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Analyzing the drivers and challenges of feed-in tariff policy in Kenya

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Analysing the Drivers and Challenges of Feed-In Tariff Policy in Kenya

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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ABSTRACT

Feed-in in Tariffs (FITS) policies are used by many developed and developing countries world over as a mechanism to promote renewable energy development across various technologies including hydro, wind, solar PV, geothermal, biomass and biogas. The tariffs are administratively determined and producers of power from renewable energy sources are guaranteed a right to sell the power generated to an off-taker at a fixed tariff for a set period. The research focused on the Kenyan FIT policy which was introduced in 2008 and revised in 2010 and 2012. The research problem was that if the FIT policy for Kenya remains in place electricity prices will not be competitive, project development will delay, it will not attract investment in some technologies and the country's energy targets will not be met. The general objective was to analyse the drivers and challenges of the FIT policy in Kenya. The study approach was descriptive and qualitative and relied on secondary data sources and primary data collection from key informant interviews (KIIs). A purposive sample of key informants was used. Qualitative data analysis adopted a thematic analysis approach whereby common themes were identified from the KIIs. Findings from the study reveal that the main drivers for the FIT policy were to promote generation of electricity from renewable sources, attract investment and independent power producers (IPPs) to the sector, reduce transaction and administrative costs and the need for conformity with global standards or commitments. Secondly, findings reveal that the key challenges for the FIT policy relate to the unavailability of technical expertise for policy design and inefficiencies in policy implementation. The findings on alternative mechanisms to promote the generation of electricity from renewable energy sources include net metering, mini-grids and auctions or competitive tendering. FIT policies achieved marginal effects with the lack of impact on the energy industry attributed to ineffective implementation of policies and a general misalignment of interests among stakeholders. The main recommendation from this study is that the FIT policy should be revised to address the challenges associated with it and retained for projects below 10MW and the auction mechanism should be introduced for projects above 10MW. In addition, that net metering and mini-grids should be implemented as alternative options.

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LIST OF ABBREVIATIONS

EOI – Expression of Interest

FITS – Feed –in Tariffs

IPP – Independent Power Producer

KENGEN – Kenya Electricity Generating Company Limited

KIIs – Key Informant Persons

KPLC – KPLC

KWh – Kilo Watt Hour

MoE – Ministry of Energy and Petroleum

PPA – Power Purchase Agreement

PV – Photovoltaic

RE –Renewable Energy

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DEDICATION

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Climate change considerations and high volatility of oil prices attracted the interest and support of governments for investments in renewable energy capacity and led to the implementation of different support policies in many countries around the world (Fagiani et.al; 2013). FITS were introduced by many governments world over to encourage the uptake of renewable energy. FITS were a response to a given historical need for alternative energy sources other than fossil fuels to mitigate the climate change effects posed by fossil fuels. With fossil fuels near exhaustion and with devastating consequences on the environment, by 2008, at least 48 countries with 14 from developing countries had renewable energy promotion policies (Ramli & Twaha, 2015).

Renewable energy (RE) refers to energy which can be naturally replenished and is not depletable (IRENA, 2012) indicated the number of countries with renewable energy targets at 48 in 2005 and 109 by 2012 and majority were developing economies. Countries increasingly relied on renewable energy policy making to address the challenges of climate change, air pollution, volatile fossil fuel prices, and a growing electricity demand. By 2011, 73 countries world over had set policy targets for renewable electricity at the federal or regional levels and the FIT was the most prevalent national RE policy in the world. By early 2011, 50 countries had some type of FIT in place and majority were in developing countries (Rickerson et.al, 2012). Kenya has potential for power generation from renewable energy. It has abundant solar, hydro, wind, biomass and geothermal sources led the Government to seek expansion of renewable energy generation. Government prioritised the development of geothermal and wind as well as solar-fed mini grids for rural electrification (Republic of Kenya, 2018).

FIT policies are made more relevant by the regional and global commitments by countries. With its directive 2009/28/EC, the European Commission decided that by the year 2020, at least 20% of the community's gross final energy consumption had to be

met by RE (Fagiani et al., 2013). Access to energy was adopted as the United Nations Sustainable Development Goal 7 aimed at ensuring affordability, reliability, sustainability and accessibility to modern energy for all by 2030 (United Nations, 2015).

A FIT is a mechanism for promoting electricity generation from renewable energy sources by allowing power producers to sell electricity generated from renewable energy sources to an Off-taker at a fixed tariff for a given period (Ministry of Energy, 2012) and (Comesa, 2017). A FIT is a guaranteed payment for a specified term with specific conditions to eligible RE generators (Grace, 2009). FIT electricity generators are paid a fixed amount per kWh of electricity generated based on a regulator's estimated average generation cost of renewable energy technologies (Fagiani et. al, 2013). A FIT policy provides for tariffs applicable to the various technologies and guidelines to project developers, financiers and other stakeholders on the procedures for project development and provides a guarantee that all energy generated will be purchased at a fixed price and that there will be return on investment. It is meant to attract investments in renewable energy from IPPs, companies, communities, and individuals.

FIT is the most commonly used and established policy globally for fast-tracking RE deployment and accountability for most of the renewable energy development (Comesa, 2017) and (Meyer - Renschhausen, 2013). (Alizamir,2016) referred to the 2008 European Commission Report which stated that FITs are the most widely implemented and most promising instrument accounting for a greater share of renewable energy propagation than other policy support schemes. However, on the contrary it has been argued that it is questionable to suppose natural superiority of any instrument (Comesa, 2017). Countries that adopted FITs included USA (1978), Germany (1991), Spain (mid 2000s) and Italy (2012). In Africa, among the first countries that developed renewable energy FIT policies early were Algeria in (2004), Uganda (2007), Kenya in (2008), Tanzania (2009), Mauritius in (2010), Rwanda in (2011) South Africa initially adopted a FIT policy in 2009 but later opted for a bidding process. In Asia, countries with FIT policies include; Thailand (2006 - 2007), Malaysia (2011), Indonesia (2013) and

Philippines (2012) (Ismail et.al., 2015). (Meyer - Renschhausen, 2013) also referred to Algeria, Kenya, Uganda, Ghana and Tanzania as African countries with FITS.

1.1.1 FIT policy in Kenya

In March 2008, Kenya's public procurement oversight authority approved the country's first FIT policy for RE technologies. The FIT policy had capacity limits for wind (50MW), biomass (10MW) and small-hydro (40MW) sources for power projects (Ministry of Energy, 2012). Considering the time and resources that were required to conduct the studies, the MoE developed the FIT policy to protect interests of developers who had conducted feasibility studies and to promote the development of renewable energy sources. The policy was revised in 2010 and included revised tariffs for wind and biomass and new tariffs for geothermal and biogas. In 2011 a review of the policy commenced and in December 2012, the revised FIT policy was published (Ministry of Energy, 2012).

The 2012 revised policy reduced transaction costs for PPAs for small RE generators by introduction of a standardised power purchase agreement (PPA) for projects of up to 10MW and also enhanced the FIT calculation model for tariff adjustments. The policy is supported by application guidelines issued by the Ministry of Energy and Petroleum (MoE). The policy had different rules for different project sizes (small and large) guaranteed priority purchase, assignment of standardised PPAs to projects up to 10 MW), technology specific tariffs, technology neutral PPAs. The conditions for a PPA offer were demonstration of technical economic viability, satisfaction of grid connection requirements, ability to satisfy legal and regulatory requirements and financing. Projects were approved on a first come first serve basis with no competitive bidding (Ministry of Energy, 2012). The FIT policy was implemented by the MoE after a four-year policy development process involving the MoE, Kenya Power and Lighting Company (KPLC), Kenya Electricity Generating Company (KENGEN) and Energy Regulatory Commission (ERC) (Nganga, 2013).

The policy was designed taking into account Kenya's long-term strategy 2012 – 2030 which set the targets of 5530 MW from geothermal, 1000MW from biomass, 200MW

from wind and 300MW from small hydro. The eligible projects for each technology are Biogas (0.5 - 40MW), Biomass (0.5 – 100MW), Geothermal (up to 70MW), Small hydro (0.5 – 10MW), Solar PV (0.5 – 10MW) and wind (0.5MW – 100MW) (Ministry of Energy, 2012).

The First draft of the FIT policy was considered ideal for projects developed by government entities because investment costs borne by the private sector were excluded. Secondly, investors argued that tariffs were too low considering the high interest rates and even higher capital costs applicable to the private sector and developers criticised the policy for excluding other technologies. On tariffs, developers opined that although the tariffs for hydro were reasonable, the tariffs for wind would only be viable on sites with constant high wind speeds and solar tariffs were unattractive for financing (Nganga, 2013). Kenya's FIT policy was revised to include more eligible technologies in which investors had shown interest or for which the tariffs were not attractive.

Five years after publication of the FIT policy, there was still a demand – supply gap. According to the (Ministry of Energy & Petroleum, 2013) the MoE investment prospectus indicated a demand – supply imbalance evidenced by scheduled power rationing since 2006 and that there was a need to address the undesirable situation through more generation from various renewable energy sources.

By 2011, there were 49 expressions of interest (EOI) submitted under the FIT policy with 23 for wind and 19 for hydro totalling to a capacity of about 1500 MW, of which 1311 MW were approved (Republic of Kenya, 2011). In Kenya, the total capacity of FIT projects was 69.5MW in a period of four years. Kenya's target electricity generation was 5000MW by 2015 from all electricity generation technologies (Comesa, 2017). The Kenya FIT policy has therefore not achieved much since 2008 when it was published and currently there are several EOIs, license applications and PPAs still pending approvals under the FIT policy.

1.2 Problem Statement

FITs have several advantages which include limited risks for investors, facilitation of entry of new players in the market, flexible design to accommodate different policy objectives and adaptable to change, usually funded by consumers and free from public budget cuts and long- term investment security offered by FITs drives industrial development in renewable energy technologies. FITs can however be costly when high deployment rates are achieved, complexity and challenges of tariff setting and adjustment and exclusion of electricity market prices from generation (Ngadiron Z., 2016). Given the challenges associated with the FIT policies, there has been a shift to combining FIT policies with other mechanisms or a complete shift from FIT policies to other mechanisms.

FITs have been criticised for a number of reasons mostly economic and these include: can lead to an increment in electricity prices particularly if they promote the more expensive technologies, distortion of electricity market prices, do not address the challenge of initial high up-front costs yet RE projects are capital intensive at the onset , not market oriented and do not respond to market signals on pricing, exclusive to those with high financial capability thereby excluding low income persons or entities , non – competitive and may not easily fit in an existing policy framework (Couture & Karlynn Cory, 2010).

Going by the recommendations in the Least Cost Generation Plan 2017 -2037 (Republic of Kenya, 2018), there are several challenges in respect of Kenya's FIT policy. Kenya's FIT policy is criticised for its project pricing uncertainty, lack of transparency or public scrutiny, non –competitiveness and opportunistic delays in project developments by developers targeting reductions in the cost of renewable energy equipment. The FIT policy has also not attracted private sector participation in geothermal and biogas technologies and yet it was the intention of the policy to utilise the geothermal and biogas resources of the country and is also criticised by investors for favouring state institutions.

Some of the recommendations in the Least Cost Development Plan 2017 -2037 (Republic of Kenya, 2018) include fast-tracking the operationalisation of the energy auction market for the solar and wind projects, adoption of a new FIT policy for integration of small hydro and biomass technology into the grid, phasing out committed medium term solar and wind projects under the FIT policy, negotiation of generation tariffs downward and suspension of procurement of new intermittent capacity plants under the FIT policy , establishing mechanisms to manage delays in implementation of generation projects and FIT projects such as Kipeto and Kinangop wind. Delays affect decision making in the energy sector and scheduling of future plants.

If the FIT policy is retained as is, electricity prices will not be competitive for consumers because the FITs are not premised on market conditions therefore projects under the FIT mechanism will be paid higher tariffs that market tariffs. The high consumer prices will undermine attainment of the big 4 Agenda and other policy goals provided for in the Vision 2030 and the Medium-Term Plan 111. Secondly, there will be delays in project development which may hinder attainment of the country's energy targets. Thirdly, where the demand for electricity is slow, the country is still bound fulfil its obligations to the projects already in the pipeline or risk sending the wrong signals of uncertainty within the legal framework to investors. To address these challenges, more must be known about the effectiveness of the FIT policy and this study therefore seeks to investigate the effectiveness of the FIT policy in the promotion of renewable energy.

1.3 Research Objectives

The general objective is to analyse the drivers and challenges of FIT policy in Kenya.

1.3.1 Specific Research Objectives

(i) To analyse the drivers of FIT policies.

(ii) To explore the challenges faced in respect of FIT policy design and implementation.

(iii) To explore alternative options for promotion of generation of electricity from renewable energy sources in Kenya.

1.4 Research Questions

In order to realize the above objectives, the study sought to answer the following research questions:

(i) What have been the drivers of FIT policies?

(ii) What are the challenges that have faced the process of FIT policy design and implementation?

(iii) Based on the lessons learnt from the Kenya FIT policy experiences, what are the possible alternative options for promotion of generation of electricity from renewable energy sources?

1.5 Scope of the Study

The scope of the study is focused on FIT policy makers and implementers (MoE, ERC, KPLC and KENGEN) and IPPs with signed PPAs within the industry. The unit of study comprises the organizations considered under the two umbrella categories. Geographically, the FIT policy is applicable in Kenya and the organisations which are the focus of the study are in Nairobi. The time scope of the study is from 2008 when the FIT policy was introduced to 2019 when the study was undertaken. The study will focus on the drivers and challenges of the FIT policy and alternative mechanisms for promoting the generation of electricity from renewable energy sources.

1.6 Significance of the Study

This study is important to a wide stakeholder base including the MoE, ERC, the off-taker (KPLC), IPPs, project lenders and consumers. To the MoE, the study provides an assessment of the challenges related to FIT policy design and implementation which will inform improvements in policy implementation and revision. To the energy regulator the study offers insight into the terms and conditions to be included in the licenses or approvals of PPAs between power producers and the off-taker. To the off-taker, the study offers insights into the challenges related to PPA negotiations. For IPPs who are part of the private sector, the findings from this study will provide knowledge on the roles of both the public sector entities and the IPPs in promotion of generation of electricity from renewable energy sources. Project lenders who are also usually part of the private sector, findings will acquire knowledge on the challenges in policy

implementation which will encourage lenders to adopt more efficacious lending approaches. To all stakeholders generally, the study offers insights into the gaps in the policy, the due diligence processes that should be undertaken before licensing and grant of approvals, the need to improve sector planning and coordination, the need to balance stakeholder interests and the possible alternative options to promote electricity generation from RE sources. The study recommends adoption of alternative mechanisms to increase generation of electricity from RE sources and this has social-economic benefit to local communities which will benefit from increased access to electricity and related advantages. This study is also relevant as a contribution to existing academic knowledge.

CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

The purpose of this review is to critically analyse literature on the drivers and challenges of FIT policy and alternative mechanisms for promoting the generation of electricity from renewable energy sources in Kenya. The research gaps have been identified and the analytical framework is included.

2.2 Theoretical Literature Review

There are several theories underlying RE development and FITS and below are two theories that are applicable to this area of study.

2.2.1 Institutional Theory

Institutional theory is as old as social theory and the first systematic attempts to theorize what institutions are and their influence is found in the writings of two classical scholars: Max Weber and Emile Durkheim. Weber's notion of cultural rules or system is similar to the generally accepted understanding of an institution today and he argued that a cultural system provides a set of meanings to attach to certain actions. Durkheim argued that institutions are symbolic systems of knowledge, beliefs and moral authority and are subjective products of human interaction but experienced by people as objective. Institutions are seen to possess moral authority and are backed by religion-like sanctions (Shadnam, 2008).

The institutional theory posits that organisations in different socio-economic and political contexts often react differently to similar internal and external challenges due to constraints imposed by the environment they exist in. In the same vein, socio-economic and political contexts shape the institutional structure of an organisation, thus presenting it with an advantage or disadvantage for engaging in particular business activities. Therefore, for organisations to endure, they must conform to the rules and belief systems prevailing in the environment in which they exist. Institutional theory has been widely used in various organisational studies across a number of disciplines mostly to explain how internal and external factors influence organisations. It is therefore relevant for understanding organisational behaviour (Weerakkody, 2009).

Many studies have applied the institutionalism theory to interpret phenomena in the energy sector. Earlier studies applied rational choice institutionalism to the challenge of regulating newly liberalised public utilities including energy. Later, institutionalism was relied on to explain the varying nature and consequences of energy sector reform in the former communist countries of Central and Eastern Europe and the Former Soviet Union. Institutionalism was also applied to many other aspects of the energy sector: for example, to electricity. Regulatory, normative and cognitive rules can constrain the pace and path of the low-carbon energy transition. The institutional context shapes policy discourse and the relative power of actors (Andrews-Speed, 2016).

As evidenced by subsequent discussion on empirical findings, the implementation of the policy was impacted by internal and external challenges within the environment or industry in which the public sector entities and IPPs exist. The institutional theory therefore serves to provide a lens through which to assess the roles of different actors mandated to design and implement the policy and the its impact on the various stakeholders.

2.2.2 Stakeholder Theory

The notion of stakeholder was initially applied in strategy then later on corporate governance. The main objective of the stakeholder theory is to broaden the understanding of the role and responsibilities of leaders from purely profit maximization to include the rights of non-shareholders as part of business interests, Stakeholder theory is concerned with the study of the nature of the relationships that connect the organization with its different stakeholders (Safae, 2019).The language and tools of stakeholder analysis may be useful within the public policy process (Freeman, 2010).

Renewable energy policies are traced back to a need to balance a variety of opposing stakeholder interests. RE policies have garnered support and transformed electricity systems despite opposition interest groups. Various interest groups compete and lobby for regulations that favour them. There are many players influencing national RE

policies (Strunz, 2015). The Article sought to analyse the complexity of stakeholders' interests in respect of policies to support renewable energy investment in Ghana. Until the 21st century, fossil fuel sources dominated global energy supply and consumption. Increasing calls for paradigm shift towards RE generation to mitigate greenhouse gas emissions from fossil fuels. Adoption of renewable energy tariffs was strongly opposed by high profile fuel energy players. Additionally, uncertainty about who would bear the cost of the transition to clean energy especially in developing countries was also an obstruction. A political economy analysis was necessary to identify all forms of competing ideas, interests, values, preferences and narratives and their influence on policy making and implementation (Bawakyillenuo, 2017).

The stakeholder theory relates to the study because of the interactions between key stakeholders in the renewable energy sector. This theory is pertinent to the ongoing study as it highlights the pivotal role of multiplayer actors with varying and often differing interests in influencing policy design and implementation between the public entities and IPPs. It is therefore necessary that polices be created through inclusion of the views of as many affected parties as possible. Based on the outcomes of the FIT policy as indicated by multiple stakeholders with different vantage points, it is possible to deduce the relevance of this theory in FIT policy design and implementation.

2.3 Empirical Literature Review

2.3.1 Analysis of the drivers of FIT policies

Increase in renewable energy generation

According to (Nganga, 2013) countries develop FIT policies for variety of technologies to lay a foundation for a successful electricity system. FIT policies transform energy sectors and societies by increased energy production, fostering economic development and improved access to clean energy. By 2012, about 65 countries had implemented FIT policies with majority for solar and wind technologies. FIT policies are adopted because they promote access to electricity, increase generation capacity, enhance stability of the grid and promote inclusive economic and social development. Many developing

countries have low electrification levels and have prioritised promotion of electricity generation. Other countries like Ethiopia also see electricity as a source of revenue through exportation hence adopt FIT policies to promote electricity generation beyond local demand.

The lesson learned so far in Europe is that many countries have successfully promoted RE in an effective and economically efficient way by implementing FITs (Haas., 2011). In fact, where implemented this policy has resulted in higher levels of new renewable energy investment than tradable Green Certificate (TGC) systems, probably due to the lower risk involved for investors (Fagiani et. al., 2013). One of the reasons that FITs have diffused so rapidly around the world has been their success at supporting new renewable electricity generation, particularly in Europe. According to Bloomberg New Energy Finance. FITs have driven 64% of global wind and 87% of global solar PV capacity. To date, however, most of these installations have been concentrated in developed countries (Rickerson et.al, 2012).

The analysis of the lessons identified shows that the application of FIT scheme in Saudi Arabia is likely to speed up the development of RE resources within the area (Ramli & Twaha., 2015). China, wind energy production increased because of a series of effective policies were embraced to support wind power system installation. China introduced support schemes and as soon as the RE introduced in 2006, penetration of PV was accelerated. FIT and capital subsidies, public bidding and teamwork within Government agencies played key roles in China. The most common and desirable supporting policy to RE is the FIT mechanism that sets the obligation to the utility to purchase the electricity produced from RE (Ramli & Twaha, 2015).

In Turkey, the feed-in tariffs were introduced by the Renewable Energy Act in 2005 and were revised in 2007 and 2010. Wind energy installed capacity increased from 10MW in 2005 to 1367MW as of March 2011 (Erturk, 2012). In Europe, FIT programs are believed to be the primary contributor to the success of the RE markets in Germany and Spain. In 1990, Germany adopted a law enforcing utility companies to purchase

electricity from renewable energy generators at prices tied to the retail price of electricity (Kyoung-Kuk Kim, 2012). In 2007, Spain adopted a sliding premium mechanism which offered an unfixed FIT payment above the existing market price and this sought to secure profitability of projects. Netherlands also adopted the sliding premium mechanism in April 2008 (Comesa, 2017).In California, the FIT policy drivers were development of a sufficient quantity of RE, provision of market certainty and financial security for developers and investors, promotion of a diverse mix of renewable resources through technology or attribute specific tariffs, development of a self-sustaining renewable industry and attainment of specific policy objectives (Grace.,2009).In Rwanda, the RE FIT regulation promulgated in 2012 aimed at providing a guarantee to investors in RE a ready market and an attractive return on investment for generated electricity (Comesa, 2017).

Compared to other RE support schemes, FITS encouraged green electricity production in Ukraine since FIT rates were high and grid access was guaranteed by law. In Italy FITS were introduced in 2005 and PV market experienced a boom and it was one of the leading markets in solar PV and this was attributed to a series of FIT schemes that were operated until 2012 (Ramli & Twaha, 2015).In Uganda the overall objective of the RE policy was diversification of energy supply technologies and particularly to increase the use of modern new renewable energy from 4% to 61% of the total energy consumption by the year 2017. The FIT scheme was aimed at attracting international investments into the power sector (Electricity Regulatory Authority, 2011/2).

In Kenya, the government's objectives for introducing the FIT were to facilitate the increase of the country's energy supply, improve the energy mix, reduction of greenhouse gases, and generation of income and employment. The FIT policy was also expected to provide investment security, reduce transaction and administrative costs, and attract private sector players (Ministry of Energy, 2012). The three main reasons for implementing a FIT policy in Kenya were to promote the uptake of renewable energy, increase power production, promote smaller electricity projects, to open up the energy market and attract the private sector (Nganga, 2013). Similarly, the 2016 Lahmeyer

International report stated that the FIT policy was introduced to provide investment security to renewable electricity generators, reduction of administrative and transaction costs and encourage private investment in the sector (Lahmeyer International, 2016).

The need for conformity with global standards or commitments

Secondly, another key driver for FIT policies is the transnational actors like the United Nations (UN) through sustainable development Goal 7, European Union commitment through Directive 2009/28/EC, World Bank (WB) and African Development Bank Group (ADBG) which have played a role in influencing countries to adopt FIT policies. According to (AFDB, 2013), ADBG provided financial and technical support for the construction, installation and refurbishment of distribution and transmission infrastructure and increased the electricity generated in Africa by 3000 megawatts.

Power shortages

Thirdly, FIT policies are adopted following severe and rampant power shortages. Countries like Uganda and Kenya which experienced a power crisis due to over reliance on hydro power which was adversely affected by drought realised a need to increase hydro power generation and also to diversify. According to a report of the Integrated Assessment and Planning initiative project the extreme power shortages in Kenya during the period of 1999 – 2000 had a negative impact on the economy (Ikiara, 2006).

Benchmarking

Fourthly, benchmarking from other countries is also a driver of FIT policies. Some of the countries with well developed solar PV electricity generation also have FIT policies and this has influenced other countries to adopt the policies with the expectation that their power sectors will also grow. For example, according to (Ismail et.al., 2015), Germany and Italy were the largest solar PV markets 2010 and 2012 respectively and they also have FIT policies.

Reduction in transaction and administrative costs

Fifthly, the cost and time saving advantages of FIT policies. The tariffs are stated in the policy so the PPA negotiations were expected to be faster and less costly. Advancement in technology and knowledge has supported adoption of FIT policies (Nganga, 2013).

Political will

Lastly, the political will is a key driver and countries whose leadership was committed to the promotion of electricity generation and green sustainable growth adopted the FIT policies. African Union (AU) heads of state in July 2011 in Equatorial Guinea agreed to advance Africa's interests in respect of green growth at the 2012 UN Conference on sustainable development (Rio+20). Further, in July 2012 in Addis Ababa, AU heads of state expressed their support for transitioning to green economies by asking the AFDB and other entities to provide support to those countries which were implementing the Rio +20. When leaders agree to policy issues at a global or regional level, it becomes easier to implement those policies at the national level. The conventions on sustainable development, protection of the environment, energy efficiency ratified or adopted lay a foundation for adoption of FIT policies. One of the reasons for the success of South Africa's bidding program was the political support from the top leadership evidenced by the written commitments the country had made to green energy (World Bank, 2014). The Spanish central government prioritised grid investments and with a strong grid system, the system operator was able to handle well the intermittent nature of wind energy (Linares & Libandeira, 2013). There are many reasons why jurisdictions implement FIT programs ranging from energy security, concerns about climate change to job creation as well as peak shaving. (Kyoung-Kuk Kim, 2012).

2.3.2 Challenges faced in FIT policy design and implementation

Difficulty in determining the best FIT level

A FIT policy is expected to be simple and flexible to provide for specific technologies, minimise investor risk, attract new players in the sector, drive technological development given its long term guarantees of payment, incentivise generation, where the costs are passed on to consumers through the tariff, should not impose a burden on

public spending however for political reasons, a government may decide to subsidise the FIT. It is linked to a fixed timeframe and considered a well established and successful method (Passey et.al. 2014).

Finding the best FIT level for each country is difficult. With a fixed FIT, projects do not need to respond to price signals from the market, resulting in bad market integration and FITS can be very costly for a country. A badly designed FIT policy can result in high utility costs for the consumers and when funded through a budget the stability of the FIT is dependent on the budget reliability. There is less control over the installed quantity (Passey et.al., 2014) (Laumanns, et al., 2015).The main design elements of FITS are fixed premium versus fixed tariff, support tied to electricity price, technology specificity, cap price, floor price, degression, reduction of support for existing plants, support paid by electricity consumers versus paid by taxpayers, duration of support, capacity limit per technology, cost –containment mechanisms. The paper discusses the impact of different FIT design elements on different dimensions. The choice of design elements within specific instruments is as important to promote RES-E as the choice of specific instruments (P., 2012).

Technical competence and expertise

One of the challenges faced in FIT policy design is lack of technical competence and expertise to accurately determine tariffs and their adjustment methodologies. It is recommended that policy makers should when designing FITs take into account the eligible technology, eligible plants, mechanisms for financing, size of the plants, consumers tariff calculation methodology (balance interests), technology specific tariffs, general access, priority grid access for eligible plants and cost sharing methodology for grid connection (Comesa, 2017). The success or failure of FIT policies critically depends on tariff determination and adjustment. There is therefore a need for technical competence and expertise in designing FIT policies (Alizamir., 2016). It is advisable to have a FIT policy for all technologies because this encourages investment across all the technologies. Where it is preferred to have a FIT policy for some and not others, it is advisable to have alternative mechanisms for those not covered.

Designing, implementing, monitoring and adjusting FITs require specific skills and competencies which may not e readily available in most developing countries. Each of the issues may require new expertise, capacity, and resources that were not required prior to the introduction of the FIT. Some countries may be well positioned to accomplish all of these tasks internally. However, there are few developed or developing countries that have not turned to external resources to accomplish some or all of these tasks. Networking and knowledge sharing among FITs practitioners and policymakers between developed and developing countries, and through South - South exchange (Rickerson et.al., 2012).

Perhaps, it is relatively easier for governments to set policy objectives and targets than to design policy instruments meant to translate policy into action. The work of designing policy and choosing clear; credible and long-term instruments requires skilful assessment of environmental effectiveness; cost; flexibility; feasibility; complementarity to other existing policies and/or efforts; equity concerns; and co-benefits. Yet, there are no 'one-size-FITs-all' policy instruments. Each country must find suitable instruments appropriate to its stage of development, energy sector composition, institutional capabilities, and ability to undertake scaled investments (Sanjay Kumar Kar, 2016).

Dependence on a regulator's determination

Secondly, there is a challenge of dependence on a regulator's choices. A FIT policy could perform better than a certificate market, but its performance was strictly dependent on regulator choices (Fagiani et.al. 2013). Serbia the FIT structure could not attract investments in Solar PV. Several other FIT schemes were suggested for a larger FIT payment or extension of the rate period from 12 years to the whole project period of 35 years (Ramli & Twaha., 2015). Under a FIT system, the regulator must define the level of the tariffs without perfectly knowing the exact generation cost of each technology. Tariffs performances are strictly dependant on regulator's decision regarding tariffs level which are based on average cost estimations and could result in either low effectiveness or over investment. Moreover, regulator's estimations can be far from perfect and subject to manipulation by lobbyists (Fagiani et.al., 2013).

Capacity building is critical because the individuals and entities charged with design and implementation should be competent.

Failure to consider the peculiarities of a country or market

Thirdly, is the failure to consider factors peculiar to a country. It is recommended that the factors peculiar to a country and the different motivations for introducing a FIT policy are considered. According to (Nganga, 2013), Tanzania was motivated to adopt a FIT policy due to its low electrification rates and widely spread population. Algeria and Egypt adopted FIT policies even with a very high rate of access to electricity hence they had different motivations. South Africa was motivated by mounting pressure for it to reduce carbon emissions.

Experience from Brazil and India suggests that policy instruments, design and complexity of the policy scheme should be tailored to the realities of the market and institutional capabilities (Odero, 2014). Different renewable technologies may require different policy approaches and the same support policy may result in very different outcomes (Linare & Libandeira., 2013). It is also important that FIT policies be designed and revised in accordance with the changing environment in which the policies are operationalised and aligned with the country's priorities. According to (Linare & Libandeira, 2013) it is worth noting that policy is not quick enough to adapt to quick technological changes which may lead policy makers to resort to retroactive changes which erodes credibility for investors (Odero, 2014). Detailed implementation differs across nations and also different methods used to determine tariff levels are not the same for example Portugal determined tariff level based on avoided costs, climate environmental benefits and effects on energy supply security while most EU countries based the tariff levels on generation costs such as initial investments, operating costs, inflation. (Kyoung-Kuk Kim, 2012).

Complexity of design and approach

Fourthly, there is also a challenge of complex policy designs. (Nganga, 2013) advocated for a phased approach. It is prudent to begin with a basic or straightforward FIT policy

and gradually expand the scope and complexity. Germany's first renewable energy FIT law in 1990 had 5 articles, 13 in 2000, 21 in 2004 and 66 articles in 2009. This phased approach allows for gaps to be identified and experience gained which are useful and a basic policy is easier to understand and accept at the onset than a complex one.

Policy cost

Fifthly, policy cost is a critical issue especially in developing countries. In Europe, FITs were inherently expensive because of the large volume of renewable energy capacity that had been built under FITS. Further, many developing countries lack the resources to pursue generation projects that will significantly increase ratepayer or taxpayer burdens. It was observed that countries may and have adopted radically different FIT designs to reflect their different policy goals and national circumstances. FIT policies can be designed to limit ratepayer impact and do not necessarily need to be expensive from the point of view of ratepayers (Rickerson et.al., 2012).

2.4 Descriptive statistics on target MW and actual MW generated from FIT projects in Kenya

The researcher further assessed publications on the generation capacity anticipated from the FIT renewable projects. In doing so, data from the FIT policy (second revision) was used as the basis of comparison with current figures indicating the progress of total energy contributed by or anticipated from each of the options. Table 2.1 and 2.2 highlight the stipulations for small renewable projects (up to 10 MW of installed capacity), and renewable projects above 10 MW of installed capacity, respectively as stipulated in the 2012 version of the FIT policy.

Table 2.1 below indicates the FIT values for small projects (10MW and below) across the various renewable energy sources and the maximum target capacity that was to be generated which totals to 51MW.

Table 2.1: FIT values for small renewable projects
Source – FIT policy 2012

	Installed capacity (MW)	**Standard FiT (US $/ kWh)**	**Percentage Escalable portion of the Tariff**	**Min. capacity (MW)**	**Max. capacity (MW)**
Wind	0.5 -10	0.11	12%	0.5	10
Hydro*	0.5	0.105	8%	0.5	10
	10	0.0825			
Biomass	0.5-10	0.10	15%	0.5	10
Biogas	0.2-10	0.10	15%	0.2	10
Solar (Grid)	0.5-10	0.12	8%	0.5	10
Solar (Off-grid)	0.5-10	0.20	8%	0.5	1
				Total	51

Table 2.2 below indicates the FIT values for large projects (above 10MW) across the various renewable energy sources and the maximum target capacity to be generated from all which totals to 1500MW.

Table 2.2: FIT values for renewable projects above 10MW -
Source - FIT policy 2012

	Installed capacity (MW)	**Standard FiT (US $/ kWh)**	**Percentage Escalable portion of the Tariff**	**Min. capacity (MW)**	**Max. capacity (MW)**	**Max. Cumulative capacity (MW)**
Wind	10.1-50	0.11	12%	10.1	50	500
Geothermal	35-70	0.088	20% for first 12 years and 15% After	35	70	500
Hydro	10.1-20	0.0825	8%	10.1	20	200
Biomass	10.1-40	0.10	15%	10.1	40	200
Solar (Grid)	10.1-40	0.12	12%	10.1	40	100
					Total	1500

From both tables 2.1 and 2.2, it can be deduced that the cumulative target output from all FIT projects was thus 1551 MW. However, table 4.3 below indicates that all the FIT projects at different stages in the process have a cumulative capacity of 4469.04MW. This implies that if all projects are developed and in operation, 4469.04MW of electricity will be generated which is way above the target 1551MW hence a risk of oversupply. Secondly, the table also indicates that the MW of electricity so far generated from FIT projects is very minimal at 10.3MW with majority of the projects in earlier phases of the process.

Table 2.3 below provides a summary of the FIT project status as of 2018. The table offers a point of contrast in assessing the progress in the industry with regard to renewable energy generation.

Table 2.3: Summary of FIT projects as at May 2018
Source - Ministry of Energy

	Wind	**Biomass/ Biogas**	**Small Hydro**	**Solar PV**	**Geothermal**	**Total No of Projects**	**Total Capacity (MW)**
Plants in Operation	0	1	5	0	0	**6**	**10.3**
Projects With Signed PPA's	3	3	9	7	0	**22**	**376.25**
Projects with Initialled PPA's	3	2	3	3	0	**11**	**338.51**
Projects with Finalized PPA Negotiations awaiting Kenya Power Board Approval	1	0	0	3	0	**4**	**80**
Projects with PPA's under Negotiations	0	2	6	7	0	**15**	**307.65**
Approved Projects with PPA Negotiations Yet to Start	2	2	6	4	0	**14**	**165.3**
Projects with Feasibility Studies approved and	2	0	0	23	0	**25**	**517**

sent to ERC-LCPDP							
Projects in Feasibility Study Stage	8	20	64	62	1	**155**	**2674.03**
Total No. of Approved Projects	**19**	**30**	**93**	**109**	**1**	**252**	
Total Capacity (MW)	**898**	**504**	**490**	**2509**	**15**		**4469.04**

The current total output, as indicated, is 10.3 MW with an anticipated total of 4469.04 following fruition of all projects. The general observation, therefore, is that there has been a significant delay in the development of renewable energy projects given the ten-year time lapse following introduction of the FIT policy. The discussions subsequently put forward and made in light of this observation.

Lessons learnt

Some of the lessons from Germany and Spain are ; FIT design is critical to the success of the policy, long term generation cost based payments grow renewable energy markets, technology specific tariffs create diversity when set at appropriate levels, investor security is determined by both price security and policy certainty, incentives may or may not put downward pressure on renewable energy prices, implementing support for emerging resources is challenging, setting the correct price for some technologies like biomass can be challenging, long term payments have been used successfully, FITs can promote technological innovation, policy costs can be distributed nationally and FITs can suppress wholesale market prices (Grace ., 2009).

Benchmarking is recommended. There is benefit in drawing comparisons with other countries. The tariff of a similar country with a FIT policy and successful program provides a good guide even before other technical aspects are considered. The FIT design should ensure that profitability decreases over time so that investors do not

strategically delay investment and the constant profitability is theoretically rarely optimal (Alizamir.,2016). Also recommended is an introductory/trial phase before implementation of a FIT program offers policymakers an opportunity to make adjustments where appropriate. Setting intentionally low rates for power generators in a trial phase could help ensure developers do not receive windfall profits and the cost to stakeholders is acceptable and keeping the policy as simple as possible helps maintain transparency and allows greater access to interested parties (Comfield, 2010).

Most of the FIT schemes in Africa did not work well because of unfavourable institutional design, inadequate FIT rates or implementation challenges. Failure in the design and implementation of FIT schemes is evidenced by conflicting policy targets on affordability of power and stability of the grid and property rights conflicts and time-consuming negotiations of PPAs. To overcome some of the design and implementation challenges, stakeholder engagement is very key and if not done effectively, it poses a challenge in designing and implementation of the policy. Technical aspects determining which projects qualify influence who will participate, the extent of their participation and the overall impact of the policy. Citizen and leadership buy in are very important for successful implementation. It is advisable to sensitize stakeholders and to form alliances to garner support for the policy.

2.3.3 Alternative options for promotion of renewable energy development

Options for promoting generation of electricity from renewable energy sources

The UNEP handbook for drafting laws on energy efficiency and renewable energy resources stated that a wide range of policies was used to support renewable energy development around the world, including renewable portfolio standards (RPS), economic tools, distributed generation measures, and disclosure and green marketing (Ottinger et.al., 2007). Policies comprise FITs, tax credits for investment/production, research, development and demonstration programs, renewable energy mandates, reduction on import duty and export support, technology forcing regulations, preferential loans, accelerated depreciation rates, government green purchasing preferences and consumer purchasing preferences, competitive bidding and green certificate trading (Ramli & Twaha., 2015).

There are several policy instruments for promoting RE and these include subsidies, quotas, tendering and feed-in tariffs each with strengths and weaknesses and different energy policy targets. A combination of different instruments maybe applied simultaneously, or modifications made to the FIT scheme for compatibility of policy targets (Meyer - Renschhausen, 2013). Support policies for renewable energy were mainly in two broad categories: price/tariff based and quantity – based mechanisms (Fagiani et.al., 2013). Tariff- based instruments, quantity – based instruments and hybrid instruments (tariff and quantity – based instruments) are the main categories of renewable energy support schemes aimed at supporting the procurement of renewable energy generation (Barroso et.al, 2015). The main instruments for promoting RE are FITs, quota obligations, tenders and (energy) tax exemptions. Countries usually choose one but there are cases of combination e.g Austria and also connect this with other political instruments such as subsidy programs, soft loans, tax allowances, tax exemptions. Germany (9841MW) and Spain (3737MW) were leading and energy countries have FITs. (Comesa, 2017). In the EU, three main renewable electricity subsidy schemes play a central role: FITs; tendering schemes; and renewable obligations (RO), or Renewable Portfolio Standards (RPS). For instance, Germany adopted a FIT, France a tendering scheme and the UK a Renewable Obligations scheme (Gao, 2015).

Auctions/ Competitive Tenders

Competitive tenders and auctions are competitive processes which vary in approach and complexity from requests for proposals (RFPs) that result in a single, low - bid winner to multi- round clock auctions with multiple winners. Auctions refer to competitive bidding procurement processes for electricity generation from RE. They are also known as demand or procurement auctions and involve a government call for tenders to install a specific capacity of electricity from RE sources (Barroso et.al, 2015). In 2005, FITs were the most popular support mechanism while only 6 countries at the time had implemented auctions however, auctions have seen strong growth and were implemented in over 60 countries by early 2015. Countries have started to implement a blend of different policies (hybrid policies), allowing them to profit from the benefits offered by a range of different policies (Ferroukhi, 2015).

Competitive auctions and FIT schemes have been used for the promotion of power generation, policy frameworks and support mechanisms in South East Asia Nations. The auction may through bidding lower prices and have the potential to discover real production cost of renewable energy. The most common support schemes that have been implemented and proven successful in the past are the competitive auctions and the FIT scheme. Although FITs are still popular, the use of auctions is increasing worldwide (Ngadiron, 2016). South Africa launched the competitive tendering mechanism in August 2011 after failure of the FIT policy. It was a very successful mechanism and attracted investment commitments worth US$14billion to develop 3922MW of new renewable energy generating capacity in South Africa. (Eberhard, 2014). Competitive tendering is therefore a viable option for Kenya to adopt.

China in 2008 implemented a competitive bidding process to determine competitive benchmark electricity prices at regional level resulting into FIT energy contracts (Comesa, 2017). Under its bidding program, South Africa attained more investment in power generation by IPPs than the African continent had in the last two decades (World Bank, 2014). South Africa opted for the tendering approach to achieve the often-conflicting policy targets of increasing renewable energy development, affordability and grid stability (Meyer - Renschhausen, 2013). Auctions may be technology neutral or specific and have been used in some countries to promote the development of non-conventional renewable energy sources including wind, hydro (small plants), biomass, tidal, geothermal, and solar. Auctions are a viable alternative to the commonly used FIT policies because they foster competition and drive prices down which reduces end user tariffs and facilitates a more sustainable electricity system (Barosso, 2011).

It is advisable for Kenya to consider adopting the auctions or competitive tendering method which makes planning easy and minimises the challenges of having many unsolicited EOIs submitted.

Mini-grids

Although traditionally, it was assumed that FIT policies were implemented where a well-developed national grid existed, Tanzania overcame the challenge of dispersed populations and low electrification levels by implementing a FIT policy through decentralised mini-grids (Nganga, 2013). Therefore, since the national grid in Kenya faces stability challenges particularly in respect of intermittent technologies and Kenya also has low electrification levels with some areas not connected to the national grid, the use of mini-grids is an alternative option to promote renewable energy development. In Nigeria, renewable energy mini-grids were identified as a mechanism to promote rural electrification and ten thousand mini-grid sites with a total capacity of 3000 MW were identified for possible development by 2023. Renewable energy mini-grids were also adopted in Rwanda, Sierra –Leone, Tanzania, Cambodia, Indonesia, India and Peru to promote rural electrification (IRENA, 2018). An IRENA report with case studies on eight countries and their adoption of renewable energy mini-grid policies and implementation of the mini-grids indicates that it is a viable alternative option to promote renewable energy. It is therefore a viable option for Kenya to implement renewable energy mini-grids as one of the mechanisms for promoting the development of renewable energy.

Kenya recently adopted the Kenya Off-Grid Solar Access Project (K-OSAP) which is intended to increase electricity access to underserved areas or areas that are not connected to the national grid or are far from the national grid. If the project is effectively implemented, it will contribute to development of renewable energy sources in the country.

Net Metering

A study was conducted for the Government of Kenya to establish a framework for net metering to increase renewable energy electricity generation in Kenya. Net metering was defined as a mechanism which allows grid-connected electricity consumers who also generate their own power to “bank” or “store” their electricity in times of over-production. It was also stated that many countries in the high –income, middle-income

and low-income brackets had adopted net metering policies and Kenya had great potential for a successful net metering program (Economic Consulting Associates and Carbon Africa, 2014). Net metering is a mechanism which allows electricity customers to generate electricity from renewable energy sources and offset some or all of their electricity use. The customer receives power from the grid when they need more electricity than they are producing and sell excess energy to the grid when they use less electricity than they are producing, and the customer is billed monthly for only the net energy used. Different net metering schemes have been implemented in different countries in the world and depending on the unique circumstances of each country or state (Poullikkas A; et. Al 2013).

Although net metering system is a new concept in India, this programme successfully worked in countries like Australia, Canada, Italy, Spain, Denmark and United States. In 2002, Thailand was the first country to initiate the first net metering policy in the developing world. Another successful use of the net metering system may be seen in Canada, which started in 2006 and California has also used the net metering systems successfully.

2.4 Research Gaps

The literature reviewed covers largely FIT policies for RE in developed countries and some developing countries which have stronger institutions and systems, greater access to financing and have also had the FIT policies in existence for a longer time in comparison to Kenya. Previous research has widely investigated the key FIT policy design elements and options, made general and qualitative comparisons between FITs and other policy instruments for scaling up renewables and recommended best practice. Some studies on other African states are on FIT policies for large scale projects unlike the Kenyan FIT for both small and large projects. Other studies on Kenya focused on the creation of the Rural Electrification Authority in Kenya but did not focus on the drivers and challenges of the FIT policy and alternative options to promote generation of electricity from renewable energy. This research is distinguished by its focus on a developing country with a FIT policy for a comparatively shorter period. The key question remains on what the drivers and challenges of Kenya's FIT policy are and

alternative options to promote the generation of electricity from renewable energy sources.

2.5 Analytical Framework

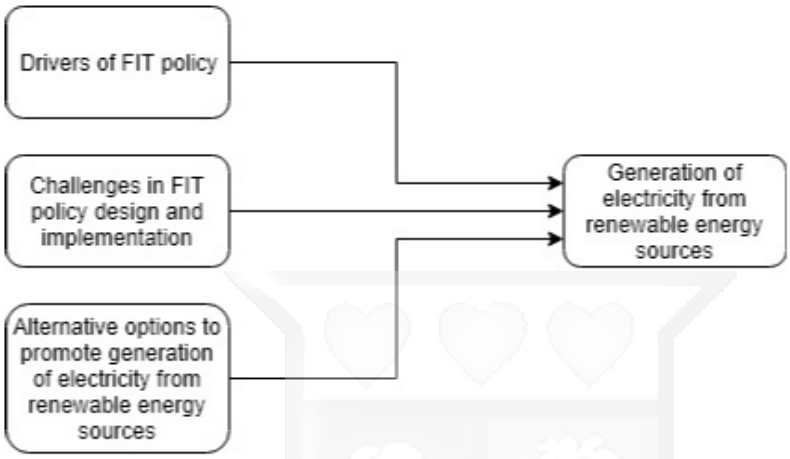

Figure 2.1 Analytical framework

The diagrammatic representation of the above constructs in the study shows that the three factors are pivotal in determining the extent of generation of electricity from renewable energy sources. The drivers of FIT policies, the challenges faced in FIT policy design and implementation and availability and implementation of alternative options all have a direct impact on the generation of electricity from renewable energy sources. Where the motivations for developing a FIT policy are clear and well understood and the challenges in policy design and implementation are minimised or addressed and alternative options to promote the generation of electricity from renewable energy sources are implemented in combination with or as a replacement to the FIT policy then these promote the generation of electricity from renewable energy sources.

2.6 Chapter Summary

The theories applicable to this study include the institutional theory and stakeholder theory. The literature review suggests that the drivers of FIT policies are establishing successful electricity systems, increasing electricity generation, influence of transnational actors who also influence global initiatives to promote renewable energy, rampant shortages, benchmarking, cost and time saving benefits of FITs and political will.

The literature on challenges faced in policy design and implementation is to the effect that determination of the correct FIT level is difficult and dependant on the regulator's decision which is also based on estimates. Further, other challenges include lack of technical competence to design the FIT policy effectively, the cost of policy design and implementation, failure to consider market peculiarities and opting for complex policy designs. There are several alternative options which have been implemented successfully in other countries to promote renewable energy and these include auctions or competitive tendering, net metering and mini-grids. These options are viable for Kenya and the foundation has already been set for them through the K-OSAP project (mini-grids), the Energy Act passed in March 2019 made provision for net metering and there have been recommendations to adopt the auction mechanism in a number of reports as indicated in this study.

CHAPTER 3 – RESEARCH METHODOLOGY

3.1 Introduction

In this Chapter, the research methodology, design, data collection methods, data analysis, research quality and ethical considerations will be discussed.

3.2 Research Design

This research took on an exploratory approach to investigate the drivers of FIT policy, the challenges in implementation of the policy and alternative options for promotion of generation of electricity from renewable energy sources. The research will rely on secondary data sources from the MoE, ERC and other published reports. Primary data collection will be conducted through key informant interviews (KIIs) with employees from the MoE, ERC, KPLC and KENGEN and IPPs.

3.3 Population

The total population of the study was 26 respondents. The population comprised all the four relevant government entities involved in the FIT policy design and implementation and these included the MoE, ERC and KPLC. It also included the wholly owned government electricity generating company KENGEN which is a key stakeholder in the generation of electricity from renewable sources and was involved in the FIT policy design process. According to a study, the FIT policy was implemented by the MoE after a four-year policy development process involving the Ministry of Energy, KPLC, KENGEN and ERC (Nganga, 2013). The study population also comprised of IPPs who constitute the private sector and are stakeholders in the FIT policy implementation. As of 2018, there were 22 IPPs with signed PPAs. The researcher targeted the 22 IPPs. The study approach was both descriptive and qualitative, with a triangulation of the data from all sources and other published reports. This research involved review and analysis of data from the year 2008 when the FIT policy was introduced to 2019 when the study was undertaken. Specific methodologies included structured guides and checklists, relevant documents and key informant guides.

3.4 Sampling Technique and Sample Size

A census approach was applied in finding respondents for the study. The researcher sought to reach all public sector institutions involved in FIT policy implementation and IPPs with signed PPAs for participation; informants were identified as indicated in Table 3.4 below based on availability and willingness to participate in the study. The Interview Guide is attached as Appendix 1.

Table 3.1- Key Informant Interview Target Population

Category	**Institution**	**Designation**	**Number of respondents**
Line Ministry	Ministry of Energy	• Director for energy policy. • Chairperson of the FIT committee. • FIT Committee member	1
Sector Regulator	Energy Regulatory Commission.	• Director General • Head of Licensing • Head of Economic Regulation	1
Off-taker	Kenya Power and Lighting Company (**KPLC**).	• The Managing Director. • Member of the Power Purchase Agreement Committee.	1
Key public sector stakeholder	Kenya Electricity Generating Company (KENGEN).	• Managing Director • Director for projects	1
Independent Power Producers (IPPs)	Project developers with signed Power Purchase Agreements	• Twenty –two IPPs	4
Total KIIs			8

3.5 Data Collection Method and Procedures

The collection of data was achieved using interviews owing to the nascent nature of the phenomenon under study and the level of expertise required to provide insights into the study topic. The interview guide was structured with questions addressing aspects of the study objectives; in particular – drivers of FIT, challenges in FIT implementation, and alternative options for FIT development of RE.

Data was collected through one on one interview with the target respondents. As observed, in a publication, interviews are essential in collection of insightful data in previously unexplored relationships and expositions as may be the case in exploratory studies. Further, that exploratory studies allow for the gathering of insights on emergent phenomenon by leveraging the use of insightful unstructured data collection and analysis tools. (Maxwell, 2012)

3.6 Research Quality

To ensure validity and reliability, the researcher conducted a pre-test with potential respondents to assess that the study questions measured what they were intended to measure (validity) and that they were consistently understood across all stakeholder groups involved (reliability) (Maxwell, 2012). Furthermore, the researcher sought feedback from the supervisor in confirming the suitability of the included questions. Upon feedback from the initial pilot tests, questions were amended and confirmed to be valid and reliable across all respondent categories. The eventual interview prompt was therefore deemed to be of suitable reliability and validity.

3.7 Qualitative Data Analysis

The study was centered on a content analysis approach. All interview data was collected and coded to provide themes in light of the study objectives. These themes were then curated through consultation with the supervisor after which they were presented in response to each objective. The process was theory-driven wherewith the analysis categories determined based on the study objectives and the conceptual framework. Additionally, descriptive statistics by way of summarized table were included to provide insights on the general findings put forward by the respondents.

3.8 Ethical Considerations for the Study

Participation in the study will be voluntary and based on informed consent. The study participants will be informed of the benefits of the study and their participation, the approach to be used in conducting the study and their right to withdraw from the study. Confidentiality of the participants and data collected from them will be upheld. Data collected will be safely secured to ensure it is not accessible to unauthorized persons.

CHAPTER 4: PRESENTATION OF ANALYSIS

4.1 Introduction

This chapter addresses the research questions through the data collected for the study. This section provides a presentation of the analysis and is structured into sections addressing each of the objectives. Discussed herein as well are the response rate of the study, and descriptive statistics of the respondents.

4.2 Response rate

The researcher sought to reach four respondents with at least one respondent from each of the public sector organisations (MoE, ERC, KPLC and KENGEN) and four respondents from the IPPs in Kenya. A total of eight respondents were reached with representation of both public and private sector. This therefore represents 100% of the public sector population and 18% of the intended IPP population totalling to a joint response rate of 31%. As indicated in table 3.1, the researcher interviewed high-ranking representatives of the respective organizations to gain insightful feedback on the study topic. The collected data, given the represented institutions and the designation of respondents was thus deemed sufficient for analysis. The responses gathered were thus deemed to be reflective of the institutions from which the respondents were sourced.

A study was conducted to analyse the response rates in web- or internet based surveys and one of the key arguments that was made on response rates was that response representativeness is more important than response rate in survey research and that response rate is important if it bears on representativeness (Cook, 2000).The position on response rates and response representativeness is applicable even to non-web or internet based studies. In my study, the response rate from the public sector side was very good and representative. The respondents from the public sector entities were technically very experienced and represented their respective entities on various committees in respect of the FIT policy implementation and related matters and their responses were therefore akin to the entities' position on the various aspects that were discussed in the interviews and hence representative. On the IPP side of respondents, their responses were also representative because the respondents were high ranking, experienced and

knowledgeable persons with a wide understanding of their business and industry, they had been involved in various stakeholder discussions related to the FIT policy and other issues in the industry and were well versed with issues from both the public sector and IPP perspectives.

4.3 Roles of the Organisations Represented by the Respondents

Respondents were required to provide information on the roles of their respective organizations that they represented. Among the public entities, the following roles were cited – approval of power purchase agreements, issuance of COD (Commissioning Date) letters, permitting, licensing, off-taker, system operator, service provider, oversight of PPA issues and guidance on interpretation of provisions in the PPAs and advising parties in respect of PPA disputes, policy creation, strategic direction and planning. Among the private sector, the following roles were cited; project development (site identification, submission of expression of interest, conducting feasibility studies, application for permits and approvals, land acquisition), power generation, and other activities in the project development phase and power generation.

4.4 Analysing the drivers of the FIT policies

Reasons for the FIT policy

In addressing this objective, the researcher queried respondents on the main reasons behind creation and implementation of FIT and the efficacy of the policy. Answers emanating from the thematic and summative analysis of each of the respondent's feedback is presented in respective sections. The main reason behind the introduction of FIT, as quoted by the respondents, was to attract the private sector investment in the energy sector in the bid to increase power generation and ensure adequate supply of renewable energy within the country. The main theme under this objective was attractiveness of the tariffs to the private sector or IPPS. Seven respondents indicated that the tariffs were high with two indicating that they were too high. Two indicated that they were too low at the onset. Responses pointing to the appropriateness of the tariffs were based on the reported low costs of the panels, batteries, controls, and general equipment required for production of energy. In the 2012 policy revision tariffs for solar

and wind are USD 12 cents/kWh and 11 cents/kWh respectively, the prices are today deemed exorbitant and requiring downward revision owing to reduced input costs. Two respondents were of this view. Two respondents posited that the tariffs were attractive from the start. The public entities' views however contrasted with IPPs with one respondent indicating that in practice, there was an informal cap at USD 7.5 to 8.5 cents/kWh for solar. Producers were required to engage in negotiations on the tariff rates which is a practice contrary to the provisions of FIT. The government owned generation company was also reported to be offered lower tariffs than IPPs hence indicating variability in pricing and unlevelled ground for competition.

4.5 Exploring the challenges faced in FIT policy design and implementation

4.5.2 Challenges of policy design and proposed changes

This section addresses questions pertaining to the various challenges that the public sector entities and IPPs encounter in respect of policy implementation. The section is thus subdivided to address the challenges of each of the stakeholder categories assessed in this study.

Effectiveness of policy design

Whereas there were six instances of citations of the FIT policy design as a success, it was qualified that the FIT was successful in generating interest and private sector involvement in the sector only but unsuccessful in promoting renewable energy generation. There were 4 mentions to the contrary (some respondents provided yes and no answers with justification). Among the reasons cited in support of the view that the policy was not successful were that the policy design was ineffective. The lower tariffs put in place at the onset did not attract a lot of interest from private developers, the policy design allowed for unsolicited expressions of interest and very many were submitted which distorted sector planning. Further, the policy design did not provide for a mechanism of ensuring that the ministry did not accept excessive number of expressions of interest. Seven respondents indicated that the policy design was effective with one being of the contrary opinion. The effectiveness of which was cited, by one respondent, as being derived from the fact that the policy was built off of benchmarking

efforts with similar policies in South Africa and Germany. Among the notable provisions of the policy was the basing of tariffs on the capacity generated. The challenge with this approach, however, was that with packaged tariffs, companies without capacity to develop the projects could also apply and seek EOIs. The open or unsolicited mechanism, allowing for smaller players in the industry, was however also lauded for allowing for entry of under 10MW technologies suitable for small projects. It was also reported that the policy was created after wide consultation with multiple stakeholders – a process that allowed for the identification and addressing of emerging gaps to the process.

Of the cited shortcomings, the regulatory aspect stood out as the most apparent issue. The mandate of the MoE with regard to issuance of EOIs was not accurately stipulated thereby leading to ambiguity in the issuance of the same to prospecting developers. The policy did not further provide for possible causes of action following overcapacity. De-risking of sites by the government was also proposed as a necessary addition to the policy; the inclusion was deemed to mitigate against risk of project failure as a result of land acquisition challenges. The USD 12 cents quoted tariff was also deemed to be an over-estimation with the actual prices being about USD 7.5 cents for solar energy. The general inference, therefore, was that the structuring of the policies was hindered by implementation challenges.

4.5.3 Challenges of policy implementation and proposed enhancements

Effectiveness of policy implementation

In respect of policy implementation, there were delays in decision making by public entities, delays in obtaining approvals from public sector entities, delays and failure by IPPs to achieve milestones within specified timelines, no punitive action taken against IPPs who did not achieve milestones in project development and there were failures in due diligence and evaluation of applicants because many IPPs who acquired approvals and licenses yet they lacked the technical and financial capacity to develop projects .The delays on both the public sector and IPPs in the various stages involved and the

multiplicity of government bodies were factors also cited as reasons for the ineffectiveness of the structuring and implementation of the policy.

The FIT policy was deemed to have resulted in the lengthy development periods and supply of a small amount of energy. However, as one respondent observed,

> *"The 2008 and 2010 versions of the policy were unlikely to attract bankable projects, but the 2012 revision was a better version of the FIT policy."*

The rate of project completion was also viewed as subpar and structuring of the policy was also deemed to suffer major technical incompetency; for instance, the standardised PPA crafted did not consider the peculiar aspects of various technologies. As one respondent indicated:

> *"Deemed Generated Energy Payments were provided for all technologies with no differentiation per technology yet for example the deemed generated energy payment for wind shouldn't be the same for hydro since deemed generated energy payments are about costs and compensation for loss."*

Of those that indicated that the policy was successful, one regulator indicated that since 2013, the policy attracted enough project developers to meet the energy targets set for solar in the 2012 FIT policy revision thereby pointing to the success of the policy. Five respondents also reported that there was an influx of investors as a result of the 2012 policy revision. The success of the policy was evidenced by the high number of projects reported to be pending PPA approval, under negotiation, awaiting COD letters, and those under feasibility study.

Seven respondents indicated that the implementation process was flawed thereby hindering manifestation of the anticipated outcomes of the otherwise well-crafted FIT policy. Among the cited failures in implementation were the misalignment between regulator bodies, inadequate implementation and lack of adherence to the legal framework (2 respondents). The allocation of commission dates was also deemed

arbitrary in that dates were not set according to energy needs (2 respondents). The resulting situation was thus a likelihood of overproduction as many projects were underway and would be completed despite the lack of demand for additional energy. Given the PPAs, payment to the developing companies would be required despite underutilization.

The suggested recourse as put forward by the respondents involved clear communication and openness from the government and the creation of technology-specific power-purchase agreements that would take into effect the peculiarities of the various options and the economic implications of the same. It was however reported that an updated policy was currently in effect although it had not yet been published for access by the public. The policy was viewed as addressing the challenges in the industry.

The general themes emanating from the responses were that the FIT policy was effectively designed but there was inefficiency in implementation of the policy and a lack of cadence in the interests of the various represented stakeholders. With regard to implementation, it was apparent that the unsolicited proposals without strict monitoring of progress resulted in the possibility of oversupply of projects and the bureaucratic processes and inefficiencies led to delays on public sector side while lack of technical and financial capacity on the side of IPPs led to delays on their side. Furthermore, granting approvals and licenses to incompetent entities resulted in project delays by project developers. Despite consultations in the creation of the policy, there was a lack of alignment of interests and poor implementation of agreements. The inefficiencies of the system as a whole hindered the development of renewable energy. The suggestions put forward in addressing the challenges of the industry generally focused on the role of government in achieving effective implementation of policies, strict adherence to rules and procedures and improvement in sector planning.

Delays in concluding PPA negotiations

The main emerging reasons were contentious provisions on which parties took long to reach agreement, poorly drafted documents hence ambiguity in interpretation, multi-

stakeholder involvement leading to a bogging down of the process, bureaucratic challenges and to a small extent different negotiation styles resulting from inter-cultural differences between the foreign teams and local teams. Human resource capacity concerns on the part of the off-taker were also reported because the team involved in negotiations was at certain times overwhelmed with negotiating back to back with different sets of IPPs.

Challenges faced by IPPs

In assessing the challenges that organizations face in performing their roles in respect of energy projects development, it was apparent that there was an underlying theme of poor planning on the part of the government. Three of the respondents cited bureaucratic challenges causing delays in both the decision making and project development stages. With regard to the same issue (government planning) it was also reported, by three respondents, that there was a misalignment of interests between government actors and also between government actors and IPPs. The government regulatory arm struggled to address the interests of various parties. These challenges have led to the informal introduction of auctions and halting the process of considering expressions of interest until such time as the Government may consider ideal (prior to formal changes to the same).

One respondent also reported that there was concern around the ability of local companies to participate in the process without partnering with foreign entities. There was also subjectivity in the implementation of policies in that different developers were subjected to different interpretations of the policy (two respondents). Two respondents observed that approval of EOIs was not done with respect to the energy needs of the demand side thereby resulting in a possibility of oversupply. Related to this concern was reservations among developers, of the governments intent to pay for supply given that, as one respondent indicated, private companies that had prior been given the go-ahead to engage in feasibility studies were barred from proceeding with PPA negotiations. The challenge of oversupply was anticipated to be detrimental in that given the PPAs, unused generated energy would have to be paid for and the costs would be transferred to the

consumer. Renegotiation of FITs due to reduction in technology costs (reported by 3 respondents) however indicated the government's intention to balance the needs of the developers to make a return on investment and consumers to pay a cost reflective tariff.

4.5.4 Challenges in development of renewable energy projects

Three respondents indicated that financial challenges presented a major hurdle because power projects were capital intensive and two indicated, specifically, the need for large tracts of land, rights of way and way leaves and the challenges around acquiring the same. Government policies and requirements were also reported, in five instances, to be major pain-points and onerous in due to bureaucratic processes and inefficiencies in some cases (as reported in the foregoing section) prevented expediency in the process with the decision-making process around approvals being inefficient and time consuming. An example to this end was the introduction of sporadic regulations and the required approvals by multiple bodies within the industry. The local content bill was also deemed to add additional requirements to an over-regulated energy sector. Changes to the fit policy were also reported to introduce uncertainty among developers as the financial impact to be conveyed by the changes were not readily decipherable.

Discordance in the industry was also reported by two respondents with the citing of misalignment between developers, their shareholders and financiers proving a major challenge in project development; these challenges often resulted in costly and time-consuming conflicts. Poor planning on the part of developers was also reported with some middlemen cited as acquiring licences but being unable to deliver. A capacity and technological misfit was also reported; whereas companies can produce energy to be fed to the grid, the grid and system had stability challenges and intermittent technologies were in particular affected. These factors were not considered hence hindering the potential usability of the generated energy; this was reported as a challenge associated with wind and solar energy technologies. Competition from IPPs was also deemed a challenge to the government generation company which was likely to put its projects on hold until demand increases.

4.5.5 Changes in technology cost meriting revision of tariffs in the FIT policy

All eight respondents indicated that there was need for downward revision of tariffs. The main reason cited was that the price of renewable energy was lower than at the onset and as such, it was necessary to reflect these price changes in tariffs issued for the various energy sources. As quoted by one of the respondents,

> *"Today there are types of wind turbines where one turbine generates 4.25MW while previously one wind turbine would generate 850kilowatts so today less turbines are required hence less land. Solar prices have also gone down due to increased research and growth in technology; both factors make the technology cheaper."*

The need for benchmarking to assess the most applicable price was also put forward with an example provided of a comparison between land prices in Ethiopia and Kenya. The suggestion put forward was that given that land prices were higher in Kenya, commensurate tariffs should be paid, and these would generally be higher than those paid for the same energy source in Ethiopia.

4.5.6 Gaps in the applicable laws

Six respondents indicated that there were gaps in the existing law. Most of the gaps were however deemed to have been addressed by the new Energy Act. The challenge of disparity in investment in generation and transmission points to a gap between the two functions; a gap that is to be addressed through the opening up of the industry to allow for new entrants in the capacity of system operators. The new players would thus compete with the off taker and system operator therefore allow for lowering of costs and efficiency in production and transmission. The new Act was also deemed to address the failure of the prior policies about attracting private investors into the industry. One regulator however observed that it was difficult to legislate for emerging issues as policy would always lag behind these.

4.5.7 Gaps in the FIT policy

Six respondents indicated that the FIT policies were less that optimal in their addressing of the needs of the industry. Two respondents stated that the implementation of the policy was wanting and that timelines should be adhered to. Three respondents proposed the shift to auctioning as the preferred approach with the argument that such an approach would address the current inefficiencies of the industry. The policy was also deemed to have unrealistic tariffs with a suggestion made that the revised FIT policy be adopted by the ministry and put into effect. Other efforts at play in addressing the shortcomings of FIT were quoted as standardisation of technology specific Power Purchase Agreements, and alignment of the FIT policy process with public private partnership processes.

4.5.8 Changes necessary to address challenges

Most of the suggestions offered were aimed at the government. For example, a respondent suggested that all government approvals and roles related to the development of renewable energy projects should be coalesced into one body. Alternatively, there was need for improvement in coordination amongst government entities to streamline operations and ease the acquisition of the necessary authorizations. Still with regard to defragmentation and standardization, it was suggested that the government should issue a standard, bankable PPA for each technology. Having such a PPA would streamline the process of negotiations and acquiring financing.

Another proposition was that penalties should be put in place for failure to adhere to timelines and strictly enforced. Further, that any provisions made in the legislation for renewable energy such as new tariffs are effected with minimum delay. Finally, it was suggested that access to FITs be limited to smaller projects whose power output is between 1MW and 10MW with a focus on those technologies where Kenya had the resource but in which little or no interest had been expressed. This would diversify the range of sources of renewable energy, rather than promoting the few that are already being exploited competitively.

The last suggestion was echoed by the respondents who were part of the public sector. They proposed that the government should increase its support for technologies that are currently less exploited. Among regulators, it was also suggested that the country ought to embrace auctions, which address the issues of price discovery and best knowledge.

4.5.9 Actions taken by organizations to address challenges

Given that the respondents' organizations still faced challenges and that the aforementioned suggestions had not been implemented, the respondents were asked to give solutions that they had implemented in the interim to temper the challenges. Five of the respondents proposed actively engaging the government as stakeholders. Of these, two reported that they lobbied for the changes to be implemented through the Kenya Private Sector Alliance (KEPSA). This was the case because there was no lobbying group to champion the interests of RE companies. To address this need, one respondent stated that there were plans for the formation of a Power Sector Association together with other IPPs.

Of those taking up their role as stakeholders with the government, three had done it on an individual organisation level. One respondent reported that they had participated in meetings with the parliamentary energy committee. The key issues discussed in these meetings were government letters of support, the FIT process, tariffs in FIT policy and proposals to the energy bills especially on biomass. Another respondent's organization had made a formal submission on how to make a lower tariff work in Kenya and on how the government can help developers. Finally, yet another respondent had provided the government with proposals for inclusion in the Energy Act. Two respondents expressed confidence that their interests would be represented in the Energy Act. They however stated that there was a need to develop new regulations to operationalise the Act. Other actions taken by the respondents included conducting studies whose findings they expected would inform decision making in the power sector.

4.5.10 Institutional changes necessary to address challenges

Regarding institutional changes deemed necessary to address identified challenges, three respondents stated that there was need for better cooperation and alignment amongst government actors. A respondent expressed this as a need for

> *"Improvement in co-ordination of government entities to ease the acquisition of permits, licenses, approvals and land."*

Another respondent agreed with this and stated:

> *"Establishing many entities is not good and each new entity comes at a cost. Different institutions advocate for different interests hence there is a need for independent review otherwise democracy (accommodating everyone's views) has costs."*

This need was however apparently addressed to some extent in the Energy Act, which proposed the creation of two new institutions. As one respondent from the public sector stated:

> *"Management of energy efficiency has been placed in an independent institution yet to be determined. Rural Electrification Agency is going to be restructured to REREC (Rural Electricity and Renewable Energy Corporation) and charged with broader responsibility."*

Other suggestions included the adoption of auctions in place of FITs, capacity building for regulatory bodies and giving the government generation company a supervisory role over IPPs.

4.5.11 Industry best practices applied in Kenya

Respondents were requested to share opinions about the best practices applied by the country in promoting development of power projects. In this question, the most prevalent opinion was that the government had introduced the FIT policy which is a commonly used mechanism globally to promote renewable energy. Secondly, the government had also opted to use mini grids as an opportunity to increase access to electricity and this is also a globally recommended practice for promoting RE.

Thirdly, Government's plan to transition to auctions is also one of the best practices and this was put forth by three respondents including two public sector entities. Others include denominating the tariffs in United States Dollars, regular tariffs reviews, formal global commitments to increasing access to renewable energy, tax exemption for some renewable energy technology equipment, practices like use of Engineering, Procurement and Construction contractors which is practised globally and sector planning (Least Cost Power Development Plan).

4.5.12 End user tariffs cost-reflectiveness

The general thrust of responses to this question was that the prices were cost-reflective (8 respondents). The indication however was that they were reflective but there were some inefficiencies in the energy production and supply system. As one respondent indicated, the prices were as a result of the compounded cost across the supply chain. The risk of over-supply through one form of energy was also quoted. One respondent indicated that legislation should not interfere with the least-cost energy provision option and that subsequent legislative changes should be centred on sector planning in the need to reduce inefficiencies. A fraction of the cost levied onto end user consumers was attributed to the operational costs attributed to the running of mini-grids and operational costs of the off taker and system operator; this observation was supported by the observation (by a different respondent) that not all costs reflected in consumer bills were attributed to generation costs.

4.6 Alternative options for promotion of generation of electricity from renewable energy sources

The alternative options put forward to promote renewable energy generation were mainly a shift to the auction's mechanisms especially for large projects above 10MW and for intermittent technologies like solar and wind. Secondly, there were also suggestions for possible improvement the FIT model. Most respondents retained faith in the FIT model advocating for its modification to apply to smaller projects of 10MW and below and specific technologies like hydro, biomass, biogas and geothermal. They also advocated for standardisation of technology specific PPAs so that the projects are bankable. A summary of the ensuing responses is subsequently presented.

Five respondents, including two from public sector, recommended auctions as a preferred mechanism to FITs develop renewable energy. This was however subject to the condition that the bidding and selection process be done in a transparent manner. The concern about transparency was raised again, with another respondent specifically recommending that the government increase transparency to international standards. One of the respondents stated that:

> *"FIT policies are meant to spur the market and Kenyan FIT policy did that, therefore auctions should be introduced at this point. The FIT policy is not meant to remain in force for a long time after the private sector has invested in the market or expressed interest".*

Two respondents suggested the implementation of net metering. With net metering, energy producers who produced energy in excess of their requirement would have a way of feeding it to the grid. In turn, when the energy they produced was less than their requirement, they would source the deficit from the grid. This would allow more efficient use of the energy supplied through the national grid, while increasing supply stability. Development of pump storage facilities was also suggested as a possible way to increase grid stability by tempering the fluctuations in the power supplied by renewable energy sources.

However, concerns were raised by two respondents in respect of net metering as stated below:

> *"Net metering which is now included in new Act creates a possibility of complicating the sector because it will enable consumers to generate and sale power which would leave KPLC stranded with the power".*

> *"There is a need for a clear policy on net metering to take care of customer needs and also the public sectors that is; balance both interests. Consumers who will generate and sale power also need the grid to stabilise their power. Currently, there is no policy yet guiding on how the consumers will be*

connected, the pricing also has to be well thought through to avoid a situation where consumers who will be relying on electricity from KPLC will have to pay more to sustain the business or the Government may even have to provide subsidies or increase the burden on tax payers. Electricity will become expensive in Kenya and this will affect the manufacturing and other sectors therefore imports will flood the county".

In a similar effort to facilitate development of renewable energy, two respondents from the private and public sector, proposed the use of mini grids.
This would help the use of renewable energy in localized areas which are not covered by the national grid or where there is an extra energy requirement. As one respondent stated:

"Mini grids are an opportunity for renewable energy development. The KOSSAP program is focused on mini grids as an opportunity for development of renewable energy. Currently, there are isolated grids operated by KPLC and mini grids to be supported by the World Bank Group to be operated by a private developer."

On the part of the government, three respondents proposed that the government should offer incentives such as tax exemptions to encourage investors. As one respondent stated:

"Government should provide support through establishing special economic zones to help power projects pay less tax".

It was also suggested that the government should map resources and identify areas with best wind speeds, solar insolation and other baseline data on resources. Such information would be published in investor guides to attract and ease investment in renewable energy in the country. Regarding increased investor involvement, it was also suggested that the government should liberalize the energy market and have more players, although the respondent acknowledged that this would be disadvantageous to the KPLC. It was also

proposed that hybrid projects should be adopted by the government, since only one has been approved so far. Finally, regarding financing, it was suggested that there was a need to improve the access that renewable energy companies had to funding. Green boards were also suggested as a way of raising affordable financing. It was proposed that more research should be done on particularly pump storage and ancillary services to support especially the intermittent technologies should be made available. The main themes were revision of the FIT policy to improve implementation and address existing challenges and adoption of alternative options to promote generation of electricity from renewable energy sources.

4.7 Lessons learnt since introduction of the FIT policy

As regards the lessons learnt since the FIT policy was published, it emerged that auctioning was preferred to FIT, particularly for large projects above 10MW. It also emerged that it was important that FIT be improved through regular tariff review, and it was pivotal to plan for transition and combination of tariff setting mechanisms. In line with this, most respondents stated that there was a need for reducing tariffs owing to reduction in the price of some renewable energy technologies like solar and wind. Respondents also stated lessons learned with regard to government regulation. One lesson was that there was need for more coordination amongst public sector players, clear roles, and non- interference with entity roles. It also emerged that there was need for more consistent and impartial regulation. As two respondents stated;

> *"IPPs negotiate PPAs on estimated prices and the main energy generating company negotiates PPAs on quoted prices. Even IPPS should negotiate based on quoted prices."*

> *"Commissioning Dates should be allocated after a careful evaluation of projects and also confirmation that the projects are required on those dates to avoid projects getting commissioned before they are required in the system."*

It also emerged that there was need for the government to check demand before approving projects to avoid oversupply. Two respondents also noted that government bureaucracy caused significant delays. Finally, one public sector respondent stated that

the government should ensure availability of ancillary services for the various technologies. It was however noted that negotiating PPAs has improved on the side of government actors in recent years. Another lesson was that there was significant financial difficulty in funding renewable energy projects. Other lessons included the presence of weaknesses in contract documents that complicated negotiations.

4.8 Summary of findings

In assessing the rationale for introduction of the FIT policy, it emerged that the main reason behind the introduction of FIT, as quoted by the respondents, was to attract private sector investment in the energy sector in the bid to ensure adequate supply of renewable energy within the country. Despite interest and participation by the private entities in the sector as a result of the FIT policy, assessment of the efficiency of the policy, in light of the reasons behind its implementation, indicated a significant gap between private sector participation in the sector and the resultant megawatts of electricity generated by the private sector. This gap was predominantly attributed to challenges in implementation of the FIT policy and the financing challenges.

The second objective addressed the challenges experienced by the various stakeholders in the industry. The general theme emanating from the discussions was that of ineffectual implementation of an otherwise workable policy. The brunt of the blame, as assessed by regulators and providers alike, lay with the government and specifically in the implementation of the policy however it was noted that the IPPs also had their share of the blame, but government had the responsibility for addressing the challenges that arose. Changes suggested in the bid to ensure effective operation within the industry centred on the need for curtailed bureaucratic processes and due diligence in assessing and assigning PPA and other requisite approvals to those involved in the generation of energy.

The third and final objective assessed possible alternatives that could be put in place to address the need for renewable energy in the country. Responses provided indicated a preference for alterations, more than a complete overhauling of the FIT system. There however was an appreciation of the challenging task that this would involve given that

current failures in implementation of the policies in place. Auctions also emerged as a strong contender to the FIT system with proponents indicating that such an approach would allow for more effective supply of energy and eventually lower costs on the part of consumers.

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The purpose of this chapter was to show how findings from this study add to the body of knowledge by addressing the research questions. The chapter therefore puts the findings in context by drawing from previous research and showing how findings from prior authors agree or refute observations from this study. Also discussed in this chapter are the conclusions to be drawn, recommendations, limitations and areas for further research as identified by the researcher.

5.2 Discussion

The general objective of this qualitative study was to analyse the drivers and challenges of the FIT policy and alternative mechanisms for promoting the generation of electricity from renewable energy sources in. The specific objectives to this end were as follows: to analyse the drivers of FIT policies, to explore the challenges faced in FIT policy design and implementation and to explore alternative options for promotion of renewable energy in Kenya. Subsequent sub-sections discuss each of the objectives.

5.2.1 Drivers of the FIT policies

The main reason behind the introduction of FIT, as quoted by the respondents, was to attract private sector investment in the energy sector in the bid to ensure adequate supply of renewable energy within the country. Increments to this end were reported in that various projects – predominantly solar-based were in the process of completing construction and would thus soon be ready to generate electricity and feed into the grid. It was however observed that inefficiencies in the implementation of the FIT policy would likely result in excess capacity despite the issuance of PPAs to firms. The excess capacity charges, given the agreements, will be channelled to end user consumers.

Nganga (2013) observes that the government's objectives for introducing the FIT were to facilitate the increase of the country's energy supply, improve the energy mix, reduce emission of greenhouse gases, and generate income and employment. The stabilization of supply was as a response to historic shortages in supply due to overreliance on hydroelectric power thereby resulting in shortages during periods of drought. The

government's objective was to ensure constant supply of power to enterprises and homes and in doing so, avoid the economic retardation (Ikiara, 2006).

The researcher assessed that the FIT policy was expected to result in significant gains in the industry given the success of similar green-energy initiatives in other countries such as South Africa. However, in comparing the anticipated outcomes and those achieved, it was evident that significant challenges had been encountered. In particular, the anticipated output from renewable energy had not been achieved and should all the projects in the pipeline progress to operation stage, there was a likelihood of generation of excess power within the industry. This also indicates that the energy mix would to a greater extent than is desirable be tilted more towards intermittent (solar and wind) renewable energy sources which would worsen the challenge of grid instability. Gains by way of reduction in greenhouse gases and generation of income through employment were however not mentioned by the respondents. The general inference, therefore, is that the FIT policy goals had been met in part.

5.2.2 Challenges faced in FIT policy design and implementation

The main challenges faced by regulators of the industry were a lack of technical knowhow in structuring projects and contracts, delays in implementation and financial inability of IPPs. From the IPPs point of view, implementation of policies was done with little efficiency. Furthermore, an element of distrust was apparent in that approvals were issued subjectively. Tariffs were also deemed subpar in some cases and IPPs were in recent times asked to settle for less than the tariffs stipulated in the 2012 FIT policy. The general observation therefore, was that myriad challenges had been experienced and there was need for restructuring of implementation approaches so as to achieve optimal operation within the industry.

According to the Ministry of Energy, the conditions for a PPA offer were demonstration of technical economic viability, satisfaction of grid connection requirements, ability to satisfy legal and regulatory requirements and financing. Projects were approved on a first come first serve basis with no competitive bidding (Ministry of Energy, 2012).

This assertion however does not seem to hold true given complaints around the inability of some firms to deliver the stipulated energy on account of a lack of technical knowhow.

Passey (2014) further observes that a FIT policy should be simple, flexible and specific to technologies in order to minimize investor risk and to ensure long-term guarantees of payment. As noted from the study, the process of implementation of the FIT policy was marked by downward negotiations of tariffs and overcapacity challenges owing to the inefficient process of PPA allocation and incompetence among IPPs. It is therefore apparent that the implementation of the policy curtailed the benefits that would otherwise have resulted from a sufficiently crafted policy. Finally, as highlighted by COMESA (2017) one the challenges resulting from poorly constructed FIT policies is the lack of technical competence and expertise to accurately determine tariffs and their adjustment methodologies. This challenge was apparent in the industry given the response from some IPPs that the public sector was proposing to revise the FITs and negotiate PPAs at lower tariffs that those indicated in the policy and a likewise observation by all respondents that the tariffs in play were higher than should be given the lower costs of the various technologies.

As assessed by the researcher, the process of FIT policy implementation was unsuccessful to a large extent and was hampered by various inefficiencies in implementation which undermined the intended outcomes from the FIT Policy. The researcher noted that the public sector entities involved in the FIT policy implementation had learnt many lessons from the FIT policy design and implementation challenges and were also alive to the risks related to the current status of FIT policy projects.

5.2.3 Alternative options for promotion of renewable energy in Kenya

The FIT Policy was introduced in Kenya with the purpose of attracting investors from the private sector, among other reasons. (Ministry of Energy, 2012). As per the opinions of the respondents, implementation was less than satisfactory in the beginning, with the

tariffs viewed as unattractive. However, currently the tariffs are attractive to investors, with some respondents even terming them as exorbitant.

The public entities therefore realised the need to revise the tariffs downwards to reflect the reduction in costs of technology. It is apparent that there have been significant setbacks to the industry. The most prominent as per this study was the inefficiencies in policy implementation and fragmentation of public sector entities which has resulted in the realization of a need for coalescence among industry players so as to advocate for better implementation of policy and in some cases, complete overhauling of the FIT model for alternative options such as auctions or competitive bidding. It was however reported that the new Energy Act, having been passed after consultation with various stakeholders, would go a long way towards addressing some of the current pain-points of the industry.

Competitive bidding (Ramli, 2015) can be considered as an option in the bid to ensure supply of renewable energy. This option was quoted as a possible alternative to the current policy approaches with the reason cited being a lack of transparency, uncompetitive tariffs and over involvement in bureaucratic process on the part of the government. The overall inference therefore is that there exists a schism of interests and that remedying approaches should be considered in order to promote development of renewable energy and protect the final consumer from exorbitant energy costs.

According to (Ottinger et.al., 2007) a wide range of policies options can be used in the bid to ensure sufficient supply of renewable energy in a country, these options include - renewable portfolio standards (RPS), economic tools, distributed generation measures, and disclosure and green marketing. Given the frustrations within the industry, it is apparent that different avenues should be sought to augment the existing FIT policy so as to ensure effective generation of renewable energy in Kenya.

A study was conducted for the Government of Kenya to establish a framework for net metering in order to increase renewable energy electricity generation in Kenya. Net

metering was defined as a mechanism which allows grid-connected electricity consumers who also generate their own power to “bank” or “store” their electricity in times of over-production.

It was also stated that many countries in the high –income, middle-income and low-income brackets had adopted net metering policies and Kenya had great potential for a successful net metering program (Economic Consulting Associates and Carbon Africa, 2014). On net metering, an IRENA report with case studies on eight countries and their adoption of renewable energy mini-grid policies and implementation of the mini-grids indicates that it is a viable alternative option to promote renewable energy (IRENA, 2018). The new Energy Act passed in March 2019 made provision for net metering therefore the provisions of the Act should be operationalised effectively in order to realise the benefits of net metering and adequately plan for and manage any related challenges. The Act has also provided for expansion of the mandate of the Rural Electrification Agency and this may be used to facilitate the development of mini grids especially in rural areas to increase access to electricity from renewable energy sources.

The researcher assessed that net metering and use of mini-grids were also viable alternatives to promote the generation of electricity from renewable energy sources and that they should be implemented in addition to the FIT policy. The implementation of these options should be done effectively in order to realise the expected benefits from the options and avoid the challenges faced with the FIT policy.

5.3 Conclusion

The researcher has shown that all three study objectives were addressed. The first objective assessed the drivers of the FIT policy. From the foregoing discussion, it is evident that the policy was driven by mainly the need to promote generation of electricity from renewable energy sources, provision of investor security and attraction of independent power producers to the sector. These goals were partially achieved. The second objective of the study aimed at highlighting the challenges faced in FIT policy design and implementation by the various stakeholders in the industry. Responses

indicated that the policy design was effective given that it attracted interest and players into the sector however a theme of ineffectiveness in implementation of the policy and a general misalignment between industry players was observed.

From the public sector side, it was evident that the due diligence processes and monitoring of project milestones were inadequate and as a result, some of the IPPs that were granted approvals, licenses and with executed PPAs lacked technical and financial capacity to develop the projects and or meet their obligations. Finally, in addressing the final objective on alternative options, it was apparent that that was a need to implement other options, such as auctions or competitive tendering, net metering and mini-grids to address the needs of the industry. The researcher assessed that it was important for the public sector entities to take the lead in efforts to chart a viable and sustainable way forward while taking into account the need to uphold contractual obligations with IPPs and maintain investor confidence. Further, it was also important for the IPPs to improve on their compliance with the legal and regulatory framework and contractual obligations and to apply best practices in project development and management.

5.4 Recommendations

The main recommendation forthcoming from this study is the need for restructuring of the implementation process of the FIT policy. As evidenced by multiple respondents, the policy, though not perfect, bears a lot of strengths that can be leveraged by all stakeholders to achieve a higher percentage of renewable-energy-sourced power in grids. This is however unlikely to happen without engagement of stakeholders in such a manner as to create workable implementation plans that ensure efficient achievement of set goals and strict adherence to these plans.

5.5 Limitations

This study suffered methodological challenges in that the sample size reached for the private sector or IPPs, though representative of the targeted population was small. This factor limited the researcher to reliance on qualitative analysis approaches. However, to address this limitation, the researcher sought high ranking and knowledgeable representatives from both the public and IPPs. Secondly, the public sector organisations

had a more significant role than the private sector in the policy design and implementation and the researcher conducted lengthy sit-down interviews thereby allowing for clarification and probing into the entails of the various dynamics that shape the industry.

Given the depth of knowledge of the targeted respondents, the researcher surmised that the sourced information was sufficient in highlighting the most notable aspects deemed pivotal to the research objectives. Further, the timing of the study came at a time when the public sector entities had had several engagements and also involved the private sector /IPPs over the FIT policy challenges and related matters and were therefore able to provide insights from both the public and IPP perspectives on the issues.

5.6 Areas for Further Research

This study focused specifically on the FIT policy drivers and challenges and possible options for promotion of generation of electricity from renewable energy sources. The researcher however identifies that there are multiple avenues that can be leveraged in the bid to achieve a larger representation of renewable energy in the country's energy mix. Among the options highlighted was the preference for auctioning, net metering and mini-grids as alternative mechanisms to FIT policies. It is therefore recommended that future studies focus on alternative approaches to the FIT so as to shed light on the most efficacious approach in light of the sustainability development goals. Secondly, this study focused on policy design and implementation which is predominantly a public sector role therefore, it is recommended that future studies focus on the private sector or IPPs' perspectives on the FIT policy and its role in the promotion of the development of renewable energy.

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APPENDICES

Appendix 1: Interview Guide

Questions for all interviewees

1. What is the role/mandate of your organization in the power sector?
2. What challenges does the organization face in performing its role in respect of power projects development?
3. What are the challenges facing development of renewable energy projects in Kenya?
4. Has the FIT policy for Kenya been effective?
5. What were the drivers of the FIT Policy and was the policy design effective? If not, what changes would you propose to the design?
6. Has the policy implementation been effective and if not, what changes would you propose to the implementation process?
7. Are the tariffs in the FIT policy attractive to developers?
8. Are there changes in costs of technologies which justify revision of the tariffs in the FIT Policy?
9. Are the end user tariffs affordable for consumers?
10. Are there gaps in that need to be addressed in the applicable laws?
11. Are there any gaps in the FIT policy that need to be addressed?
12. What policy changes are necessary to address the indentified challenges?
13. What alternative measures may be implemented to promote development of renewable energy projects?
14. What action has the organisation taken in the interim to address the challenges?
15. What institutional changes are required to address the identified challenges?
16. What are the best practices in promoting development of

power projects that Kenya is applying?

17. What lessons have been learnt since the FIT policy was published to date?

Additional questions for specific interviewees

Ministry of Energy

1. How many Expressions of Interest under the FIT policy has the ministry received?
2. How many Expressions of Interest has the Ministry approved or rejected?
3. Is the number of Expressions of Interest received so far below, within or above the number desired in light of the shortfall in supply of electricity?

Energy Regulatory Commission

1. How many applications for licenses have been submitted to the commission under the FIT policy?
2. How many licenses have been issued by the commission under the FIT policy?
3. Is the open or unsolicited mechanism for license applications ideal for the power sector?
4. Would the regulator consider a mechanism of applications being submitted only upon invitation by the regulator and auction for submitted bids?
5. What are the reasons for refusal to license or delays in licensing power projects for projects under the FIT policy?

Kenya Power and Lighting Company (KPLC)

1. What are the causes of delays in concluding negotiations for Power Purchase Agreements for projects under FIT policy?

Kenya Electricity Generation Company Limited (KENGEN)

1. Why has renewable energy generation remained under developed in Kenya?

Appendix 2: Checklist of data to be collected from secondary sources

I plan to collect copies of documents including reports, publications, registers which provide the information below.

Ministry of Energy and Petroleum

- The register indicating the number of project developers who applied for an Expression of Interest from the ministry.
- The register indicating the number of Expressions of Interest b which have been granted or rejected by the ministry.
- The Energy Policy
- Policies to support development of renewable energy generation in Kenya.
- Guidelines issued by the ministry relating to renewable energy development
- Reports and Publications on renewable energy potential and development in Kenya, the megawatts of electricity generated in Kenya across the various technologies and the megawatts of electricity demanded in Kenya.
- Annual Reports of the organisation since 2012.

Energy Regulatory Commission

- The documented licensing framework indicating the processes and timelines for applications and approvals.
- The license register indicating the total number of licensees issued for the different technologies in electricity generation in Kenya.
- Guidelines issued by the regulator to support development of renewable energy projects.
- Annual Reports of the organisation since 2012.

Kenya Power and Lighting Company (KPLC)

- Information indicating the number of Power Purchase

Agreements signed with project developers under the FIT policy.

- Information indicating the number of Power Purchase Agreements under negotiation with project developers under the FIT.
- Strategy plan of the entity to review measures to promote renewable energy generation in the short – term or long - term.
- Annual Reports of the organisation since 2012.

Kenya Generation Company (KENGEN)

- Strategy plan of the entity to review measures to promote renewable energy electricity generation in the short – term or long - term.
- Annual Reports of the organisation since 2012.

Independent Power Producers

- Reports indicating the observance of processes and timelines for the application process.
- Reports indicating the support provided by the Government of Kenya to the developer.
- Reports indicating any financing support the developer may have received from development finance entities.
- Any studies conducted by the entity and relating to renewable energy development and licensing frameworks.