 42% of the total projected new generation) will come from renewable energy.

Among the renewables, geothermal and wind energy are expected to be the main contributors to the country's planned generation capacity accounting for 71% and 27% respectively while hydro which is susceptible to climatic patterns and co-generation sources will account for 2%.

Private sector participation in the electricity sub-sector in Kenya as of June 2015, comprised of ten (12) Independent Power Producers (IPPs) as compared to ten years ago when the number

of private generation companies were only four namely Westmont, Iberafrika, Tsavo, and Orpower (Eberhard & Gratwick, 2012). All together, the IPPs have developed 1,106 MW at an approximate cost of US\$ 2.3 billion in investment (Eberhard, Gratwick, & Kariuki, 2018). Still with this level of private involvement, approximately 70% of the electricity generation capacity is controlled by the public sector.

The level of public sector capacity contribution is likely to change significantly if the plans in the Kenya Medium Term Plan 2015 to 2018 are fully implemented and new private sector generation capacity are realised. According to the Medium term Plan, new generation is expected to be developed by the Kenya Electricity Generation Company(a government controlled company) contributing 14% or 195.7 MW), imports from Ethiopia government (29% (400 MW) and the remaining 57% (801 MW) will be developed by additional sixteen (16) different independent power producers¹.

Drivers or Critical Success Factors (CSFs) for IPPs and PPPs in renewable energy have been well researched in many developed countries and significant literature (both empirical and theoretical) exist (Chou & Pramudawardhani, 2015; Hwang et al., 2013; S. T. Ng et al., 2012; António & Fuinhas 2012; Marques & Fuinhas, 2012; Marques et al., 2010; Bing et al., 2005; Martinot et al. 2002).

In Africa, studies on drivers of renewable energy development have focused on North Africa and South Africa (Eberhard & Gratwick, 2011; Eberhard & Gratwick, 2011a; Eberhard & Gratwick, 2008). In emerging and developed countries, Cherni & Kentish, (2007) reviewed the impact of renewable energy policy and electricity market reforms in China and how institutional reforms such as establishment of a China Renewable Energy Scale-up programme and investment mechanisms in the sector spurred renewable energy development in China.

Moreover, most of the studies that have been undertaken in developed countries have limited extent to which the lessons learnt can be applied to a developing country or Kenyan case. This is considering the differences in developmental scale, macro-business environment and other sector specific challenges.

Further, in identifying critical success factors for renewable energy, different methodological approaches have been applied. Zhang & Asce, (2005) for example adopted a systematic approach involving carrying out extensive literature review to identify critical success factors

¹ The list of committed projects between 2015 to 2018 is shown as Appendix 1

in previous researches, drawing experience from successful projects and failed ones, and through interviews and correspondences with PPP practitioners and experts.

Chua, Kog, & Loh, (1999) on the other hand adopted an Analytical Hierarchical Process (AHP), used widely for multicriteria decision making, to survey expert opinions on CSFs. The study considered sixty seven (67) success related factors grouped under four main project aspects, namely, project characteristics, contractual arrangements, project participants and interactive processes.

Considering the interest in renewable energy development and climate change issues amongst governments, policy makers, multi-lateral and bilateral development finance institutions such as the World Bank, African Development and many international and local organisations, Kenya provides a pedestal upon which successes of renewable energy development in a developing country setting can be assessed and allows for replication in other jurisdictions.

This study, therefore, focuses on renewable development in Kenya as a developing country and takes a three-stage survey approach focusing on the macro-level business environment, structure of the energy sector and project profiles or characteristics in identifying drivers of renewable energy development.

1.2 Problem Statement

Development of renewable energy requires significant resources and private investment or public private partnership has been identified as one of the approaches to spur renewable energy investments which is required to provide the needed sustainable energy to support economic development (Bhattacharyya, 2013; Hodge, 2007; Carbonara et al., 2015)

The African development Bank estimates that to achieve universal access to electricity by 2025, approximately US\$ 65 billion to US\$ 90 billion will be needed based on the Bank's ten (10) year strategy 2015-2025. The Bank further estimates that African governments currently invest only 0.3% of their GDP on average on energy development. At this rate of investment, it will take several years before the universal access to electricity is realised.

Eberhard, Gratwick, Morella, & Antmann, (2016) separately estimates that between 1990 – 2013, some US\$31 billion was invested in power generation in Sub-Africa (excluding South Africa) resulting in increase of capacity by 19GW. During this period, Independent Power producers contributed 23% (or approximately US\$ 6.9 billion) of the total investment.

The required scales of investment in the energy sector underscores the importance of involving private sector participation in supplementing government's efforts in upscaling renewable exploitation and development. A host of extensive research has focused on the drivers of private investment, especially the Independent Power Producers, in the energy sector in developed countries and in selected Sub-Saharan African countries such as South Africa, Nigeria, Uganda, Tanzania and Kenya (Eberhard et al., 2016). Out of these countries, Kenya has been identified as having demonstrated experience in attracting significant private sector interest in all forms of energy generation since 1996 and has shown signs of success in renewable energy development and increased interest by private investors, Kenya, therefore, provides a useful case study for drivers of renewable energy development.

Building on existing theoretical and empirical findings on drivers of renewable energy development, this study seeks to find out the drivers of renewable energy development in Kenya, especially at the investment entry level, through analysis of macro-level environment determinants, obtaining energy sector structural issues and the enabling project specific profiles and characteristics.

A study of drivers of renewable energy development in Kenya will provide useful insights that can be adaptable to other developing or middle-income countries especially in Africa

1.3 Research Questions and Scope

The main research question to be answered in this study is "*What are the determinants of successful renewable energy development in a middle income country?*" To achieve this objective; the study focuses on the assessment of the macro-business environment factors, energy sector structure and project profile in Kenya by answering the following specific questions:

- a) What are the macro-economic variables necessary for renewable energy development in Kenya?
- b) What are the sector specific conditions promoting interests in the renewable energy sector in Kenya?
- c) What are the renewable energy project characteristics/profiles that make renewable energy succeed in Kenya?

1.4 Purpose and Significance of the Research

This study seeks to assess the determinants of private investors' participation in renewable energy development in Kenya.

The findings from this study will be of significance to diverse groups of people and institutions as follows:

1. Consistent with the findings of (Hwang et al., (2013) who studied the Critical success factors and risk allocation in Singapore, this study will help both the public and private sector to better understand the risk factors for renewable energy, besides providing valuable information to investors that intend to invest in the renewable energy space in Kenya.
2. Investors; who in the quest for investment opportunities and need to diversify their portfolio, view renewable energy development as an avenue to achieve their investment aspirations. The investors could also use the results from this study to enrich their investment evaluation criteria by incorporating the macro-environment, sector structures and project level outcomes affecting strategic investment choices;
3. To provide information to investors who intend to invest in infrastructure procurements based on PPPs and to enhance understanding of country's profiles in terms of key drivers, CSFs and risk allocation
4. Governments and policy makers; in formulating policy issues affecting renewable energy development;
5. International investors can use the information to institute risk preventative strategies in their transactions; and
6. Academicians; as they seek to increase the frontiers of knowledge in renewable energy investments, private sector participation in renewable energy development and extending the principles of Sustainable Responsible Investment Principles to renewable energy space.

1.5 Assumptions, Rationale and Summary

This study seeks to assess the determinants of renewable energy development in Kenya focusing at the aggregate level. The analysis focuses on the renewable energy generally and has not focused on the individual renewable energy sources.

Further, the study attempts to address the drivers or determinants of renewable development in a developing country at the entry level. The study assumes that once the project is implemented, the conditions at entry point will continue to prevail to support the project during the operations phase. This research does not attempt to provide a screening criteria for renewable energy projects development.

The study focuses on a developing or middle-income country like Kenyan and employs a three-stage survey approach focusing on the context of the renewable energy investments as reflected

by the prevailing conditions in the macro-business environment, the structure of the electricity sector and project profiles or characteristics as determinants. The interdependence or interplay between these factors have not been assessed.

The rest of the paper is organized as follows: Section 2 presents the Literature Review; Section 3 describes the Methodology; Section 4 presents the Research Findings, Analysis and Discussions; Section 5 presents the Research Conclusions and section 6 describes the Recommendations for Further Research.

2 LITERATURE REVIEW

Renewable energy is touted as a reliable, secure and affordable source of energy and is seen as central to addressing many of today's global development challenges such as poverty, inequality, climate change, lack of energy access, food security and education (Bazilian et al., 2012, Deichmann et al., 2011, Sokona et al., 2012).

Indeed, a clear link has been established between energy consumption, wealth creation and economic development (Karekezi, 2002a, Bazilian et al., 2012, Bugaje, 2006). According to the Africa Energy Outlook publication by OECD/IEA, (2014), Democratic Republic of Congo, for example, is cited as a country that exhibits low electricity access rates (less than 9%) and dwarfed economic growth resulting partly from under exploitation of huge renewable hydro-potential. OECD/IEA (2014) further posits that a trilateral strategy of increased investment in the energy sector (to the tune of US\$ 450 billion), deeper regional and economic integration and better management of revenue and resources could boost the Sub-Saharan economy by 30% in 2040.

Consistent with the above findings, African Development Bank Group, (2018) points that close to 640 million Africans have no access to electricity and per-capital energy consumption in Sub-Saharan Africa (excluding South Africa) is low (180 KWh compared to 13,000 KWh in the United States and 650 KWh in Europe). African Development Bank Group, (2018) further asserts that poor infrastructure (energy included) shaves off 2% average Africa per capita growth rate. This implies that the benefits of electricity to social development such as health, education and reduction of the cost of doing business is not yet fully realized in Africa.

While renewable energy is seen having the potential to play an important role in providing sustainable energy to the vast populations in developing countries with no access to clean energy and despite its economic viability for several applications, its potential is yet to be fully realised due to several barriers to its penetration (Painuly, 2001).

The barriers to renewable energy development notwithstanding, investment in energy sources involves making strategic choices for any investor considering its demonstrable long-term impact and significant outlays of economic resources.

It is estimated, for example, that for countries to attain universal access to energy for all by 2030 as espoused in the United Nations' Sustainable for All (SE4AL) initiative, unprecedented levels of investment will be required for financing electrification projects and clean cooking energy (Bhattacharyya (2013). The International Energy Agency (IEA) puts such investments

outlay to be in the tune U\$14 Billion. Such scale of investments cannot be met by the governments alone and involvement of private sector players is central. The African Development Bank estimates that African governments annually allocates only 0.3% of their GDP to energy development and observes that this level of contribution to energy budgetary is low compared to approximately 4.2%-4.4% required to provide meaningful capacity growth.

Several studies have been undertaken on the barriers to renewable energy development. Beck & Martinot, (2004) identifies a variety of factors including conventional forms of energy, high initial capital costs, lack of fuel price adjustment, imperfect capital markets, lack of skills and information, poor market acceptance technology prejudice, financing risks and uncertainties, high transaction costs and a variety of regulatory and institutional factors as some of the barriers to renewable energy development.

These challenges still abound in most developing countries and a shift in focus is being seen in the exploitation of mini and micro-energy sources, which ensures that the energy sources benefits the population around the resource endowments. Indeed, the development financial institutions like the World Bank and the African Development Bank are encouraging the exploitation of mini and off-grid energy sources and are developing tailor-made financial products for renewable energy sources using the micro and mini-grid technologies to target populations located around the resource endowments and without transmission or distribution infrastructure.

Some of the approaches to overcome some of the challenges in the exploitation off-grid and min grid energy solutions lies in the employment of innovative business models. Ngoepe et al., (2016) in a review of innovative business models lauds the use of Pay-As-You-Go (PAYG) as the most popular end-user financing model where customers pay a deposit for a device (e.g for Solar PVs) to be installed in their homes and make regular payments through their phones over times. There are also a number of energy access enterprises working in collaboration with Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs) to unlock markets and build capacity for exploitation of off-grid renewable energy solutions.

Institutional barriers to renewable energy includes the size of most of the power systems which are too small to support meaning exploitation of renewable energy sources, (Eberhard & Shkaratan, (2012). By 2014, for example, Sub-Saharan African countries had a combined installed capacity of 92 GW out of which, half was controlled by South Africa with only 14 of the remaining countries have installed capacity of more than 1GW (Eberhard et al., 2016). This

calls for investment in capacity expansion strategies for renewable resource endowed countries if exploitation of such resources are to be accelerated including lessening disruptions into the power systems stability.

Karekezi & Kithyoma, (2003) identifies poor institutional framework and infrastructure, inadequate planning policies, lack of coordination and linkages in the renewable energy programme and pricing distortions as some of the impediments to renewable energy development. Deichmann et al., (2011) documents ability and willingness to pay by consumers as one of the deterrents to renewable energy development and remains key determinants for both expanded, centralized and decentralized service provision. They have also cited inadequate grid connection, which is generally to the account of the consumer as a further deterrent to full service provision. However, considering the growth in electricity demand occasioned by economic and population growth, the power systems have been expanding and the need for increased generation is expected to motivate more private sector participation.

They further identify high initial capital costs, weak dissemination strategies, lack of skilled manpower, poor baseline information and weak maintenance services and infrastructure. However, according to figures from the International Renewable Energy Agency (IRENA, 2018), renewable energy technologies have experience price reductions over the last ten years.

IRENA estimates that Solar PV have dropped by close to 75% between 2010-2017 while wind-turbine prices have dropped by 50% over a similar period driven largely by technological improvements, higher Solar PV modules efficiencies and larger turbines. Such significant capital cost reductions will result in lower tariffs making renewable energy technologies to compete with their conventional energy technology peers

Exploitation of renewable also experience challenges stemming from labour unions resistance, tariff increases precipitating protests from industrial and residential consumers, and accusations of corruption and collusions which painted the image of the reform process negatively (Karekezi & Kimani, (2002).

South Africa, for example, in its draft Integrated Resource Plan for Electricity (IRP draft 2018) projects a shift away from the current reliance on coal, to a mix dominated by renewable energy where coal is expected to contribute 34,000MW (36%), gas 11,930MW (16%), wind 11,442MW (15%), Solar PV 7,958MW (10%), hydro 4696MW (6%), pump storage 2,912MW (4%), nuclear 1,860MW (2.5%), and CSP 600MW (1%), and by 2030.

However, Eskom in its 2018 annual report specifically cites that by 2022/23, increased generation from IPPs will be approximately 19,833 GWh and is expected to increase its cost by ZAR 4.2 billion at an average price of ZAR 226c/KWh. Eskom further states that the IPPs will place significant burden cost on its primary energy cost considering that IPPs costs exceeds its short-run marginal costs and any replacement of its plants which are largely coal based which result electricity price increases.

Such sentiments signals resistance to renewable energy developments from both the off-takers perspective and consumers with the resultant effect of slowing down the growth of renewable development. In Kenya for example, a US\$ 150 million Kinangop wind project development was halted after the resistance from the surrounding communities.

Risk perception has also been cited as another barrier that has contributed to stagnation of renewable energy development. Masini & Menichetti, (2013) notes that investors are reluctant to allocate resources to new technologies that guarantee uncertain returns. This view is, however, contestable considering that investment in Renewable Energy can be viewed as a risk management tool for both public sector and private sector players through risk diversification.

Kenya and Uganda, for example, have experienced serious episodes of electricity shortages stemming from droughts that effected Kenya (in 1990 and 1999) and the reduced hydrological conditions that affected water water-levels in Lake Victoria significantly affecting electricity generation in Uganda in 1998 and 2008 Kapika & Eberhard, (2013). As a result, these two countries resorted to deployment of expensive emergency power from thermal sources such as Aggrekko.

It can therefore be argued that considering that approximately 80% of the global energy supplies rely on depletable fossil fuels which create significant energy security risks, the exploitation of renewable energy provides a diversification effect both to the government in terms of electricity mix and to the private sector in terms of portfolio diversification (Wüstenhagen & Menichetti, (2012).

In a bid to address some of these barriers and spur renewable energy development, a number of measures have been undertaken by governments. One of the significant measures involved unbundling of the electricity sector into separate generation, transmission, distribution and marketing companies. This was driven by funding constraints, underperformance of utilities and pressures from multi-lateral and bilateral financial institutions.

A host of studies have been dedicated to investigating the influence of electricity sector reforms in attracting private sector participation in the energy sector and especially renewable energy investments. Wüstenhagen & Menichetti, (2012) for example found out that technological improvement (that have led to reliability), declining costs of renewable energy options and renewable energy policies that have created new market opportunities for renewable energy development.

Woodhouse, (2006) posits that the power sector reforms that occurred in Chile, England and Wales and which advocated for unbundling of utilities, provided a template upon which many electricity reforms in developing countries have been benchmarked. Other reform measures include governments subsidizing capital investments in renewable energy and enacting measures and policies to increase renewable energy share in electricity production mix and to internalize the associated advantages (Frey & Deborah, 2002).

Researchers have also underscored the importance of energy planning in attracting investments in energy supply. It has been noted, for example, that energy capacity planning increases a country's ability to anticipate and respond to rapid changes occurring and arising opportunities (Bazilian et al., 2012).

Generally, energy planning reduces investment uncertainty risk and allow investors to plan their investments accordingly. Countries such as Kenya and Uganda employs the Least Cost Power Development Plan approach to the sector planning while South Africa relies on the Integrated Resource Plan to plan for the deployment of renewable energy and retirement of old plants.,

While some of the above challenges persist, the contribution of private players in accelerating electricity development in most markets cannot be gainsaid. Apart from purely private investments in the energy sector, Public-Private Partnerships (PPPs) models have also gained currency. PPPs can be traced to economic development in American and British Public Policy in the late 1970's and emerged post-privatization to save governments money and to make the economies run efficiently by broadening sphere of activity directed by market forces (Clyde & Brenda, 1992).

Private participation in the energy sector can therefore be looked at both from purely Independent Power Producer perspective or Public Private Partnership Arrangement. Public Private Partnership (PPP) involves a partnership between the public sector and the private sector for the purposes of delivering a project or services that were traditionally provided by the public sector (Chowdhury, Chen, & Tiong, 2011).

In the United Kingdom, PPPs, also synonymous with Private Finance Initiative (PFI), was widely used in the 1990's in response to stakeholders changing preferences and risk bearing attitudes towards ownership and control (De, 2004; Baldwin, 2013).

PPPs, considered as an alternative to privatization, are seen as a qualitative jump ahead in the effort to combine the strong side of the public sector and the private sector; where public sector makes use of private capital as a financing tool (Hodge, 2007).

2.1 Public – Private Partnership Development Model & Renewable Energy

Motivations of Public-Private Partnerships are seen as consisting of a series benefits for both public and private sectors. Such benefits include reducing public sector costs, fast delivery of infrastructure, high efficiency, stability and sustainability assumed responsibility, private management, elimination of risk and more improved quality of services.

Considering that significant investments are required to deliver energy projects, private sector participation and PPP models are seen as one of the strategies for delivery of renewable energy projects. International Energy Agency, for example, estimates that approximately U\$14 Billion is required for electricity access while Bhattacharyya (2013) estimates that out of the investment required to attain universal access to electricity, 50% will be through private public partnership arrangements.

Komendantova et al., (2012), notes that while public financing has contributed to the major share of investment in renewable factors, the scale of investment required and the drain on public budget including missing on the efficiency gains that the private sector involvement portends casts doubt on the sustainability and attractiveness of the model of government involvement).

Further, faced with budgetary constraints and the increasing need for development of infrastructure, governments are seeking new ways to financing public utility. One option is through involvement of private sector which rests on using such models as public private partnership (PPP) approach (Carbonara et al., 2015).

Babonea, (2014) sees a confluence of renewable energy and regional development and contends that if governments finds the needed funding to develop the renewable energy resources, it could provide positive regional developmental effects, which are geared towards job-creation, reducing unemployment, promoting activities with low environmental impacts as well as supporting the well-being of citizens.

Chowdhury et al., (2011); Babonea, (2014) cites drivers of PPPs as fiscal deficits, budgetary pressures, demand-supply gaps, inefficient public service to infrastructure, gaining operational efficiency, innovative technological and management skills, achieving expertise from the private sector and achieving more involvement of private players in public service.

Kumaraswamy & Zhang, (2001) on the other hand cites inadequate public financial resources, lack of domestically accessible advanced technology as providing impetus for governments to turn to international private sector for development of public infrastructure. They contend that PPP transactions require favorable legal, political and economic environments and co-operative between the public and the private sector.

Carbonara et al., (2015) contends that while PPPs portend numerous benefits such as provision of efficient, lower-cost and reliable public facilities, improving quality and efficiency of infrastructure services and promotion of local economic growth and employment opportunities, they are also fraught with high risks emanating from the multiplicity of stakeholders involved, huge capital outlay and long-concession period.

This contrasting view on PPPs is also held by Ng & Loosemore, (2007) who argues that concessions, a form of PPP, involves high waste, rework and transaction costs and complex tendering arrangements and post-tendering negotiations. They argue further that PPPs increase public sector risk and in some cases are not economical unless compensated by service charges to the public in terms of premiums.

Chou & Pramudawardhani, (2015) while observing that PPP are an effective and established strategy for procuring infrastructure projects also points out that not all projects implemented under this framework have been successful on account of inappropriate risk allocation and lack of information on success factors in specific countries.

2.2 Critical Success Factors for Private Investments and PPPs in Renewable Energy Development

Critical Success Factors (CSF) are classified as inputs, distinct characteristics and conditions which in the appropriate environment, interact as independent variables and play an important role in the project success (Pandremmenou, Sirakoulis, & Blanas, 2013). While these factors are adaptable to many PPP transactions, specific CSFs have been identified in many studies involving development of renewable energy.

United Kingdom is touted as one of the most successful countries in implementing PPPs for infrastructure projects (Chou & Pramudawardhani, 2015). The success is attributed to efficient

communication among the parties on the issues regarding risk allocation (Chou & Pramudawardhani, 2015; Bing et al., 2005).

In Singapore, in a study of risk and preferred risk allocation for PPP projects; well-organised agencies, appropriate risk allocation and sharing and strong private consortium were identified as positive factors for renewable energy development while negative factors were viewed as delays in concluding transactions, high transaction costs, unclear government objectives, evaluation criteria, lack of experience and appropriate skills (Hwang et al., (2013).

S. T. Ng et al., (2012), on the other hand, found that, acceptable tariff, cost effectiveness, financial attractiveness, existence of long-term demand for the proposed services, availability of strong- private sector consortium, alignment with government strategic objectives and reliable service delivery were some of the factors that were ranked by both the private and public sector as Critical Success Factors for renewable energy development in Hongkong

Citing evidence from European countries and using Panel data estimation for the period covering 1990-2007 and focusing on a set of twenty-three (23) European Countries , António & Fuinhas (2012) analyzed a number of Public Policies Promoting Renewables. The researchers found that measures such as quota obligations, Product labeling, Research and Development or tradable certificates did not produce desired effects of increasing renewables.

On the other hand, António & Fuinhas (2012) found that incentives and subsidies policies such as feed-in-tariffs and policy processes such as strategic planning did prove effective in fostering Renewable Energy Development in the selected European Countries.

Marques & Fuinhas, (2012) empirically tested the public policies driving development of renewable energy in a large number of European countries and found that policy of incentives such as subsidies and Feed-in-Tariffs proved to be significant drivers of Renewable Energy Development.

In a different study of factors motivating renewable energy in European countries, Marques et al., (2010) using a panel data technique reviewed the effects of political, socio-economic factors and country specific factors motivators. They found lobby pressure, CO₂ emissions and incomes as important drivers of renewable energy investment as drivers. They also cited oil booms and busts, social and political pressure for developments in clean energy and financial crisis (requiring governments to boost their economies) as drivers of renewable energy development post 2006.

In Brazil, tariffs regimes have been identified as CSFs for renewable energy development. Policies allowing utilities to purchase renewable power at higher prices than conventional electricity with the costs being spread among the whole customer base and allowing IPPs to supply electricity on a competitive basis to third parties and receiving open access to transmission and distribution system based on wheeling fees were cited as drivers of private sector participation (Martinot et al. 2002).

Alagappan et al.,(2011) reviewed the impact of factors such market structure (restructured vs non-restructured); use of feed-in-tariffs and anticipatory transmission planning in a study involving 14 countries. They found that market restructuring does not affect renewable energy development. On the contrary, countries with Feed-in-Tariff policies, anticipatory transmission planning and where end-users pay for interconnection costs had the highest percentage of installed capacity of renewable energies generation.

The feed-in Tariff as a driver was attributed to its clarity and certainty while anticipatory transmission planning was lauded as assisting the renewable developers with planning as to when, where and how they will obtain transmission access.

In a separate study, Alagappan et al., (2011a) found that transmission planning is very critical for the development of renewable energy from a private developers' perspective. They concluded that, markets with best sites, high Feed-in-Tariffs, anticipatory transmission planning and low interconnection cost to renewable developers promote renewable energy development while market structure only has a small impact.

Alagappan et al.,(2011) indicated that while these policies may lead to high penetration of renewable energy development in the short run, the attendant costs to the tax-payers in the long-run may be a burden bringing to question the sustainability of investment in renewable energy developments.

Beck & Martinot, (2004) agrees that transmission infrastructure is necessary because certain renewable resources are located away from population centers and transmission access is required to facilitate sale of energy from third-party developers to the utilities or consumers.

In a review of 40 independent power projects in Africa, (Eberhard & Gratwick, 2008), attributed the success of IPPs in North Africa to attractive investment environment, more robust policy framework, fewer planning mishaps, abundant low cost fuel and secure contracts as well as credit enhancement instruments than in their Sub-Saharan Africa counterparts.

These findings are consistent with those of Eberhard & Gratwick, (2011) who identified the determinants of success of private sector investment in the energy sector as favourable investment climate, clear policies and regulatory framework, effective planning, procurement and contracting policies and practices.

In a similar study, Eberhard & Gratwick, (2011a) cites clear policy frameworks, clear, fair and consistent regulatory frameworks, coherent power sector planning linked to procurement and contracting local participation, long-term Power Purchase Agreements, participation of Development finance institutions (including bilateral and multi-lateral lenders); sourcing of financing from local markets where debt capacity exist, credibility of partners & Project sponsors and security enhancements such as PRGs, Sovereign guarantees and government support as determinants of renewable energy success

Baldwin (2013) observes that for PPPs to be successful, a number of variables including macro-economic environment, legal and regulatory regimes, project specific factors such as contracts and public-private participants' agreements to risk allocation must be right. Political risk has also been identified as one of the key stress factors and that has emerged as one of the greatest fears of the private investors in PPP transactions (Babonea, (2014).

Technological advancements have also been cited as a strong drivers for renewable energy development (Wüstenhagen & Menichetti, 2012). The argument is that as the cost of Renewable energy technologies have been on the decline as a result of technological development, deployment and economies of scale.

Nevertheless, even after the private sector players have been attracted to an investment jurisdiction, the continuing operating conditions can ensure continued success or attract future private players into the country. Challenges including cancellation of contracts, review of tariffs mid-stream, escalating investment costs and post-contract changes such as those characterized by the initial development of IPPs in countries such as Kenya, Nigeria, Tanzania and Ghana are likely to discourage private sector participation (Eberhard & Gratwick, (2011a).

Bugaje, (2006) finds that weak institutional framework impedes the development of renewable energy. The author prescribes a number of policy measures to address this situation such as introduction of comprehensive standards and codes of practice, promulgation of appropriate legislation to support the institutional framework, integration of renewable energy development with environmental and training of quality personnel at both technical and engineering levels among other factors.

Chou & Pramudawardhani, (2015) notes that while Indonesia is a much sought after PPP investment destination, PPPs implementation have remained problematic on account of unmanageable risks surrounding government projects especially with regards to land acquisition.

Carbonara et al., (2015) concludes that several studies dedicated to risks in PPP have not found an exhaustive or risks and allocation strategies that are applicable to all risks associated with PPP projects and concludes that a PPP project may be exposed to and are affected by a number of factors such as the type and scale of the project, the country where the project is allocated and the sector.

While most of the factors investigated from the above studies are similar or related, different approaches have been adopted by the researchers. Zhang & Asce,(2005) adopted a systematic approach involving carrying out extensive literature review to identify critical success factors in previous researches, drawing experience from successful projects and failed ones, and through interviews and correspondences with PPP practitioners and experts. The CSF identified from the above steps were then consolidated into main aspects and sub-aspects and presented in a questionnaire which was then used to solicit expert opinions on the relative significance of the CSFs.

Chua, Kog, & Loh, (1999) on the other hand adopted an Analytical Hierarchical Process (AHP), used widely for multicriteria decision making, to survey expert opinions on CSFs for construction industry. The study considered 67 success related factors grouped under four main project aspects, namely, project characteristics, contractual arrangements, project participants and interactive processes.

The approaches of study adopted notwithstanding, there is almost a consensus among authors on the set of factors that can be considered as CSFs for PPP projects. The table below highlights a sample of studies on CSFs and the set of CSF considered which can form a basis of subsequent studies and research.

Table 2.2-1: Summary of Sample studies on CSF for PPPs

Authors	Critical Success Factors	Success Sub-Factor/Indicator
	Favorable Investment Climate	1) Stable Political Systems 2) Favorable Economic Systems 3) Adequate Local Financial Market 4) Predictable Currency Exchange risk

Authors	Critical Factors	Success	Success Sub-Factor/Indicator
(Zhang & Asce, 2005)			<ul style="list-style-type: none"> 5) Predictable and reasonable Legal Framework 6) Government Support 7) Supportive and understanding community 8) The Project is in Public Interest 9) Predictable Risk Scenarios 10) The Project is well suited for privatization 11) Promising economy
	Economic Viability		<ul style="list-style-type: none"> 1) Long-term demand for products/services 2) Effective Project Organization 3) Strong and Capable Project Team 4) Good relationship with host Government 5) Partnering Skills 6) Rich Experience in International Project Management 7) Multidisciplinary Participants 8) Sound Technical Solution 9) Innovative Technical Solution 10) Cost –Effective Solution 11) Low environmental impact 12) Public Safety and health considerations
	Sound Package	Financial	<ul style="list-style-type: none"> 1) Sound financial analysis 2) Investment, payment and drawdown schedules 3) Sources and Structure of main loans and standby facilities 4) Stable currencies of debt and equity finance 5) High Equity/Debt Ratio 6) Low financial charges 7) Fixed and Low interest rate financing 8) Long-term debt financing that minimizes financing risk 9) Abilities to deal with fluctuations in interest/exchange rates 10) Appropriate toll/tariff level and suitable adjustment formulae
	Appropriate Allocation versus Reliable Contractual Arrangements	Risk versus Contractual	<ul style="list-style-type: none"> 1) Concession Agreement 2) Shareholder Agreement 3) Design and contract agreement 4) Loan agreement 5) Insurance Agreement

Authors	Critical Factors	Success	Success Sub-Factor/Indicator
			<ul style="list-style-type: none"> 6) Supply agreement 7) Operation agreement 8) Offtake agreement 9) Guarantees/Support/Comfort Letters
(Chou & Pramudawardhani, 2015)	Stable Economic Environment	Macro-	<ul style="list-style-type: none"> 1) Sound economic policy 2) Favorable Legal Climate 3) Stable Macro-economic conditions 4) Appropriate Risk allocation and sharing 5) Available Financial Market
	Shared Responsibility Between Public and Private sectors		<ul style="list-style-type: none"> 1) Multi-Benefit objective 2) Shared authority between Public and Private Sectors 3) Commitment and responsibility of private and public sectors 4) Project Technical Feasibility 5) Thorough and realistic assessment of the costs and benefits
	Transparent and efficient procurement processes		<ul style="list-style-type: none"> 1) Competitive Procurement Process 2) Transparency procurement process 3) Well –organized and committed public agency 4) Clarification of Contract Documents 5) Clear defined responsibilities and roles
	Stable Political and Social Environment		<ul style="list-style-type: none"> 1) Political Support 2) Social Support 3) Outstanding Private Consortium 4) Good governance/Government Support
	Judicious Government Control		Government involvement by providing guarantee

2.3 Overview of Renewable Energy Development in Kenya

Kenya is considered among the African countries that has liberalized its energy sector and has also enacted PPP legal framework to spur private sector participation in its economy. The Kenya's Power sector was liberalized in 1995/6 where private sector participation was introduced to provide stop-gap measure to the electricity rationing challenges of that time and followed by the enactment of the electric power Act of 1997 which set in motion the unbundling of the sector (Katharine & Gratwick, 2007).

Part of the reforms saw the creation of independent regulator, increased private sector participation, partial-privatization of two dominant government utility players in the sector and creating an independent agency for rural electrification and a Special Purpose Company for Geothermal Development. Further reforms continue to occur in the Kenyan Energy Sector following the adoption of the new constitution and review of the energy sector policy has been undertaken resulting in the development of the National Energy and Petroleum Policy.

The potential of renewable energy in Kenya is put at between 10,000 MW and 32,000 MW out of which only 5%-10% or 1,471 MW has been exploited²². This scenario portends that the potential for renewable energy investments is still enormous and its exploitation has the potential effect of contributing positively to economic development.

On realization of the huge energy potential and attendant economic impact, the Government of Kenya in its energy development plans addition of approximately 5,000 MW of new energy sources by 2020 out of which approximately 2,318 MW (representing 42% of the total projected new generation) will come from renewable energy. Among the renewables, geothermal and wind energy are expected to be the main contributors to the country's planned generation capacity accounting for 71% and 27% respectively while hydro and co-generation sources will only account for 2%.

As of June 2015, the Kenya electricity sub-sector comprised of ten (10) independent power producers (IPPs) as compared to ten years ago when the number of private generation companies were only four namely Westmont, Iberafrica, Tsavo, and Orpower (Eberhard & Gratwick, 2012). Still with this level of private involvement, approximately 70% of the electricity generation capacity is controlled by the public sector.

²² Kenya Energy Regulatory Commission

This scenario is projected to change considering the statistics in the Kenya's electricity medium plan development which suggests that over the period 2015 to 2018, 14% (195.7 MW) will be developed by the Kenya Electricity Generation Company; a government controlled company, 29% (400 MW) will be Hydro-Power imports from Ethiopia government and the remaining 57% (801 MW) will be developed by additional sixteen (16) different independent power producers³.

Further, as revealed by statistics from the Offtaker's (Kenya Power & Lighting Company) annual report, the IPPs participation in the sector over the last ten years in Kenya has grown at a compounded annual growth rate of 13%. This growth has largely been driven by private investments in the renewable energy sources which have grown at a compounded annual growth rate of 30% as compared to private investments in the fossil energy sources has had a compounded annual growth rate of only 11% over the same period.

The investments by the private investors in renewable energy development is projected to increase the number of private players from the current four to twenty IPPs underscoring the increased private sector participation in the Kenyan energy sector and especially on renewable energy platform.

One of the other investment approaches being adopted in the sector is Public Private Partnership development strategy. As part of this strategy, the government on its own or through its agencies will partner with private players in the delivery of the planned energy projects.

Various incentives to attract private sector participation into the sector have been put in place by the Kenya's Ministry of Energy especially targeting renewable energy investors. Some of the policies include the adoption of the Feed-in-Tariff (FiT) Policy for wind, small hydros and biomass resource generated electricity. The Feed-in-Tariff is aimed at attracting private sector investments in electricity generation from Renewable Energy Sources (RES). The feed-in-Tariff policy is also aimed at providing investment security and market stability for investors.

Drawing from the above literature review, this study takes a different methodological approach to study the drivers of renewable energy investments in Kenya., The study takes a three (3) stage approach involving the review of a set of factors under macro-business environment, energy Sector structure and project profile to identify the drivers of renewable energy in Kenya.

³ The list of committed projects between 2015 to 2018 is shown as Appendix 1

The figure shows the researcher’s choice of the variables and their relationship which informs the framework for the study.

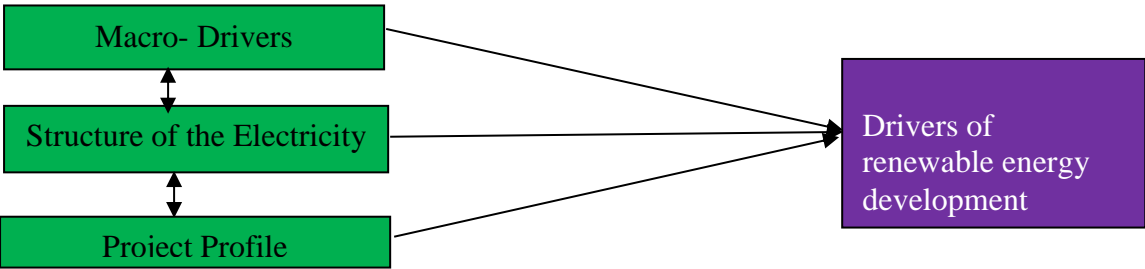


Figure 1: Conceptual Framework for the Study

In this study, macro-drivers encompasses a host of macro-economic, political and governance dynamics in an economy that may promote or impede project development. Such factors included the general political goodwill in the county, government commitment to renewable energy development, independence of the regulator, country’s development plans, economic growth and quality of the country’s governance systems.

Structure of the electricity sector is concerned with the factors necessary for the proper functioning and management of affairs of the players in the sector. Key considerations would include quality of laws and regulations, existing renewable energy policies and standards, quality of contracts such as Power Purchase Agreements, quality of power distribution and transmission infrastructure, procurement procedures and systems, independence of the regulator and financial strength of off-taker.

Project profile encompasses dimensions such as environmental and social standards, bankability considerations and technology and capacity factors. Considering that most renewable energy resources are found in remote and hard-to reach areas, sustainable exploitation of the resources, environmental and stakeholders’ management is critical. This requires adherence to international environmental standards and guidelines and crowding in or winning the support of the local population and communities for the Project. The general expectations on environmental and social issues and how are they managed form a key consideration for investors wishing. Bankability considerations looks at the investment risks and available risk mitigation instruments that are available to investors to enable them receive adequate returns on their investments. Other factors include the maturity of technology to be deployed and human capacity factors in a jurisdiction.

The general expectation is that the preference for investors would vary among the factors and some factors will be preferred more than others. However, the positive prevalence of all the factors would be considered ideal to promote private sector involvement in renewable energy sector.

3 RESEARCH METHODOLOGY

This Section provides the approach, steps and methods to undertake the study. The chapter gives details of the research design, variable description, population, sampling techniques and sample size determination. The chapter also describes research instrument, data collection and data analysis.

3.1 Research Design

The study employed deductive qualitative design which uses analytical categories to describe and explain social phenomena (Bryman, A; & Burgess, 1994). A qualitative research approach assists to answer the “why” and “how” type of questions which form the cornerstone of this study (Yin, 2009).

Deductive research design was be used to test the theory and use the theory to guide which questions to ask (De Vaus, 2001). Borrowing from (S. T. Ng et al., 2012), the study entailed carrying out comprehensive literature review to identify the various critical success factors assessed by researchers. Using these theories and through identification of emerging themes/variables from the literature review, propositions were developed and assessed through analysis of data.

The deductive research design has been combined with descriptive cross-sectional analysis to describe the findings at the single point in time. Given the dynamic nature of the themes under study, the findings of the study are attributable to the factors promoting PPPs at the current state since variables and factors tend to evolve and change over time.

3.2 Variables

The main variables examined in this study were the macro-economic drivers, structure of the electricity sector and project profile.

The macro-variables consisted of a set of questions asking the respondents to rate a number of factors based on a likert scale. The macro-variables were further assessed using sub-factors that have been reviewed in previous studies and that the researcher believe characterises the nature of macro-environment for renewable energy development. Such factors included the level of political support in the county, government commitment to renewable energy development, independence of the regulator, country’s development plans, economic growth and quality of the country’s governance systems.

The structure of the electricity sector variable focused on assessing the quality of laws and regulations, existing renewable energy policies and standards, quality of contracts such as

PPAs, quality of power distribution and transmission infrastructure, procurement procedures and systems, independence of the regulator and financial strength of off-taker.

Project profile variable was considered as the their tier driver and focused on project characteristics that would make developers consider investing in renewable energy projects assuming the macro-environmental and electricity sector structure are conducive. such environmental and social standards included an assessment of quality of local environmental laws and standards, stakeholder support for renewable energy development and ease of obtaining way leaves and access to renewable energy sources;

Another project characteristics that was reviewed on the study focused on bankability considerations and assessed factor such as electricity tariffs, ease of raising and cost of capital, availability of credit enhancement instruments, electricity despatch guarantee, demand factors, availability of reports and studies on renewable energy development, participation of MFIs and DFIs and financial strength of the off-taker.

Technology and capacity issues were also assessed as part of project profile and focused on the availability of skills, proven technology and credible partners to implement projects.

The main variables were measured using a nominal type of measurement scale.

3.3 Population and Sampling

The population and respondents for this study were be drawn from groups of experts who have interacted or undertaken PPP transactions at various levels. The target population consisted participants drawn from of the following institutions and sampling frame i) Relevant government departments and agencies (Including Ministry of Energy, National Treasury, Public Private Partnership Unit; Geothermal Development Company Limited, Kenya Electricity Generating Company, Kenya Power & Lighting Company and Energy Regulatory Commission); (ii) Private sector (including developers, contractors, consultants); (iii) Financial Institutions (including Development finance institutions, Investment Bankers and commercial banks) and (iv) Academic and research institutions.

Government ministries and agencies were targeted for the study because of their role in crafting various policies that affect the business environment. Ministry of Energy and Petroleum is responsible for developing policies affecting the energy sector. The main government agencies involved in renewable energy development are also owned and controlled by the government.

The main government institutions included the autonomous and independent regulator (the energy regulatory commission) which also receives the bulk of its budget from the government,

the off-taker (Kenya Power and Lighting Company Limited) which is 51% owned by the government, the Kenya Electricity Generating Company (KenGen) which provides almost 70% of the total electricity generated in the country and in which the government has 70% ownership control and Geothermal Development Company which is 100% owned by the government and was formed as a special purpose vehicle to fast-track geothermal development (a form of renewable energy) in the country. The actions or inactions of the government and these entities on renewable energy development is likely to affect the risk appetite and perception of private players' interest in renewable energy investment.

The Public Private Partnership (PPP) unit is also a government department responsible for approving PPP transactions and processing credit enhancement instruments such as the Government Letter of Support while the National Treasury provides budgetary support to the government agencies and also in conjunction with or through the Central Bank and Kenya Revenue Authority develops and implements fiscal and monetary policies.

The second category of respondents for the study were drawn from private sector. These proxy of private sector players were represented by the project developers, contractors and consultants. Project developers play a critical role in renewable energy as investor and therefore their views and perception provides a critical perspective on the suitability or lack thereof of a renewable energy development destination.

Consultants and contractors on the other hand could be engaged by the project developers and government to implement or provide advisory services on certain aspects of the transactions. The knowledge, information and perspectives acquired during such interaction could provide valuable feedback on the drivers of renewable energy investment in a country.

The third category of participants in the study targeted financial institutions. These were mainly drawn from commercial and development financial institutions. DFIs are the main providers of long-term debt financing and in some instances equity to private sector players investing in renewable energy. To enhance project bankability, DFIs also provide credit enhancement instruments such as Partial Risk Guarantees (e.g by African Development or the World Bank) and Political Risk Insurance (e.g by African Trade Insurance). The DFIs also provide budgetary support to the governments or directly to government agencies to implement renewable energy projects. Their perspectives on the renewable energy environment is therefore critical.

Commercial Finance institutions also participate in financing renewable energy developments albeit at a small scale through collaboration with DFIs. Moreover, the commercial financial

institutions are also able to provide debt financing in local currency to finance local project component costs. Their knowledge of local conditions is therefore relevant for this study.

The fourth category of respondents were drawn from the academic institutions and research disciplines. These category of respondents carry regular research and usually keep abreast with the developments in the business environment and their possible effects.

Stratified and purposive sampling techniques were employed to reach the above target population. A Sample size of 40 Participants was targeted with each cluster or strata targeting 10 respondents. This sample size was considered adequate for this study. The responses received were representative of the following groups:

Table 3.3-1: Respondents Field of Expertise

Category of Institution	Frequency (%)
Central Government	8
Government Agency/ Parastatal	31
Contractors	11
Developers	14
Consultants	6
Commercial Financial Institution	3
Development Financial Institution	14
Academic Institution	8
Others	6
Total	100

In terms of field of expertise, the representation was as shown in the table below:

Table 3.3-2: Respondents Field of Expertise

Field	Frequency (%)
Engineering	31
Finance	20
Law/Regulation	7
Planning	18
Procurement/Supply Chain	9
Scientist e.g Geophysicist, geochemists	9
Academics	2
Environmental/Social Scientist	4
Total	100

Source: Primary data/author

The heterogeneous nature of the responds provided useful information and insights that enable analysis and drawing of conclusions to support the objective of the study.

3.4 Data Collection Method

Data was collected through use of semi-structured questionnaires. The questionnaires were emailed to respondents and additional information obtained from review of relevant literature and industry sources such as the Off-takers annual reports, annual reports from the regulator and relevant publications on the study topic.

The questionnaires focused on questions targeting the four (4) major areas to aid in collecting relevant data to address each of the research questions posed by the study. The first part consisted of information about the respondents' profiles such nature of organisation, field of expertise, experience with PPP transactions, and experience with the different renewable energy sector technologies.

The second part of the questionnaire focused on collecting questions on the set of macro-economic variables while part three (3) of the questionnaire focused on capturing data related to the structure of the electricity sector and how it supports or impedes the development of PPPs in Kenya. Part four (4) collected information that was used to assess project specific factors and their influence to PPPs.

As part of the data collection process, respondents were asked to rate the factors from their own perspective using a 5-point likert scale. The questionnaire also provided the respondents the opportunity to add their own perceptions and contributions to the study.

A Sample of the questionnaire used for the study is attached as **Appendix II**

3.5 Data Analysis

Raw data from the field was summarized in Microsoft Excel and then exported to SPSS version 23 where descriptive statistics was used to analyze the data. To achieve this, data was analyzed by calculating Significance Indices of each of the CSFs and the sub-success factors under each CSF. The significance indices were then ranked to assess the relative importance of each factor to the study (Zhang & Asce, 2005).

To achieve this, 5-point Likert Scale was converted linearly from the 0-5 likert scale to 0-100 as shown in the table below:

Likert Scale	1	2	3	4	5
Significance Scale	20	40	60	80	100

The following formula was be used to calculate the Significance Indices:

$$S_i = \frac{20R_{i1} + 20R_{i2} + 20R_{i3} + 20R_{i4} + 20R_{i5}}{R_{i1} + R_{i2} + R_{i3} + R_{i4} + R_{i5}}$$

Where

S_i = Significance Index

R_{i1} = Number of responses as “1” for the i^{th} factor or sub-factor

R_{i2} = Number of responses as “2” for the i^{th} factor or sub-factor

R_{i3} = Number of responses as “3” for the i^{th} factor or sub-factor

R_{i4} = Number of responses as “4” for the i^{th} factor or sub-factor

R_{i5} = Number of responses as “5” for the i^{th} factor or sub-factor

The above formula gave significance indices between 0-20, where 0 implies least significant index and 20 implies most significant index.

3.6 Reliability of the data collection instrument

The internal-consistency method was used to determine the reliability of the research instrument. Both the overall and individual reliability of the study variables were tested. Cronbach’s Coefficient Alpha was used in the computation to determine how items correlated among themselves hence internal consistency. KR20 formula was used and the coefficient generated from all the variables tested showed a Cronbach’s Alpha Coefficient of 0.806. Reliability coefficient of 0.70 or more implies that there is a high degree of reliability (Peterson, 1994)

3.7 Validity of the data collection instrument

The definition and description of what was to be measured together with the research instruments were validated through expert opinions of senior researchers and supervisors. Construct and content validity was used to evaluate the extent to which question items were understood by the respondents to enable them give responses to the issues raised concerning critical success factors for PPPs in renewable energy development in Kenya. Each respondent was exposed to the same instrument which improved the validity of the research outcome (Bernard; H. Russell, 2006).

4 RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and analysis. The chapter proceeds to analyse the empirical data related to the drivers of Public Private Partnerships in Kenya. The chapter is subsequently divided into two parts. The first part discusses the demographics of the respondents. The second part, explains the findings with respect to the research questions posed in the study.

4.2 Respondents Background Information and Statistics

A total of forty (40) data collection questionnaires were distributed out of which thirty four (34) were fully filled and returned, giving a response rate of 85%. This response rate indicates that data was collected from a sufficient number of respondents and hence ensuring reliability.

The information about the respondents' were profiled by the nature of organization, field of expertise, number of years of working experience, current position in their company, involvement in any form of infrastructure development Project and experience with Public Private Partnership (PPP) Transactions. The statistics on each of the above respondents' profiles and aspects are presented below:

a) Nature of Organisation of the Respondents

The respondents were broadly targeted from organisations involving the Government, Contractors, developers, Financial Institutions and Academics. The representation of each category of respondents in the study is as shown in the table below:

Table 4.2-1: Respondents Nature of organization

Category of Institution	Frequency (%)
Central Government	8
Government Agency/ Parastatal	31
Contractor	11
Developer	14
Consultant	6
Commercial Financial Institution	3
Development Financial Institution	14
Academic Institution	8
Others	6
Total	100

Source: Primary data/author

As shown in Table 4.2-1 above, Government Agencies/ Parastatals registered the highest number of respondents at 31% followed by Project developers and Development Financial

Institutions at 14% and Contractors at 11%. These four institutions constituted 70% of the responses provided by the respondents. These groups form a core constituency for the study and therefore relevant for the study because.

The government representation was high because most of the renewable energy resources in Kenya are owned and managed by the Government through its various agencies and through private sector participation under various public private partnership models. Moreover, considering the significant amounts of investments involved, Development Finance Institutions being the major financiers of such projects also provided a relatively high representation of DFIs in the study at 14%.

b) Respondents Field of Expertise

The field of expertise of the respondents were as varied as shown in the table below:

Table 4.2-2: Respondents Field of Expertise

Field	Frequency (%)
Engineering	31
Finance	20
Law/Regulation	7
Planning	18
Procurement/Supply Chain	9
Scientist e.g Geophysicist, geochemists	9
Academics	2
Environmental/Social Scientist	4
Total	100

Source: Primary data/author

As shown in Table 4.2-2 above, the respondents were drawn from diverse backgrounds. In terms of professional background, engineering discipline accounted for the bulk of the respondents at 31% followed by Finance at 20% and Planning at 18%. These three fields of expertise constituted 69% of the responses received.

The rest of the respondents accounted for the remaining 31% of the field of expertise. This response statistics could be explained by the fact that renewable energy development being technical in nature supports the high number from the engineering field. Also generally, planning for renewable energy resources is done by the Government ministries and agencies while the relatively high responses from the finance field could be explained by the fact that a number of the respondents were also drawn from development finance institutions as shown in the table above.

c) Number of Years of Experience

The respondents were asked to indicate the number of years of experience. The results were as tabulated below:

Table 4.2-3: Respondents No. of Years of Experience

Years of Working Experience	Frequency (%)
Less than 6 Years	9
6-10 Years	21
11-15 Years	26
16-20 Years	15
21-30 Years	18
More than 30 Years	12
Total	100

Source: Primary data/author

Table 4.2-3 shows that respondents with varying experiences participated in the study, with the highest number being those of 11-15 years at 26%, followed by 6-10 years at 21%, 21-39 years, 18%, 16-20 years at 15% and more than 30 years at 12%. Those with less than 6 years were only 9%. This implies that 91% of the respondents had experience of 6 years and above.

The number of years of experience provides further credence to findings of the study as renewable energy development generally has a longer gestation period of development and would require years of observation and active participation to deeply appreciate and understand the factors and drivers of the sector. These statistics therefore imply that the respondents are able to provide competent feedback and information for the purposes of the study.

d) Position in the Company

The field of expertise of the respondents were as varied as shown in the table below:

Table 4.2-4: Respondents Position in the Company

Position in the Company	Frequency (%)
Senior Level Management	41
Middle-Level Management	50
Others Specify - Analyst, environment specialist	9
Total	100

Source: Primary data/author

Table 4.2-4 shows that half (50%) of the respondents were from Middle level management, whereas 41% were from senior level management and 9% only were from other levels of management.

This implies that the majority, 91% were drawn from the strategic and operations levels of their respective companies and are therefore in decision making category with regards to renewable energy development. The above findings are also consistent with the number of years of experience presented in table 4.2-3 above.

e) Involvement in Infrastructure Development

The respondents’ experience/involvement in infrastructure projects is as shown in the table below

Table 4.2-5: Respondents Involvement in Infrastructure Development Projects

Involvement	Frequency (%)
Yes	88
No	12
Total	100

Source: Primary data

Table 4.2-5 shows that the majority, 88% of the respondents have been involved in an infrastructure development project and involvement with such infrastructure projects meant that the respondents are able to relate with the dynamics of renewable development and therefore the study.

f) Nature of Projects

The respondents were asked to indicate the nature of the infrastructure development projects they have handled or which they have developed experience. The results were as shown in the table below:

Table 4.2-6: Nature of Projects of Sample Respondents

Nature of Projects	Frequency (%)
Purely Private Project	19
Purely Public Project	24
Public-Private Partnership Project	57
Total	100

Source: Primary data

Table 4.2-6 shows that the majority of the responses, 57% have been involved in Public-Private Partnership Projects, whereas 24% have been involved in only Purely Public Projects and another 19% have been involved only Purely Private Projects. Since most renewable energy projects in Kenya are being implemented either through public-private partnerships or through the government agencies, the respondents for this study therefore provide a good basis for generalisation of the findings to renewable energy development.

g) Shareholding Structure of Renewable Energy Projects in Kenya

The table below presents the indication of the shareholding structure of entities developing renewable energy projects in Kenya based on the responses:

Table 4.2-7: Shareholding Structure of Sample Companies

Shareholding Structure	Frequency (%)
Foreign	17
Local	12
Government	19
Mix of Foreign and Local	43
All of the above	10
Total	100

Source: Primary data/author

Table 4.2-7 shows that most of the respondents (43%) were from institutions owned by a mix of foreigners and locals, followed respondents from institutions with purely government shareholding (19%) and a further 17% from organisations with only foreign shareholding. Respondents from organisations with purely local shareholders accounted for (12%) and those from institutions with a mix of government, foreign and local shareholding accounted for 10%.

These findings indicate that most of the respondents were from institutions owned by both locals and foreigners and therefore provide a rich mix of views. This was followed by government shareholding at 19% reflecting the fact that some of the public agencies that participated in the study are in-charge of renewable energy development.

h) Experience with PPP Transactions

The table below presents the respondents experience with PPP transactions.

Table 4.2-8: Respondents Experience with PPP Transactions

Experience with PPP Transactions	Frequency
Yes	79
No	21
Total	100

Source: Primary data

Table 4.2-8 shows that majority of the respondents (79%) had experience with PPP transactions, whereas 21% had no experience. Since most of the renewable energy development projects are implemented through Public-Private Partnerships, the statistics indicate that the responses provided would be relevant to the study in Kenya.

i) Experience with PPP Transactions

The table below presents the respondents experience with PPP transactions.

Table 4.2-9: Respondents Years of Experience with PPP Transactions

Years of PPP Project Experience	Frequency (%)
0 Years (No experience)	21
Less than 3 Years	27
3-5 Years	27
6-10 Years	15
11-15 Years	9
Total	100

Source: Primary data

Table 4.2-9 shows that those respondents with experience of less than 3 years and those with 3-5 years' experience were each 27% , whereas those of 6-10 years comprised 15%, 11-15 years constituted 9% and those with no experience (0 years) comprised of 21%. This implies that the majority, 79% had varying experiences in PPP project transactions, while 21% had no experience at all. The higher the experience, the better the knowledge of PPP transactions.

j) Involvement with PPP Transactions

The respondents were also asked the number of PPP transactions they have been involved in and the results were as indicated below:

Table 4.2-10: Number of PPP Projects involved by Respondents

Number of PPP Projects involved	Frequency (%)
None	15
Less than 3	44
3-5 Projects	24
6-10 Projects	3
More than 10 Projects	15
Total	100

Source: Primary data

Table 4.2-10 shows that the highest number of respondents, 44% have been involved in less than 3 projects, whereas 24% have been involved in between 3-5 projects, 15% have been involved in more than 10 projects and 3% only have been involved in 6-10 projects. 15% of the respondents have not been involved in any project at all. This implies that the majority, 85% have been involved in different number of projects and therefore provide credence to the results of the study.

k) Sectoral PPP Experience

The sectoral experience of the respondents with PPP transactions are as shown in the table below:

Table 4.2-11: Sectors of the PPP projects Sampled for the study

Sector	Frequency (%)
Roads and Transportation facilities	12
Environmental pollution prevention facilities	3
Sewerage, Sanitation, Water Supply and Conservation facilities	5
Health and Medical Facilities	5
Cultural and educational facilities	3
Power facilities, public gas and fuel facilities	41
Major industrial, commercial or hi-tech activities	5
Social and Welfare facilities e.g. sports facilities	2
Urban/development of new towns	5
Cultural and educational facilities	3
Geophysical exploration	14
Total	100

Source: Primary data

The respondents were asked to indicate the sector that best represents the PPP projects that they have been involved. Majority of the respondents (41%) indicated involvement with Power facilities, public gas and fuel facilities, followed by Geophysical exploration (14%) and Roads and Transportation facilities (12%). This implies the majority of respondents at 41% had experience in the energy sector hence the relevance for the study.

l) Specific Experience with PPPs in the Energy Sector

In terms of experience with transactions in the energy sector, majority of the respondents indicated having experience with renewable energy projects such as Geothermal projects (37%), Wind (18%) and Solar (12%) and biomass/biogas (10%). 5% had experience with fossil-based fuels projects while 18% of the respondents had not experience with transactions in the sector. Overall, 77% of the respondents had experience with the renewable sector which is relevant for the study as shown in the table below:

Table 4.2-12: Respondents Involvement in PPP Transactions

Number	No of Respondents
Solar	12
Geothermal	37
Wind	18
Biogas	3
Biomass	7

Number	No of Respondents
Others (Thermal/fossil fuel/min hydro/coal)	5
None	18
Total	100

Source: Primary data

In conclusion, the profile of the respondents shows that the respondents had a good grasp of the renewable energy development in general and therefore were a valuable source of information for the the study.

4.3 Research Questions and Study Findings

This section presents the findings of the study in relation to each of the research questions which the study sought to answer. The findings are presented for each factor in the sections that follows:

A. Macro –Drivers and Structure of The Electricity Sector

The study sought to identify the key macro-drivers and sector specific factors promoting renewable energy development in Kenya. To achieve this objective, the respondents were asked to rate a set of the following factors.

Table 4.3-1: Macro-drivers for renewable energy

	Parameters
1	Political Support
2	Government Commitment to Renewable Energy
3	Government Support to Off-Taker
4	Independence of the regulator
5	Country's development Plans
6	Economic Growth
7	Country's governance systems

Source: author

The respondents were asked to rank a set of macro-factors on a scale of 1-5 where 1 is Strongly Disagree and 5 is Strongly Agree.

The analysis of the above factors are discussed in the sections below.

Table 4.3-2: Macro-drivers and structure of electricity factors

	Macro-Drivers	Structure of the Electricity Sector
1	Political Support	Government Commitment to Renewable Energy
2	Country's development Plans	Government Support to Off-Taker
3	Economic Growth	Independence of the regulator
4	Country's governance systems	Financial Strength of Off-taker
5		Government Support to Off-Taker

Source: Author

1. Macro-Drivers

The macro-variables focused on the assessment of political support; country development plans, economic growth and country's governance systems. The respondents ranked the factors as shown in the table below:

Table 4.3-3: Respondents Results for Macro-Drivers

	Parameter	Responses					Significance Index	Rank
		Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree		
1	Political Support	0	3	10	12	8	75%	1
2	Country's development Plans	1	4	9	12	7	72%	2
3	Economic growth	1	4	11	13	3	68%	3
4	Country's governance systems	3	9	11	7	2	58%	4

Source: Primary data/author

As shown in the table 4.3-3 above, the results show that the main macro-drivers of renewable energy investments in Kenya are political support (75%), country's development plans (72%); economic growth (68%) and county's governance systems at 58%. The results imply that Kenya's government political support for renewable energy is favourable and the country has sound development plans such as the Vision 2030 which provides clear guidelines for the growth of the economy and hence demand for electricity. Interestingly, the country's governance systems was not rated highly as a driver of renewable energy development in Kenya.

To further gauge the respondents perception of the macro-conditions and their influence on renewable energy development, the respondents were asked to rate their overall view or impression of the existing macro-conditions for renewable energy development. A majority of the respondents (71%) indicated that they believed that macro-conditions are conducive for renewable energy development while 15% were not in agreement with a further 15% of the respondents being indifferent.

The respondents advanced a number of explanations for their views on the status of macro-variables and their influence on renewable energy development. Such views included assertions that the health of macro-variable conditions provide signals to investors; whether positive or negative and that renewable energy development depends on the stability of the economy which is depicted by the quality of macro-variable parameters.

Further, the respondents pointed that Kenya is the largest economy in East Africa and has one of the fastest growth rates which makes it conducive for renewable energy development to

sustain its economic growth rates and realise the development aspirations espoused in its country's development plans. Kenya has also demonstrated good track record in scaling up renewable energy development especially in the geothermal sub-sector which has attracted the interest of private developers to explore the exploitation of other renewable energy resources.

The respondents also asserted that the huge interest in renewable energy development is supported by the huge renewable energy resource endowment such as wind, solar and geothermal in the country which remains largely unexploited.

To further understand why political support and country's development plans ranked higher (in terms of significance indices), a cross-tab analysis was carried out against the various respondents characteristics and macro-drivers. The cross-tab analysis was carried out to find underlying reasoning and rankings of the macro-drivers from the following categories of respondents:

- i) Nature of organisation;
- ii) Field of Expertise;
- iii) Position in the company;
- iv) Energy sub-sector groups; and
- v) Shareholding structure.

The detailed cross-tab analysis are presented in *Appendix 3 Tables 8-10 to Tables 8-14*. The results are discussed in the sections below:

i) *Respondent's Nature of Organisation and Views on Macro-Drivers*

Based on the cross-tab analysis, majority of the respondents who rated political support as favourable (with ratings ranging from "good" to "very good") were from Central Government (100%), Government Agencies (54.2%), Contractors (75%) and Commercial Financial Institutions (100%).

Generally, both the central government and government agencies are likely to believe that political support is conducive. This is because these category of respondents are largely resident in the host country and the ratings could be driven by their familiarity of local conditions. Specifically, the central government and government agencies are responsible for implementing government manifestos and must work with the ruling government in realisation of its policies and in order to achieve this, political support is necessary and required.

Similarly, contractors and commercial financial institutions operate under local conditions and are affected positively or negatively by the obtaining political climate. Based on their local

presence and active interactions with the political situation, the contractors and commercial financial institutions, considering their rating for the degree of political support, believe that the political climate is Kenya conducive. The view was supported by the academics category.

Conversely, development financial institutions, developers and consultants did not rate political support as favourable (based on cross-tab results of “good” to “very good” being less than 50%). development financial institutions and the Consultants can be viewed as proxies of private sector category and based purely on the analysis of their rankings of the political support for renewable energy, it may be concluded that political support for renewable energy development in Kenya is not conducive from a private sector perspective.

Similar results were obtained for quality of country’s development plans as an indicator of the macro-drivers of renewable energy. Respondents from the central government (100%), developers (75%), academicians (66.6%) and government agencies (54.6%) expressed confidence in the country’s development plans (based on aggregate rating scores of “agree” to “strongly agree”).

Consultants also marginally (50%) agreed that the quality of country’s development plans are sound while Commercial Financial Institutions and Development Financial Institutions on the other hand were largely indifferent as to the quality of developments plans.

This could be attributed to the fact that these financial institution depend on the government plans to base their business and investment cycles. The rating therefore could be inferred to mean that their reliance on country’s development investments do not yield the expected results hence the indifference.

ii) *Views on Macro-Variables based on Respondents’ Field of Expertise and Level in the Organisation*

The analysis further delved into the assessing the respondents views on macro-variables (especially political support and quality of country development plans) based on the respondents field of expertise and level in the organisation. The professional groups were drawn from the disciplines encompassing engineering, finance, legal, planning, academic, scientists (such as geologists) and social and environmental scientists while the level of the organisation were senior levels (Strategic); middle level (Tactical) and other categorisation as provided by the respondents.

Based on the professional groupings and perception on political support; lawyers (100%), academicians (100%), Finance specialists (83.3%), planners (66.6%) and Engineers (57.1%)

agreed that political support in Kenya is conducive for renewable energy development. On the other hand, 66.7% of scientists (such as geologist) were indifferent on the level of political support while a similar number, 66.7% of supply chain experts and environmental Scientists (100%) disagreed on level of political support for renewable energy.

Generally, the views of these professionals could be viewed from their interaction with the government and politicians at a policy making level which may be construed to mean a fairly good understanding by the political class on the benefits of renewable energy and its benefit to the population.

Particularly, the planners, financiers and lawyers agreement on the level political climate for renewable energy could reflective of the allocation of resources and promulgation of quality laws and regulations that support renewable energy development. The relatively low concurrence (57.1%) of the engineering class with a relatively sizeable proportion (35.7%) being indifferent on the level of political support for renewable energy could be indicative of the fact that adoption and understanding of renewable energy technologies is slow or growing.

The views of Supply chain experts who disagreed with the level of political support for renewable energy development could point to complexity of procurement and tendering laws and processes that slows down the uptake of renewable energy technology in Kenya while that of physical scientists (such as geologists) could be taken to be isolated to geothermal energy development.

On the other hand, the views of environmental and social scientists group; that entirely disagreed on the level of political support for renewable energy; could be stemming from issues related to environmental and human factors impacting the development of renewable energy in Kenya such as way-leaves acquisition, resettlement of persons to create land for renewable energy development and evolving environmental standards and laws.

Regarding the professionals groups perception on the quality of country's development plans, most of the professionals agreed (based on results of "agreed" to strongly agreed being $\geq 50\%$) that the country's development plans are supportive of renewable energy development in Kenya. Finance experts (66.7%), legal and regulatory experts (50%), planning (66.6%), procurement/supply chain (66.6%), scientists (66.6%) and academics (100%) supported the view that the country's development plans support renewable energy development.

Generally, government's long-term development plans guide developments in the key sectors of the economy. National government, government agencies and private players also use such

plans to align and commit resources to guide the country's development agenda. In the energy sector, the long-term development agenda for the sector would include how the government intends to develop the various sources of energy and other economic sectors. Such alignment of efforts breeds a conducive environment for renewable development.

Finance experts and planning experts, for example, rely on government's development plans to schedule and mobilise resources to support renewable energy development. Similarly, the procurement experts depend on country's development plans to plan and execute procurement of renewable energy components such as Engineering Procurement and Construction contractors and consultants to assist in structuring renewable energy transactions.

Moreover, the legal/regulatory experts and finance experts services are required by renewable energy developers to provide advisory services to renewable energy developers. The concurrence on the country's development plans therefore confirms that the Kenya's renewable energy development plans are realistic and predictable to the extent that key professional experts can anchor their plans and activities around government's development plans.

Taken from the position or level in their organisations, senior level managers (50%) and Middle level managers (70.5%) agreed that political support in Kenya is conducive for renewable energy development in Kenya. It is also worth noting that a sizeable number of senior manager (35.7%) of the senior level managers were indifferent as to whether there is political support in Kenya for renewable energy.

Similar views were expressed by the professionals on country development plans with 57.2% of those in senior management and 58.8% of those in middle management agreeing that the country's development plans support renewable energy development. A majority of the respondents from the special category representing mainly environmental scientists were indifferent on the quality of country's development plans.

Generally, Industry leaders and executives of organisations consider the political situations in a country in making investment decisions. Senior-level management are in-charge of making strategic decisions affecting their companies and would consider the political situation in a county. Moreover, senior level management officials such as Chief Executive Officers are known to lobby political class on the country's political situation and also take long-term of things. On the other hand, middle-level managers implement tactical decisions (immediate to medium term) for the realisation of long-term business decisions. The views of these respondent

group could be interpreted to mean that the long-term political climate is unpredictable and uncertain as far as renewable energy development is concerned.

In conclusion and based on the above analysis, the political climate in Kenya can be said to be fairly conducive for renewable energy development. Political goodwill and support is considered a key ingredient for any investment in a country as it serves to reduce political risk and secures investors’ interest. Presence of political goodwill therefore is expected to boost renewable energy investment.

On the other hand, the views of the senior and middle level management were on the borderline implying that the country’s development plans are not fully supportive of renewable energy development.

2. Structure of The Electricity Sector

The study reviewed the structure of the electricity sector as a driver or determinant of renewable energy development. In assessing the importance of structure of the sector as a stimulant for renewable energy, factors such as independence of the regulator, government support to the off-taker, government commitment to renewable energy development and financial strength of the off-taker were considered.

In realising this objective, the respondents were asked to rank the above set of factors on a scale of 1-5 where 1 represents “Very Poor” and 5 represents “Very Good”. The table shows an analysis of the rankings assigned by the respondents to each of the parameters:

Table 4.3-4: Structure of Electricity Sector

Parameters	Responses					Significance Index	Rank
	Very Poor	Poor	Fair	Good	Very Good		
Independence of the regulator	0	1	10	12	8	77%	1
Government Support to Off-Taker	1	3	8	16	5	73%	2
Government Commitment to Renewable Energy	0	2	15	15	1	69%	3
Financial Strength of regulator	2	4	10	15	1	66%	4

Source: Primary data/author

As shown in the table above, the study finds that independence of the regulator is the leading driving factor for renewable energy investments in Kenya followed by the Government support to the off-taker and government commitment to the renewable energy sector. Financial strength of the regulator was ranked as the least driver implying that investors view the independence

of the regulator from the perspective of being an independent arbiter more critical than its financial strength.

To further understand the reasoning informing the above ratings, an in-depth cross-tab analysis was carried out and the results are presented in *Appendix 3; Tables 8-10 to Tables 8-14*. The discussions on the results are presented in the sections below:

i. Independence of the Regulator

Regulators are expected to promote sustainable functioning of the electricity sector by ensuring compliance with the rules, regulations and codes expected of the players. Besides, the regulators act as arbiters for disputes arising among the players in the sector. Independence of the regulator in this study is taken to mean no or minimal interference from the government or sector players with the activities of the regulator. Independence of the regulator is thus expected to inspire confidence in the sector players.

Independence of the regulator has been assessed through a cross-tab analysis with characteristics of the respondents such as nature of the organisation, shareholding structure, energy sub-sectors. The results of each of the cross-tab analysis are presented in the sections below:

a) Independence of the Regulator and Nature of Organisation.

Based on the cross-tab results, most of the respondents from central government (66.7%), contractors (50%), developers (50%), consultants (50%) and academicians (66.7%) were indifferent on the independence of the regulator. On the other hand, commercial financial institutions (100%), development financial institutions (100%) government agencies and parastatals (92%), a scale “good” to “very good” scale, agreed that the regulator is independent.

In Kenya, the central government is responsible for creation of the regulator and appointment of its governance team. Therefore, it could be argued that central government sees the regulator as part of it and its decisions could be viewed as representing those of the government and hence the strong affirmation of its independence.

The ratings of the developers could also have been influenced by the same argument for the central government as they view the decisions of the regulator as being influenced by the government and therefore not-entirely independent. As for the contractors, consultants and academicians, it could be argued that these respondent groups do not interact directly with the

regulator and the decisions of the regulators do not directly affect the business of the contractors and consultants.

Regarding the approval ratings by the government agencies, most of the respondents from this sub-group were largely drawn from the utilities which are under the regulatory control of the regulator. Therefore the approval ratings from this group could be taken to mean that the government agencies involved in renewable energy development are satisfied by the workings of the regulator as an independent agency.

Similarly, commercial financial institutions and development financial institutions viewed the independence of the regulator as being good to very good. Considering that both commercial and development financial institutions provide financing to the renewable energy developers, the excellent ratings and vouching provided by these two categories of the respondent groups imply that the regulator is viewed as independent and therefore provides a good impetus and demonstrates a conducive climate for renewable energy development.

b) Independence of the Regulator and Sub-Sector Groups

The respondents in this study also had experience with renewable energy development comprising solar, wind and geothermal sub-sectors of the renewable energy. Based on the results of analysis of these sub-groups, respondents involved in solar technologies largely agreed that the regulator is independent (rating of 67.4% on good to very good scale).

On the other hand, only 38.9% of the respondents that have handled geothermal technologies agreed on the independence of the regulator while 100% of the respondents that have handled wind technologies indicated that the regulator is not independent.

The ratings by the geothermal sub-sector could be explained by the fact that most of the geothermal projects are being implemented by two government owned entities (Kenya Electricity Generating Company (KenGen) and Geothermal Development Company Limited (GDC). GDC implements the projects through a various models including public private partnerships. The relatively low appreciation of the respondents on the independence of the regulator from this sub-group could be based on the fact that these agencies are owned by the government and therefore they view the decisions of the regulator as being not at arms length.

Further, the disagreement by the respondents from the wind sub-sector could be stemming from the fact that despite presence of wind resource, the harnessing of wind technology has been slow. Moreover, the largest wind project development under construction has faced challenges stemming from delays in completion of transmission line being undertaken by a government

entity and intervention of the regulator has not been forthcoming to resolve the resulting challenges between the developer and the government entities.

c) Independence of the Regulator and Shareholding of Projects

The views of the respondents based on shareholding structure presented very contrasting results. Respondents from companies with foreign shareholding structure rated independence of the regulator as poor (50% on a scale of “poor” to “very poor”) and a further 37.5% were indifferent as to the independence of the regulator.

On the other hand, 66.7% of respondents from companies with local shareholding rated the independent of the regulator as poor. Similar results were obtained for companies with a mix of local and foreign shareholding. Only companies with government shareholding agreed on the independence of the regulator (83.4% rating on a scale of “good” to “very good”).

Since the regulator, among other things, approves power purchase agreements and also provides generation license to the developers, it could be interpreted that the private companies whether with local or foreign have experienced difficulties in obtaining necessary approvals from the regulator. The response from the governments owned entities could be explained by the fact that they view the regulator as a government entity and therefore are in a position to receive government intervention when dealing with the regulator.

Overall, the above results indicate that the while the regulator has received a higher ranking as one of the sector parameters, the results have been skewed by respondents from the government entities and therefore might not provide conclusive results on the independence of the regulators.

ii. Government Support to Off-Taker

Investors in electricity generation are wont to be concerned about the financial health of the off-taker especially in electricity sector structures where the off-taker is the single bulk-buyer of electricity produced with the country.

In Kenya, the Kenya Power & Lighting Company Limited is the single-bulk buyer of all the electricity produced in the country. In situations where the off-taker has entered into several off-take arrangements or contracts with different electricity producers (whether public and Private), government support is considered necessary both from a financial and policy perspective.

On a scale of “good” to “very good” and based on the respondents’ nature of organisation, those in central government (67.7%) and government agencies (72.7%) largely agreed that there is strong government support to the regulator. Project developers (100%) also agreed that the government provides support to the off-taker.

On the other hand, only fifty-percent (50%) of project consultants and contractors felt that the government support to the regulator was poor. This view was supported by respondents from academic institutions who also rated government support as poor (33.3%) with a large majority (66.7%) were indifferent.

While the positive ratings from the government and government agencies could be attributed to familiarity bias, the views of the project developers seems to provide further credence to the government view and confirms that the government support to the off-taker in Kenya is excellent and can be expected to promote renewable energy development.

The views of consultants and contractors, on the other hand, could be as a result of the contractual relationships with the utility which is limited to the course of business for services rendered and not as sellers of energy to the off-taker.

Based on the shareholders profile, there seems to be a unanimous concurrence that there is adequate support to the off-taker by the government. Half (50%) of respondents with affiliations of foreign shareholding and 66.6% respondents with local and government shareholding agreed that there was adequate government funding for the projects.

Overall, the views of the respondents’ point to strong government commitment and support to the off-taker which is expected to promote renewable energy development in Kenya.

B. PROJECT PROFILE

Another factor that was considered as a driver for renewable energy development in Kenya is project profile. The assessment of project profile and its influence on renewable energy development was based on the dimensions covering environmental and social standards, bankability considerations and technology and capacity factors. The analysis results of each of these sub-factors are presented in the table below:

i.Environmental and Social Standards

Generally, most renewable energy resources are found in remote and hard-to reach areas. For sustainable exploitation of the resources, environmental and stakeholders management is critical. This could be in the form of adherence to international environmental standards and guidelines and crowding in or winning the support of the local population and communities for

the Project. Environmental and social issues, therefore, form a key consideration for investors wishing to exploit renewable energy resources since the cost of compliance or non-compliance could be enormous.

In this study, respondents were asked to rank their assessment of the environmental and social standards in Kenya which could influence choosing the country their choice of investment decisions. To achieve this objective, respondents were asked to rate their perception of the local environmental conditions based on a set of environmental parameters such as level of local population support for renewable energy, stakeholder management, ease of obtaining access and way-leaves and the quality of environmental standards. The results are as shown in the table below:

Table 4.3-5: Environmental and Social Standards

Parameters	Responses					Significance Index	Rank
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree		
Stakeholder management for project success is excellent	0	4	1	7	21	87%	1
Local environment & social standards matches international standards	1	9	9	11	3	64%	2
Local Population support for renewable energy projects is excellent	3	9	13	6	2	57%	3
It is easier to obtain access and way-leaves to renewable resource areas	10	9	10	3	0	42%	4

Source: primary data/author

The results from the study revealed that stakeholder management in Kenya is excellent and supports projects success as indicated by the higher Significance Index of 87%. This is followed by quality of environmental laws and standards (Significance Index of 64%). On the other hand, local population support and obtaining access and way-leaves for renewable energy projects was found to be of concern for investors as revealed by a slightly low Significance Index of 57% and 42% respectively.

To further gain insights in the reasons for the Significance Indices, secondary analysis was carried out using cross-tab analysis to assess the views of the respondents on the environmental and social standards. The results are presented in *Appendix 5; Tables 8-15 to Tables 8-17* and discussed in the tables below:

a) Stakeholder Management

Based on the cross-tab analysis results, Project developers (75%), Central Government (66.7%), Government agencies (100%), academics (66.7%) and financial institutions (both Commercial (100%) and development financial institutions (80%)) supported the view that stakeholder management in Kenya is excellent and conducive for renewable energy project's success. Only a small percentage of project developers (25%) and contractors (50%) somewhat disagreed with the quality of stakeholder management and whether it is supportive for project success.

The strong positive view of the funding agencies combined with the government institutions lends to the conclusion that the stakeholder management is excellent and considered relevant for project success. The concerns of the contractors and developers could be related to challenges surrounding obtaining way-leaves and access for project development.

b) Local and international Environmental Standards

The study also examined the parallel between the quality of local and international environmental standards. The objective of this assessment was to review whether there is convergence between the two sets of standards that makes it easier for an investor to understand and appreciate environmental conditions from a global context.

Such convergence and similarity of environmental standards, guidelines, and laws promotes acceptance and universal understanding of the environmental conditions obtaining in a jurisdiction and would be expected to promoted renewable energy development.

Based on the results, the views of the respondents on quality of environmental standards varied significantly. Respondents from the Central Government (66.6%) agreed that the local environmental standards were as good as international standards. This view could be emanating from the fact that the National Agency in Kenya responsible for promulgating and monitoring the implementation of environmental standards (the National Environmental Authority – NEMA) is a wholly owned government agency and the government believes that its environmental standards are benchmarked against those of international entities.

On the other hand, government agencies and parastatals were largely indifferent (36.4%) and some disagreed (36.4%). These ratings could be attributed to the fact that government agencies are subject to the rules promulgated by the National Environmental Agency which is a government owned entity. On the whole, it would be expected that the direction of rating of the government agencies would be consistent with those of the central government. However, since

these entities receive financing from Development Financial institutions, they are subjected to different sets of laws which may often be conflicting and are subject to stringent requirements and compliance compared to the national standards.

The views of contractors was also varied with 50% agreeing and a similar proportion disagreeing with the similarity of local and international laws. This could be attributed to the fact that contractors operate in different regimes and the dichotomy of the responses reflects their unique and different experiences with environmental issues. The responses from project developers exhibited similar pattern with fifty percent (50%) being indifferent while another fifty percent (50%) agreed that the local environmental laws matches those of the international standards.

Interesting observations were made on the commercial financial institutions and development financial institutions. All the respondents from commercial financial institutions were indifferent as to whether local environmental standards matches and international environmental laws and standards while Development Financial Institutions largely disagreed (80%) with quality of local environmental standards with only 20% agreeing that the local standards match those of international requirements.

The views of the commercial financial institutions could be explained by the fact that these institutions rely on the Project's financials and economics while making their lending decisions whereby lending decisions are based on the sponsors' ability to services the principal and interest repayments when they fall due. Such financiers would require additional securities such as guarantees to secure their investments and therefore would be less concerned with the environmental risks.

On the other hand, Development Financial Institutions are development oriented and their financial support to governments and project developers usually place strong emphasis and requirement that the projects must meet stringent environmental performance standards. In any case, most international environmental laws and standards are developed by Development Financial Institutions such as the African Development Bank (AfDB), World Bank International Financial Corporation (IFC) and other multi-lateral and bilateral financial institutions. These development financial institutions provide financing to the government and to the project developers and are likely to have experienced shortcomings with the local environmental standards in Kenya.

Overall, the evaluation of environmental laws and standards was ranked second by the respondents' in-terms of the significance factors albeit with a relatively low score of 64%. This rating could be interpreted to mean that while investors consider environmental standards as critical in their decision making, the local environmental standards do not compare with the international standards and this could be a concern to the investors.

c) Local Population Support For renewable Energy Development

As with the assessment of environmental standards and laws, the views of the respondents on the level of local population support were varied. Central government and government agencies and funding agencies (commercial and development financial) and academics either disagreed or were largely indifferent with the level of local population support for renewable energy development. Contrastingly, project developers were impressed with local population support for renewable energy development.

These contrasting views could be explained by the fact that most renewable energy resources are found in rural areas and governments and government agencies are largely responsible for engaging, resettling or compensation of the local populace to facilitate exploitation of these resources. In certain cases, governments are required to provide guarantees to project developers for risks arising from disturbance by the local population ensuring that the risk is largely removed from the project developers.

This is largely the case for projects implemented under Public-Private Partnership arrangements where the government and government agencies are responsible for land acquisition for projects and this may involve displacement or resettlement of large population of people. Such actions are most often than not, faced with resistance and rebellion.

Further, funding from development financial institutions to governments and its agencies for renewable energy development is usually pegged on obtaining of land-rights and resettlements action plans by the government. Challenges faced by the government during land acquisition is therefore likely to impact negatively on the funding cycle of the funding agencies.

These scenarios explains why central government, government agencies and funding agencies provided lower rating for local population support for renewable energy development.

Overall, local population support for renewable energy development in Kenya therefore was rated as relatively poor by the respondents.

ii. Bankability Considerations

The study also assessed bankability considerations as a sub-factor of project profile and an influencer of renewable energy development. As part of this objective, a number of bankability considerations assessed included an analysis of respondents views on the adequacy of electricity tariffs; cost of capital for the project, availability of credit enhancement instruments, electricity dispatch guarantee, electricity demand, quality of reports and studies on renewable energy, participation of development financial institutions in the sector and financial strength of the off-taker.

The respondents were asked to rank the above factors based on their perception of their importance as drivers of renewable energy development in Kenya. The analysis results is as indicated in the table below:

Table 4.3-6: Bankability Considerations

Parameters	Responses					Significance Index	Rank
	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree		
Participation of DFIs and MFIs in renewable Energy Development	0	3	5	17	8	78%	1
Demand for electricity exist and is growing	1	3	11	9	9	73%	2
Electricity Tariffs Offered are adequate	0	3	16	9	5	70%	3
Electricity dispatch guarantee	2	1	13	14	2	68%	4
Financial strength of the off-taker is excellent	0	5	14	12	2	67%	5
Reports and studies on renewable energy in the country	0	6	16	6	5	66%	6
Credit Enhancement instruments are available	4	2	14	9	3	63%	7
Ease of Raising Capital	3	8	14	7	0	56%	8
Cost of Capital is competitive	3	10	14	5	0	53%	9

Source: Primary data/author

As indicated in the table above and based on the Significance Indices, participation of Development Financial Institutions (DFIs) and Multi-lateral Financial Institutions (MFIs) was ranked as one of the major bankability considerations for renewable energy development in Kenya (Significance Index of 78%). This was followed by existence and growth of electricity

demand (Significance Index of 73%) and adequacy of electricity tariffs being offered (Significance Index of 70%).

On the other hand, electricity dispatch (68%); financial strength of the off-taker (68%), reports and studies on renewable energy (66%) and availability of credit enhancement instruments were moderately ranked. Ease of raising capital (56%) and competitiveness of cost of capital were ranked as the lowest impediments to renewable energy in Kenya.

The detailed evaluation of the respondents rating of each of the above factors is provided in *Appendix 5; tables 8-18 to tables 8-22* and discussed in the sections below:

a. Participation of DFIs and MFIs in Renewable

Participation of DFIs and MFIs in any sector of the economy is always welcome to investors. These financial institutions are able to provide long-term and low cost capital for infrastructural developments. Moreover, they are able to force governments to respect debt covenants through sovereign guarantees. Generally, it would be expected that the presence and participation of DFIs and MFIs would support renewable energy investments.

Based on the nature of the organisation, this factor was ranked highly by most of the respondents implying a general consensus from the respondents that participation of DFIs and MFIs in Kenya is good and drives investors' participation in the renewable energy investment.

Only a small proportion of the government agencies and parastatals (9.1%) did not agree with the influence of DFIs and MFIs on renewable energy development. This could be attributed to the fact that these agencies receive financial support from the government and places little reliance on the DFIs or MFIs to finance for their activities. Similarly, contractors (25% of whom did not agree with the role of DFI and MFIs) are often remunerated by project developers and not directly by the Development or Multi-lateral finance institutions.

b. Demand for Electricity Exists and Growing

When the demand for electricity in a regime exists and is growing, new sources of energy are likely to be exploited to meet the existing and growing demand. It would be expected that the existence of demand and growth thereof would stimulate investments in the energy sector including renewable energy.

The results from this study presented mixed results on the demand of electricity in the country. Most of the respondents do not perceive demand of electricity as growing. Only 33.3% (central

government); 36.4% (Government agencies); development finance institutions (40%) and developers (50%) supported the assertion that electricity demand is growing. These results could be interpreted to mean that generation from existing sources are adequate to meet the current and projected demand. Such a scenario portends a threat to development of renewable energy sources.

On the other hand, consultants, academicians and other respondents supported the view the demand exists and is growing. These isolated views cannot be used to confirm the presence of demand for electricity in the country and therefore, the factor of demand is not conducive for renewable energy development.

c. Electricity Tariffs

Electricity tariffs provide the unit of investment recovery and is required to compensate investors for the cost of investment, cover operational costs and provide a return to investors for the risk taken. Adequate or competitive electricity tariffs are expected to spur investment in the sector. In this study, respondents were asked whether the electricity tariffs being offered in Kenya are adequate for their investments.

Majority of the respondents were indifferent as to whether the offered tariffs are competitive enough to spur renewable energy development. However, the central government (66.7%) and project developers (75%) seemed to agree that electricity tariffs are adequate. Governments represents the interest of the consumers and would vouch for lower tariffs while developers represents investors' interests and would prefer competitive tariffs.

The views of these two divergent interest groups seems to provide strong concurrence on the adequacy of electricity tariffs. These views could be stemming from the fact that the Government of Kenya no longer subsidises consumer tariffs and a price discovery mechanism has been put in place through a competitive process for IPPs and negotiation of tariffs with tariffs under a Power Purchase Agreement with the off-taker.

In such a mechanism, the tariff so offered covers the cost of investment by the developers and provides a compensation of risk in form of adequate return to the project developers. This consensus provides the conclusive evidence that electricity tariffs acts as an incentive for renewable energy development in Kenya.

d. Financial Strength of the Off-Taker

Most Power Purchase Agreements for electricity supply are negotiated on the basis of Take-or-Pay terms. Financial capability of the off-taker, therefore, becomes a key consideration to investors as this dictates whether the off-taker will be able to honor its obligations as and when they fall due. Moreover, the financial strength of the off-taker will determine whether it is able to enter into future electricity contracts with developers.

Based on the cross tab analysis results, government parastatals (63.6%) and project developers (100%) agreed that financial strength of the off-taker is excellent. Considering that project developers enter into agreements with the off-taker and some of the government agencies and parastatals also enter into PPAs to develop projects, this view confirms that the investors are comfortable with the financial strength of the off-taker.

Moreover, Kenya already has a track record of private involvement in renewable energy development and these private players have over the years interacted by the off-taker. This demonstrated confidence in the financial strength of the off-taker is necessary and provides the necessary impetus for private investors to participate in renewable energy in Kenya.

On the other hand, views of the central government on the financial strength of the off-taker were varied with 33.3% agreeing, 33.3% disagreeing (33.3%) and a further 33.3% being indifferent on the strength of the off-taker. Such views of the Central Government could be explained by the fact that governments provide sovereign guarantees to the off-takers to secure investors such as independent power producers against risk of non-payment and termination risks. To the extent that investors require such guarantees from the government when dealing with off-takers, the view of the central government that the financial strength of the off-takers is debatable could be justified.

e. Quality of Reports and Studies on Renewable Energy in Kenya

Existence of quality reports and studies such as feasibility studies improves the quality of investment decision making and is likely to reduce risk and facilitate fund-raising initiatives for renewable energy.

In this study, the level of agreement with availability of information in terms of reports and studies on renewable energy resource was low. Based on the results, only 33.3% of the respondents representing central government, 36.4% of respondents representing government agencies and parastatals, 5% of consultants and 20% of those from the academic field agreed

that there are quality reports and studies on renewable energy development. Majority of the respondents were largely indifferent. Such low levels of appreciation presents the need to upscale studies on the available renewable energy resources in Kenya to facilitate private sector participation in the sector.

Interestingly, contractors (75%) and developers (50%) tend to believe that there is adequate information and reports on the sector. Such views could be restricted to only the already exploited resources under their portfolio and may not include the balance of renewable resources yet to be exploited.

iii. Technology and Capacity Issues

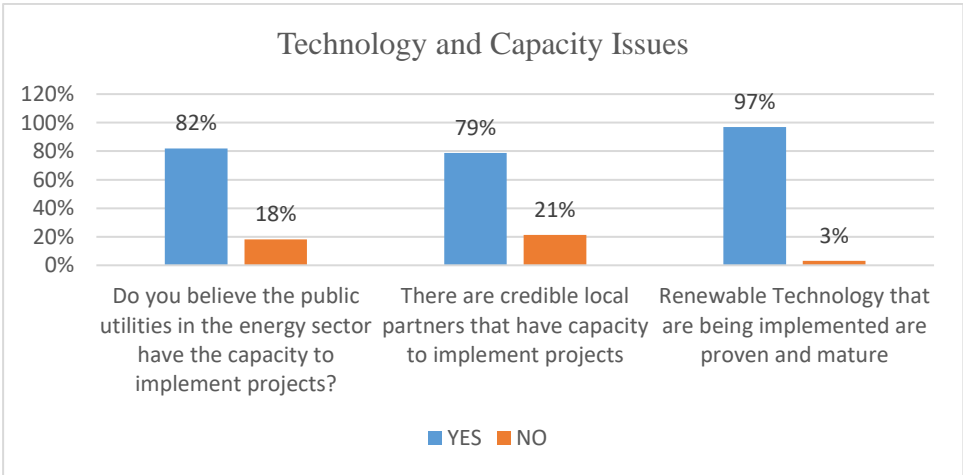
Another bankability consideration that was considered in the study relates to technology and capacity issues. Technology considerations assessed whether there are credible partners to implement the projects and whether the technologies for the various renewables have matured and proven.

Generally, financiers of infrastructure projects are comfortable to finance proven technologies given the longer financing tenors and term of Power Purchase Agreements which spans 20-30 years. Therefore, availability of known technologies to exploit renewable energy sources globally would be considered as an incentive to exploit the renewable resources.

Capacity considerations on the other hand looked at the capacity of available human resources to implement projects. Such capacities would include experience in the areas of project finance, project management, engineering skills and technical skills.

The findings of the study on the above considerations were as shown in the chart below:

Figure 2: Technology and Capacity issues and Renewable Energy Development



Source: Primary Data/author

As depicted in the table above, majority of the respondents (82%) believed that the public utilities have the capacity to implement projects. Strong capacity to implement projects is essential for project developers as investors it reduces project implementation risks such delays and cost overruns especially for projects which are being implemented under public-private partnership arrangements.

Availability of credible partners such as suppliers of spare-parts, providers of after sales services, operation and maintenance contractors and Engineering, procurement and Construction firms also received a good score with 79% of the respondents agreeing that Kenya has credible partners to implement projects. This kind of confidence is good for renewable energy development. A further 97% of the respondents were in agreement that renewable energy technologies are proven and mature. Mature technologies reduces the risks to developers and is expected to promote renewable energy development.

4.4 Study Findings and Literature Review

The study revealed many similarities with the earlier findings on the drivers and key success factors for renewable energy development. The state of the macro-business environment emerges as a key driver of renewable energy development. This is considering that project developers are concerned about the general economic health of economy as depicted by indicators such as level of political support, country's development plans, economic growth rates and country's governance systems. In the case of Kenya, the key macro-drivers for renewable energy development were identified as good political support and quality of country's development. These results are consistent with the findings of Eberhard & Gratwick, (2011) who identified the determinants of success of private sector investment in the energy sector as favourable investment climate, clear policies and regulatory framework, effective planning, procurement and contracting policies and practices.

View from the institutional perspective, an independent regulator and government support for renewable energy development were considered as key ingredients for renewable energy development. Lack of strong institutions retards private sector participation as identified by Bugaje, (2006) who cites weak institutional framework as an impediment to the development of renewable energy. To strengthen the level of institutional capacity, policy measures such as introduction of comprehensive standards and codes of practice, promulgation of appropriate legislation to support the institutional framework are recommended.

Project profile factors promoting renewable energy development such as environmental and social standards, bankability considerations and technology and capacity factors equally play

an important role in driving private sector participation. Presences of excellent stakeholder management emerged as providing a strong impetus for renewable energy development considering that most of the renewable energy resources are located in remote locations and largely in areas occupied by the indigenous population. This call for a judicious stakeholder management approach to promote local population buy-in to facilitate the exploitation of the resources.

The study considered renewable energy technologies as mature and has provided a strong incentive for private players in the exploitation of renewable energy development as found in a similar study by Wüstenhagen & Menichetti, (2012). This stems from the fact that the cost of Renewable energy technologies such as Solar PVs have been on the decline as a result of technological development, deployment and economies of scale with the resultant benefits being passed on the consumers. This has resulted in overall acceptance of the renewable technologies making their deployment widespread.

5 RESEARCH CONCLUSIONS

Drivers or Critical Success Factors (CSFs) for IPPs and PPPs in renewable energy have been well researched in many developed countries and significant literature exist. In Africa, studies on drivers of renewable energy development have focused on North Africa and South Africa.

This study sought to identify the drivers of renewable energy in a developing or middle- income country like Kenya. Further, while previous studies have adopted various methodologies, this study employed a three-stage survey approach focusing on the context of the renewable energy investments as reflected by the prevailing conditions in the macro-business environment and the structure of the electricity sector and project profiles or characteristics as determinants.

The study relied on the views of project developers (including consultants and contractors), Development Financial Institutions; Commercial Financial Institutions, Government and Government Agencies, various professional groups and academic researchers, who were the main target groups for the study.

On the macro-business environment level, two key macro-level determinants of renewable energy development in Kenya were political goodwill for renewable energy development and the country's development plans. Political support was considered a key ingredient for any investment in the country as it serves to reduce political risk and secures investors' interest while the country's development plans provide a benchmark against which developers based their investment decisions.

The study revealed that Kenya's government political support for renewable energy is favourable and the country has sound development plans such as the Vision 2030 which provides clear guidelines for the growth of the economy and hence demand for electricity. Interestingly, the country's governance systems was not rated highly as a driver of renewable energy development in Kenya and this could be a deterrent to renewable energy investment.

Regarding the structure of the electricity sector as a determinant of renewable energy development, independence of the regulator was ranked as the leading driving factor for renewable energy investments in Kenya followed by the Government support to the off-taker.

Considering that regulators are expected to promote sustainable functioning of the electricity sector by ensuring compliance with the rules, regulations and codes expected of the players, independence of the regulator inspires confidence in the sector players and thus promotes investments. Moreover, considering that Kenya has single-bulk buyer of all the electricity

produced in the country strong government support to the off-taker, whether from a financial and policy perspective, would be considered necessary. Such support allows the off-taker to continue to enter into new off-take arrangements or contracts with different electricity producers (whether public and private) while still relying on the government's backing.

Project profiles determinants for renewable energy development in Kenya had interesting results. On environmental and social issues, stakeholder management in Kenya was rated as excellent and supports projects success in Kenya. However, quality of environmental laws and standard, local population support and ease of obtaining access and way-leaves seemed to be of concern for renewable energy developers.

Other project profiles considerations identified as important in driving renewable energy development in Kenya included participation of Development and Financial Institutions and Multi-Lateral Institutions in the Kenya Energy Market, growing demand for electricity, adequacy of tariffs and proven technology and availability of local capacity.

Participation of DFIs and MFIs in any sector of the economy is always welcome to investors. These financial institutions are able to provide long-term and low cost capital for infrastructural developments while also ensuring governments respect debt covenants through sovereign guarantees. Growing demand for electricity on the other hand enables new sources of energy to be exploited to meet the existing and growing demand while competitive tariffs ensures that investors are adequately compensated for the cost of their investment, cover their operational costs and provide a return to investors for the risk taken.

On technology and capacity front, availability of credible partners such as suppliers of spare-parts, providers of after sales services, operation and maintenance contractors and Engineering, procurement and Construction firms and maturity or renewable energy technologies and local capacity were identified.

The key drivers of private sector participation in renewable energy in Kenya can therefore be broadly categorised as presence of political goodwill and government support for renewable energy development. Investors also found development plans as valuable and provide a clear pathway for development in sector. The segregation of responsibilities of sector players with clear roles arising from the unbundling of the sector and the presence of independence regulator and strong government support to the off-taker are positive ingredients for private sector participation. Sound stakeholder engagement and participation of Multi-Lateral and Bilateral Development Finance Institutions, growing demand and adequacy of tariffs also has boosted

Kenya as a preferred investment destination for renewable energy. The maturity of most of the renewable energy technologies has also boosted development of renewable energy in Kenya.

The study also uncovers a number of policy and regulatory reforms needed to boost private sector participation in the renewable energy sectors of resource-constrained environment. Strengthening of governance systems is required to attract private sector participation. This will involve instituting quality laws to fight vices such as corruption, which are key concerns for investors.

Predictability of tax-laws and the general regulatory environment is also necessary for private sector participation. In particular, environmental laws should be benchmarked with international best practices. This will enable investors to understand the local environment conditions within an international context, which ensures ease of compliance and save on attendant costs. Further, considering that renewable energy projects are found in remote and hard-to reach areas, governments should provide frameworks for acquisition of way-leaves and access to renewable energy resources to facilitate exploitation and reduce conflicts between project developers and local population.

Capital raising for development of projects is a key concern for developers. To lessen the financial risks to developers, a stable, predictable and functioning financial system is necessary. Governments need to deepen and broaden options of raising finance for private players from the local financial sector in local currency. This besides providing options to the local population to partners with project developers will also serve to reduce the financial risks occasioned by PPAs denominated in USD while revenues are received in local currencies.

Most of the renewable resources such as wind, solar, hydro and geothermal require several years of data collection and analysis to inform investment decisions and reduce risks. For example, based on this study, in the case of Kenya, respondents felt that the quality of studies were not adequate. Governments and policy makers need to build local capacity to be able to collect, analyse and store data for renewable energy resources. This call for investment in data collection capabilities including building local human resources capacity in disciplines such as Science, Technology, Engineering and Mathematics.

6 RECOMMENDATIONS FOR FUTURE RESEARCH

Arising from the review of literature and the findings of this study, a number of issues are worth investigating to accelerate the development of renewable energy resources. Some of these issues are discussed below:

Renewable energy developments through private sector development experience long-preparations periods from the signing of the PPAs to reaching financial close. It is estimated that it could take 4-5 years from signing of Power purchase Agreements to reaching financial close for most IPP transactions. Moreover, Financial Close is considered a Condition Precedent in most of these project agreements. During these intervening periods, a lot of changes could in the project environment such as change in government, economic conditions. It would be interesting to investigate what factors delay projects in reaching financial close for renewable energy projects in developing countries and propose policy recommendations.

Another interesting area of research could be to investigate the role of off-grid or mini-grid power distribution systems development or decentralised service provision in upscaling the development of renewable energy resources. This is considering that most of the renewable energy resources are located in remote locations with minimal infrastructure. Depending on the grid-connections which are usually small and the often dilapidated transmission infrastructure have a significant impact on the exploitation of the renewable energy resources especially where the developers have to depend on the national utilities to develop these required infrastructure.

7 REFERENCES

- African Development Bank Group. (2018). *African Economic Outlook. Annual yearly review study*. <https://doi.org/10.1373/clinchem.2007.093781>
- Alagappan, L., Orans, R., & Woo, C. K. (2011a). What drives renewable energy development? *Energy Policy*, 39(9), 5099–5104. <https://doi.org/10.1016/j.enpol.2011.06.003>
- Alagappan, L., Orans, R., & Woo, C. K. (2011b). What drives renewable energy development? *Energy Policy*, 39(9), 5099–5104. <https://doi.org/10.1016/j.enpol.2011.06.003>
- Babonea, A. (2014). Public-private partnership in the context of regional development – a solution for renewable energy projects ?, *XXI*(10), 77–88.
- Baldwin, R. (2013). *Asian Development Bank Institute*. <https://doi.org/10.1017/S0020818300006032>
- Bazilian, M., Nussbaumer, P., Rogner, H. H., Brew-Hammond, A., Foster, V., Pachauri, S., ... Kammen, D. M. (2012). Energy access scenarios to 2030 for the power sector in sub-Saharan Africa. *Utilities Policy*, 20(1), 1–16. <https://doi.org/10.1016/j.jup.2011.11.002>
- Beck, F., & Martinot, E. (2004). Renewable Energy Policies and Barriers. *Encyclopedia of Energy*. <https://doi.org/10.1016/j.enpol.2004.08.032>
- Bhattacharyya, S. C. (2013). Financing energy access and off-grid electrification: A review of status, options and challenges. *Renewable and Sustainable Energy Reviews*, 20, 462–472. <https://doi.org/10.1016/j.rser.2012.12.008>
- Bing, L., Akintoye, A., Edwards, P. J., & Hardcastle, C. (2005). The allocation of risk in PPP/PFI construction projects in the UK. *International Journal of Project Management*, 23(1), 25–35. <https://doi.org/10.1016/j.ijproman.2004.04.006>
- Bryman, A; & Burgess, R. (1994). Analysing Qualitative Data, 320(January), 5–7. https://doi.org/10.4324/9780203413081_chapter_9
- Bugaje, I. M. (2006). Renewable energy for sustainable development in Africa: A review. *Renewable and Sustainable Energy Reviews*, 10(6), 603–612. <https://doi.org/10.1016/j.rser.2004.11.002>
- Carbonara, N., Costantino, N., Gunnigan, L., & Pellegrino, R. (2015). Risk Management in Motorway PPP Projects: Empirical-based Guidelines. *Transport Reviews*, 35(2), 162–182. <https://doi.org/10.1080/01441647.2015.1012696>
- Cherni, J. A., & Kentish, J. (2007). Renewable energy policy and electricity market reforms in China. *Energy Policy*, 35(7), 3616–3629. <https://doi.org/10.1016/j.enpol.2006.12.024>
- Chou, J., & Pramudawardhani, D. (2015). Cross-country comparisons of key drivers , critical success factors and risk allocation for public-private partnership projects. *International Journal of Project Management*, 33(In Press), 1–12. <https://doi.org/10.1016/j.ijproman.2014.12.003>
- Chowdhury, A. N., Chen, P.-H., & Tiong, L. K. R. (2011). Analysing the structure of public-private partnership projects using network theory. *Construction Management and Economics*, 29(3), 247–260. <https://doi.org/10.1080/01446193.2010.537354>
- Chua, H. K. ., Kog, C. ., & Loh, P. . (1999). Critical Success Factors for Different Project Objectives. *Journal of Construction Engineering and Management*, (June), 142–150.
- Clyde, W. M., & Brenda, M. (1992). Public-Private Partnerships in Third World Development: A Conceptual Overview. *Studies in Comparative International Development*, 46–67.
- Deichmann, U., Meisner, C., Murray, S., & Wheeler, D. (2011). The economics of renewable energy expansion in rural Sub-Saharan Africa. *Energy Policy*, 39(1), 215–227. <https://doi.org/10.1016/j.enpol.2010.09.034>

- Eberhard, A., Gratwick, K., & Kariuki, L. (2018). Kenya's lessons from two decades of experience with independent power producers. *Utilities Policy*, 52(April), 37–49. <https://doi.org/10.1016/j.jup.2018.04.002>
- Eberhard, A., Gratwick, K., Morella, E., & Antmann, P. (2016). *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries*. <https://doi.org/10.1596/978-1-4648-0800-5>
- Eberhard, A., & Gratwick, K. N. (2008). An analysis of Independent Power Projects in Africa : Understanding Development and investment outcomes. *Development Policy Review*, 26(November), 309–338.
- Eberhard, A., & Gratwick, K. N. (2011). IPPs in Sub-Saharan Africa: Determinants of success. *Energy Policy*, 39(9), 5541–5549. <https://doi.org/10.1016/j.enpol.2011.05.004>
- Eberhard, A., & Gratwick, K. N. (2012). Light inside: the experience of independent power projects in Nigeria. *Management Programme in Infrastructure Reform and Regulation*, 38. Retrieved from <http://www.gsb.uct.ac.za/files/LightInside.pdf>
- Eberhard, A., & Shkaratan, M. (2012). Powering Africa: Meeting the financing and reform challenges. *Energy Policy*, 42, 9–18. <https://doi.org/10.1016/j.enpol.2011.10.033>
- Frey, W. G., & Deborah, L. M. (2002). Hydropower as a renewable and sustainable energy resource. *Energy Policy*, Vol:30(Issue:14), Pages:12611265.
- Hodge, G. A. (2007). Public – Private Partnerships: An International Performance Review. *Public Administration Review*, (3), 545–558.
- Hwang, B. G., Zhao, X., & Gay, M. J. S. (2013). Public private partnership projects in Singapore: Factors, critical risks and preferred risk allocation from the perspective of contractors. *International Journal of Project Management*, 31(3), 424–433. <https://doi.org/10.1016/j.ijproman.2012.08.003>
- Kapika, J., & Eberhard, A. (2013). *Power-Sector Reform and Regulation in Africa: Lessons from Kenya, Tanzania, Uganda, Zambia, Namibia and Ghana*. [https://doi.org/10.1016/S0921-4488\(97\)00040-0](https://doi.org/10.1016/S0921-4488(97)00040-0)
- Karekezi, S., & Kimani, J. (2002). Status of power sector reform in Africa: Impact on the poor. *Energy Policy*, 30(11–12), 923–945. [https://doi.org/10.1016/S0301-4215\(02\)00048-4](https://doi.org/10.1016/S0301-4215(02)00048-4)
- Karekezi, S., & Kithyoma, W. (2003). Renewable energy development:Prospects and Limits. *Prepared for: The Workshop for African Energy Experts on Operationalizing the NEPAD Energy Initiative., 2–4 June(Dakar)*.
- Katharine, B., & Gratwick, N. (2007). *Independent Power Projects in Africa : balancing development and investment outcomes*.
- Komendantova, N., Patt, A., Barras, L., & Battaglini, A. (2012). Perception of risks in renewable energy projects: The case of concentrated solar power in North Africa. *Energy Policy*, 40(1), 103–109. <https://doi.org/10.1016/j.enpol.2009.12.008>
- Kumaraswamy, M. M., & Zhang, X. Q. (2001). Governmental role in BOT-led infrastructure development. *International Journal of Project Management*, 19(4), 195–205. [https://doi.org/10.1016/S0263-7863\(99\)00069-1](https://doi.org/10.1016/S0263-7863(99)00069-1)
- Marques, A. C., Fuinhas, J. a., & Pires Manso, J. R. (2010). Motivations driving renewable energy in European countries: A panel data approach. *Energy Policy*, 38(11), 6877–6885. <https://doi.org/10.1016/j.enpol.2010.07.003>
- Marques, C. A., & Fuinhas, A. J. (2012). Are public policies towards renewables successful? Evidence from European countries. *Renewable Energy*, 44, 109–118. <https://doi.org/10.1016/j.renene.2012.01.007>
- Martinot, E., Chaurey, A., Lew, D., Moreira, J. R., & Wamukonya, N. (2002). Renewable Energy Markets in Developing Countries*. *Annual Review of Energy and the Environment*, 27(1), 309–348. <https://doi.org/10.1146/annurev.energy.27.122001.083444>

- Ng, A., & Loosemore, M. (2007). Risk allocation in the private provision of public infrastructure. *International Journal of Project Management*, 25(1), 66–76. <https://doi.org/10.1016/j.ijproman.2006.06.005>
- Ng, S. T., Wong, Y. M. W., & Wong, J. M. W. (2012). Factors influencing the success of PPP at feasibility stage - A tripartite comparison study in Hong Kong. *Habitat International*, 36(4), 423–432. <https://doi.org/10.1016/j.habitatint.2012.02.002>
- Ngoepe, T., Fisker-Henriksen, T., Patton-Power, A., Panulo, B., Modungwa, B., Scholtz, L., & Gulati, M. (2016). Switching on finance for off-grid energy, 1–35.
- OECD/IEA. (2014). Energy in Africa Today. *Africa Energy Outlook*, 13–25. <https://doi.org/https://www.iea.org/publications/freepublications/publication/africa-energy-outlook.html>
- Painuly, J. P. (2001). Barriers to renewable energy penetration; a framework for analysis. *Renewable Energy*, 24(1), 73–89.
- Pandremmenou, H., Sirakoulis, K., & Blanas, N. (2013). Success Factors in the Management of Investment Projects: A Case Study in the Region of Thessaly. *Procedia - Social and Behavioral Sciences*, 74(May 1999), 438–447. <https://doi.org/10.1016/j.sbspro.2013.03.032>
- Wüstenhagen, R., & Menichetti, E. (2012). Strategic choices for renewable energy investment: Conceptual framework and opportunities for further research. *Energy Policy*, 40(1), 1–10. <https://doi.org/10.1016/j.enpol.2011.06.050>
- Zhang, X., & Asce, M. (2005). Critical Success Factors for Public – Private Partnerships in Infrastructure Development. *Journal of Construction Engineering and Management*, 131(1), 3–14. [https://doi.org/10.1061/\(ASCE\)0733-9364\(2005\)131](https://doi.org/10.1061/(ASCE)0733-9364(2005)131)

8 APPENDICES

Appendix 1: Kenya Electricity Statistics

Table 8-1: Kenya Installed Electricity Statistics by source of generation, 2006-2015

Sources	Capacity in MW	June -06	June-07	June-08	June-09	June-10	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	CAGR ⁴
Renewables	Hydro	677	677	737	749	759	763	788	816	818	820.3	2%
	Geothermal	128	128	128	163	198	198	209	250	363	598	17%
	Wind	-	0	0	0	5	5	5	5	6	26.05	NMF ⁵
	Cogeneration	2	2	2	2	26	26	26	26	26	26	29%
	Solar	-	-	-	-	-	-	-	1	1	1	1
	Sub-Total	807	807	867	914	988	992	1,029	1,098	1,214	1,471	6%
% of Total	69%	67%	66%	67%	67%	62%	61%	62%	64%	64%		
Fossil Fuels	Thermal	370	389	443	446	484	601	661	668	672	828.33	8%
	Sub-Total	370	389	443	446	484	601	661	668	672	828	8%
% of Total	31%	33%	34%	33%	33%	38%	39%	38%	36%	36%		
Total	1,177	1,196	1,310	1,360	1,472	1,593	1,690	1,766	1,886	2,299	7%	

⁴ CAGR – Compounded Annual Growth Rate

⁵ NMF – Not meaningful

Table 8-2: Kenya Installed Electricity Statistics (public and Private Sector), 2006-2015

Source	Installed Capacity in MW	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14	Jun-15	Average	CAGR
Renewables	Public	794	795	854	866	939	944	977	1,006	1,103	1,334	91%	6%
	Private (IPPs)	13	13	13	48	49	48	52	92	111	137	9%	30%
	Sub-Total	807	808	867	914	988	992	1029	1098	1214	1471		7%
	% of Total	69%	67%	66%	67%	67%	62%	61%	62%	64%	68%	65%	0%
Thermal	Public	160	159	163	166	152	268	268	275	282	281	34%	6%
	Private (IPPs)	210	230	280	280	333	333	393	393	390	547	66%	11%
	Sub-Total	370	389	443	446	485	601	661	668	672	828		9%
	% of Total	31%	33%	34%	33%	33%	38%	39%	38%	36%	32%	35%	0%
Total		1,177	1,197	1,310	1,360	1,473	1,593	1,690	1,766	1,886	2,299		8%
By Type of Developer													
Public	Public	954	954	1,017	1,032	1,091	1,212	1,245	1,281	1,385	1,615	70%	6%
IPPs	IPPs	223	243	293	328	381	381	445	485	500	684	30%	13%
Total		1,177	1,197	1,310	1,360	1,472	1,593	1,690	1,766	1,885	2,299		8%
by Type of Investor (%)													
	Public	81%	80%	78%	76%	74%	76%	74%	73%	73%	70%	75%	-2%
	Private	19%	20%	22%	24%	26%	24%	26%	27%	27%	30%	25%	5%

Source: KPLC annual report and author computations

Table 8-3: Planned Sources of Electricity Generation, 2015-2020

Source	Type	MW	%
Renewables	Hydro	24	
	Geothermal	1,646	
	Wind	630	
	Co-Generation	18	
	Sub-Total	2,318	42%
Fossil Fuels	LNG	1,050	
	Coal	1,920	
	Thermal	250	
	Sub-Total	3,220	58%
Total		5,538	

Source: Ministry of Energy & Petroleum Medium Term Plan (2015-2020),

Appendix 2: Cross-Tab Analysis of Macro-Drivers of Renewable Energy Development

QUESTIONNAIRE

Academic Research Study Critical Success Factors for Public Private Partnerships (PPP) in Renewable Energy in Kenya

Instructions:

Kindly tick or circle the appropriate answers in the boxes provided and/or write down the appropriate answers in the spaces provided. The questionnaire takes about 20 – 25 minutes to complete.

SECTION 1: RESPONDENTS' DEMOGRAPHICS

Question 1: what is the Nature of Your Organization	
1. Central government	
2. Local government	
3. Government Agency/Parastatal	
4. Contractor	
5. Developer	
6. Consultant	
7. Commercial Financial Institution	
8. Development Financial Institution (DFIs)	
9. Academic Institution	
10. Others Specify	

Question 2: Field of expertise	
1. Engineering	
2. Administration	
3. Finance	
4. Law/Regulation	
5. Planning	
6. Procurement/Supply chain	
7. Scientist (e.g Geologist, Geophysicist, Geochemist etc)	
8. Academics	
9. Environmental/Social Scientist	
10. Others Specify	

Question 3: Number of working years' experience	
1. Less than 6 years	
2. 6-10 years	
3. 11-15 years	
4. 16-20 years	
5. 21-30 years	

6. More than 30 years	
-----------------------	--

Question 4: position in company	
1. Senior Level management	
2. Mid-level management	
3. Others Specify	

Question 5: Have you ever been involved in an infrastructure development Project?

Yes

No

Question 6: Which of the following best describes the nature of the Project	
1. Purely Private Project	
2. Purely public Project	
3. Public-Private Partnership Project	

Question 7: What's the Shareholding Structure in the Company that did/is involved in the Project	
1. Foreign	
2. Local	
3. Government	
4. Mix of Foreign and Local	
5. All the above	

Question 8: Do you have experience with Public Private Partnership (PPP) Transactions?

Yes

No

Question 9: What is your level of PPP Project Experience in years?	
1. 0 years/No Experience	
2. Less than 3years	
3. 3-5 years	
4. 6-10 years	
5. 11-15 years	
6. 16-20 years	
7. 21-30 years	

Question 10: which of the following best describes your understanding of PPP Projects/transactions	
1. None	
2. Little bit understand	
3. Understand	
4. More than understand	
5. fully understand	

Question 11: Number of PPP Projects involved	
1. None	
2. Less than 3	
3. 3-5 projects	
4. 6-10 projects	
5. More than 10 projects	

Question 12: Which of the following best represents the sectors of PPP projects have you been involved in?	
1. Roads and Transportation facilities	
2. Environmental pollution prevention facilities	
3. Sewerage, Sanitation, water supply and water conservation facilities	
4. Health and medical facilities	
5. Cultural and education facilities	
6. Power facilities, public gas and fuel facilities	
7. Major industrial, commercial or hi tech activities	
8. Social and welfare facilities e.g Sports facilities	
9. Urban/Development of new towns	
10. Others specify	

Question 13: have you done any PPP transactions in any of the following energy sub-sectors	
1. Solar	
2. Geothermal	
3. Wind	
4. Biogas	
5. Biomass	
6. Others [Please specify].	
7. None	

SECTION 2: KEY DRIVERS OF PPP's FOR RENEWABLE ENERGY IN KENYA

A. Macro-economic Drivers

Question 1: Rank the following in their order of importance to you in selecting renewable investment destinations? **(1 being Very Important and 7 Least Important)**

Political Support	
Government Commitment to renewable Energy	
Government Support to Off-taker	
Independence of the regulator	
Country's development plans	
Economic Growth	
Country's governance systems	

Question 2: How do you rate Kenya as a country in terms of the above renewable energy investment parameters? **(1 being Strongly Disagree and 5 being a Strongly Agree)**

a. Political Support	1	2	3	4	5
----------------------	---	---	---	---	---

b. Government Commitment to renewable Energy	1	2	3	4	5
c. Government Support to Off-taker	1	2	3	4	5
d. Independence of the regulator	1	2	3	4	5
f. Country's development plans	1	2	3	4	5
g. Economic Growth	1	2	3	4	5
h. Country's governance systems	1	2	3	4	5

Question 3: Overall, do you believe the existing Macro-economic environment (as reflected by factors such as GDP growth rate, inflation, exchange rate etc) is conducive for renewable energy investment?

Yes	
No	
Indifferent	

Please explain your answer in Question 3 above:

B. Structure Of Electricity Sector

Question 1: What is your impression of the following factors regarding the Kenya Electricity Sector?

[Number 1 being Very poor and Number 5 being a Very Good]

1. Quality of Regulation and Laws	1	2	3	4	5
2. Renewable Energy Policies and Standards	1	2	3	4	5
3. Definition and Separation of Roles & Mandates of Sector Players	1	2	3	4	5
4. Quality of Contracts e.g PPAs	1	2	3	4	5
5. Power Distribution and Transmission Infrastructure	1	2	3	4	5
6. Renewable Energy electricity Tariffs	1	2	3	4	5
7. Procurement procedures and systems	1	2	3	4	5
8. Financial Strength of the Off-taker	1	2	3	4	5

C. Project Profile

i) Environmental and Social Standards

With regards to renewable energy development, what is your view of the following Environmental and Social Issues in Kenya? **1 means Strongly Disagree and 5 means Totally Agree**)

1. Local Population Support for renewable energy projects is excellent	1	2	3	4	5
2. Stakeholder management is critical for project success	1	2	3	4	5
3. It is easier to obtain access and way-leaves to renewable resource areas	1	2	3	4	5
4. Local environmental & Social Standards matches International Standards	1	2	3	4	5

ii) Bankability Considerations

In your opinion, how do you rate the following Renewable Energy Projects bankability considerations in Kenya? [Number 1 being Very poor and Number 5 being a Very Good]

1. Electricity Tariffs offered are adequate	1	2	3	4	5
2. Ease of Raising Capital	1	2	3	4	5
3. Cost of Capital is competitive	1	2	3	4	5
4. Credit enhancement instruments are available	1	2	3	4	5
5. Electricity Despatch guarantee	1	2	3	4	5
6. Demand for electricity exist and is growing	1	2	3	4	5
7. Reports and Studies on renewable energy in the Country	1	2	3	4	5
8. Participation of DFIs and MFIs in renewable energy development	1	2	3	4	5
9. Financial Strength of the offtaker is excellent	1	2	3	4	5

Technology & Capacity Issues

1. Do you believe the public utilities in the energy sector have the capacity to implement projects?	YES	NO
2. There are credible local partners that have the capacity to implement projects	YES	NO
3. Renewable Technology that I am implementing is proven and mature	YES	NO

SECTION 3: GENERAL

1. In your view, what are some of the barriers/challenges hindering renewable energy development in Kenya?

2. Provide suggestions on how these barriers/challenges can be addressed?

3. Please provide any other additional information that you think might be useful for promoting renewable energy development in Kenya

Thank you for your participation in this study.

Appendix 3: Cross-Tab Analysis of Macro-Drivers of Renewable Energy Development

Table 8-4: Cross Tab Results - Nature of Organisation and Political Support

Category of Respondent	Very Poor	Poor	Indifferent	Good	Very Good	Total
	%	%	%	%	%	%
Central Government	0	0	0	33.3	66.7	100
Government Agency/parastatal	0	9.1	36.4	36.4	18.2	100
Contractor	0	0	25	75	0	100
Developer	0	25	25	25	25	100
Consultant	0	0	50	0	25	100
Commercial Financial Institution	0	0	0	0	100	100
Development Financial Institutions	0	0	60	20	20	100
Academic	0	0	33.3	66.7	0	100
Other specify-utility, Embassy	0	100	0	0	0	100

Table 8-5: Cross-Tab Results - Nature of Organisation and Country Development Plans

Category of Respondent	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	0	0	66.7	33.3	100
Government Agency/parastatal	9.1	9.1	27.3	18.2	36.4	100
Contractor	0	25	25	25	25	100
Developer	0	0	25	75	0	100
Consultant	0	50	0	50	0	100
Commercial Financial Institution	0	0	100	0	0	100
Development Financial Institutions	0	20	60	20	0	100
Academic	0	33.3	0	33.3	33.3	100
Other specify-utility Embassy	0	0	0	100	0	100

Table 8-6: Cross Tab Results - Respondents' Field of Expertise and Political Support

Field of Expertise	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Engineering	0	7.2	35.7	50	7.1	100
Finance	0	0	16.7	0	83.3	100
Law/Regulation	0	0	0	50	50	100
Planning	0	0	33.3	33.3	33.3	100
Procurement/Supply Chain	0	66.7	0	33.3	0	100

Scientist (e.g Geologist,	0	0	66.7	33.3	0	100
Academics	0	0	0	100	0	100
Environmental/Social scientist	0	100	0	0	0	100

Table 8-7: Cross-Tab Results - Field of Expertise and Political Support

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
Field of Expertise	%	%	%	%	%	%
Engineering	7.1	21.4	21.4	28.4	21.4	100
Finance	0	0	33.3	50	16.7	100
Law/Regulation	0	0	50	50	0	100
Planning	0	0	33.3	33.3	33.3	100
Procurement/Supply Chain	0	33.3	0	33.3	33.3	100
Scientist (e.g. Geologist, Geophysicist)	0	33.3	0	66.7	0	100
Academics	0	0	0	0	100	100
Environmental/Social scientist	0	0	100	0	0	100

Table 8-8: Cross-Tab Results – Position in organisation and Political Support

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
Position in the Company	%	%	%	%	%	%
Senior Level Management	0	14.3	35.7	21.4	28.6	100
Middle-level Management	0	5.9	23.5	52.9	17.6	100
Others Specify - Analyst, senior environment specialist	0	0	66.7	0	33.3	100

Table 8-9: Cross-Tab Results – Position in organisation and Country Development Plans

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Senior Level Management	7.1	21.4	14.3	28.6	28.6	100
Middle-level Management	0	11.8	29.4	41.2	17.6	100
Others Specify - Analyst, environment specialist	0	0	66.7	33.3	0	100

Appendix 4: Cross-Tab Analysis of Structure of Electricity as a Driver of Renewable Energy Development

Table 8-10: Cross-Tab Results – Nature of Organisation and Independence of the Regulator

	Very Poor	Poor	Indifferent	Good	Very Good	Total
	%	%	%	%	%	%
Central Government	0	0	66.7	0	33.3	100
Government Agency/parastatal	0	0	18.2	45.5	36.4	100
Contractor	0	0	50	50	0	100
Developer	0	0	50	0	50	100
Consultant	0	0	50	0	50	100
Commercial Financial Institution	0	0	0	100	0	100
Development Financial Institution	0	0	0	80	20	100
Academic	0	0	66.7	33.3	0	100
Other specify- Embassy	0	100	0	0	0	100

Table 8-11: Cross-Tab Results – Electricity Sub-sector and Independence of the Regulator

Sub-Sector	Very Poor	Poor	Indifferent	Good	Very Poor	Total
	%	%	%	%	%	%
Solar	0	0	28.6	38.8	28.6	100%
Geothermal	5.6	22.2	33.3	38.9	0	100%
Wind	100	0	0	0	0	100%

Table 8-12: Cross-Tab Results – Shareholder structure and Independence of the Regulator

	Very Poor	Poor	Indifferent	Good	Very Good	Total
	%	%	%	%	%	%
Foreign	25	25	12.5	25	12.5	100%
Local	33.3	33.3	0	33.3	0	100%
Government	0	0	16.7	66.7	16.7	100%
Mix of foreign and local	14.3	14.3	35.7	28.6	7.1	100%
All of the above	0	0	66.7	33.3	0.0	100%

Table 8-13: Cross-Tab Results – Nature of Organisation and Government Support to Off-taker

	Very Poor	Poor	Indifferent	Good	Very Good	Total
	%	%	%	%	%	%
Central Government	0	0	33.3	0	66.7	100
Government Agency/parastatal	0	0	27.3	63.6	9.1	100
Contractor	25	25	0	50	0	100
Developer	0	0	0	75	25	100
Consultant	0	50	0	50	0	100
Commercial Financial Institution	0	0	100	0	0	100

Development Financial Institutions	0	0	20	60	20	100
Academic	0	33.3	66.7	0	0	100
Other specify-utility Embassy	0	100	0	0	0	100

Table 8-14: Cross-Tab Results Shareholding and Government Support to Off-taker

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	
Foreign	12.5	0	37.5	12.5	37.5	
Local	0	33.3	0	33.3	33.3	
Government	0	0	33.3	33.3	33.3	
All of the above	0	0	33.3	33.3	33.3	

Appendix 5: Cross-Tab Analysis of Project Profile as a Driver of Renewable Energy Development

1. Environmental Dimensions

Table 8-15: Cross-Tab Results – Nature of Organisation and Stakeholder Management

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	0	33.3	0	66.7	100
Government Agency/parastatal	0	0	0	18.2	81.8	100
Contractor	0	50	0	50	0	100
Developer	0	25	0	25	50	100
Consultant	0	0	50	0	50	100
Commercial Financial Institutions	0	0	0	0	100	100
Development Financial Institutions	0	0	0	20	80	100
Academics	33.3	0	0	0	66.7	100
Other specify- Embassy	0	0	0	100	0	100

Table 8-16: Cross-Tab Results – Nature of Organisation and Environmental Standards

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	33.3	0	33.3	33.3	100
Government Agency/parastatals	0	18.2	36.4	36.4	9.1	100
Contractor	0	50	0	50	0	100
Developer	0	0	50	50	0	100
Consultant	0	0	0	100	0	100
Commercial Financial Institution	0	0	100	0	0	100
Development financial Institutions	0	80	0	0	20	100

Academic	33.3	0	33.3	33.3	0	100
Other specify-utility Embassy	0	0	100	0	0	100

Table 8-17: Cross-Tab Results – Nature of Organisation and Local Population Support

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	33.3	0	33.3	33.3	0	100
Government Agencies/parastatal	0	27.3	63.8	0	9.1	100
Contractor	0	50	25	25	0	100
Developer	0	25	0	50	25	100
Consultant	50	0	50	0	0	100
Commercial Financial Institution	0	0	100	0	0	100
Development Financial Institutions	0	40	40	20	0	100
Academics	33.3	33.3	1	0	0	100
Other specify-utility Embassy	0	0	100	0	0	100

2. Bankability Considerations

Table 8-18: Cross-Tab Results – Nature of Organisation and Role of MFIs and DFIs

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	0	33.3	33.3	33.3	100
Local Government	0	0	0	0	0	0
Government Agency/parastatal	0	9.1	9.1	54.5	27.3	100
Contractor	0	25	0	75	0	100
Developer	0	0	25	75	0	100
Consultant	0	0	0	50	50	100
Commercial Financial Institution	0	0	100	0	0	100
Development	0	0	0	40	60	100
Academic	0	0	33.3	66.7	0	100
Other specify	0	100	0	0	0	100

Table 8-19: Cross-Tab Results – Nature of Organisation and Electricity Demand

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	33.3	0.0	33.3	33.3	0	100
Government Agency/parastatals	0	18.2	45.5	36.4	0	100
Contractor	0	25	0	0	75	100
Developer	0	0.	50	50	0	100

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Consultant	0	0	0	0	100	100
Commercial Financial Institution	0	0	100	0	0	100
Development	0	0	40	40	0	100
Academics	0	0	0	0	100	100
Others Specify – Utilities, Embassy	0	0	0	0	100	100

Table 8-20: Cross-Tab Results – Nature of Organisation and Electricity Tariffs

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	33.3	0	0	66.7	100
Government Agency/parastatals	0	9.1	45	27.3	18.2	100
Contractor	0	25	75	0	0	100
Developer	0	0	25	50	25	100
Consultant	0	0	100	0	0	100
Commercial Financial Institution	0	0	100	0	0	100
Development Finance Institution	0	0	60	40	0	100
Academic	0	0	66.7	33.3	0	100
Other specify-utility Embassy	0	0	0	100	0	100

Table 8-21: Cross-Tab Results – Nature of Organisation and Financial Strength of Off-taker

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	33.3	33.3	33.3	0	100
Government Agency/parastatals	0	0	36.4	54.5	9.1	100
Contractor	0	50	25	25	0	100
Developer	0	0	0	100	0	100
Consultant	0	50	50	0	0	100
Commercial Financial Institution	0	0	100	0	0	100
Development Financial Institution	0	0	80	0	20	100
Academic	0	66.7	33.3	0	0	100
Other specify-utility Embassy	0	0	100	0	0	100

Table 8-22: Cross-Tab Results – Nature of Organisation and Quality of Reports and Studies

	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree	Total
	%	%	%	%	%	%
Central Government	0	0	66.7	33.3	0	100

Government Agency/parastatal	0	9.1	54.5	27.3	9.1	100
Contractor	0	0	25	25	50	100
Developer	0	25	25	25	25	100
Consultant	0	0	50	0	5	100
Commercial Financial Institution	0	100	0	0	0	100
Development	0	60	20	0	20	100
Academic	0	0	100	0	0	100
Other specify-utility Embassy	0	0	100	0	0	100