UNIVERSITY OF CAPE TOWN

FACULTY OF LAW

THE DEVELOPMENT OF NAMIBIA'S RENEWABLE ENERGY REGIME

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ABSTRACT

As is the case with many countries, Namibia has an economy dependent on fossil fuels. The country is, however, blessed with abundant and diverse - but as yet unexploited - renewable energy (RE) resources that could be used for improving the livelihood of the vast majority of its 2.2 million people. Today the conflict between energy production from fossil fuels and protection of the environment is intensifying and this compels all countries to search for means of resolving this conflict. Developing RE through the enactment of enabling legislation and implementation of relevant policy is one important step towards attaining the ideal of an energy-secure future. This state of affairs is not unique to Namibia, as most countries with abundant RE sources are striving to promote and deploy RE in their respective regimes through appropriate policies and legal frameworks. This study examines Germany and Ghana from, respectively, the developed and developing world, as leading countries that have established a pro-active RE regime. However, such a regime can only be successfully achieved if countries, including Namibia, adopt laws and policies that promote and encourage the use of RE in order to move away from fossil fuel dependence to a greener economy. Thus the study seeks to investigate RE resources in Namibia and their potential development. It outlines the current legislation pertaining to the regulation of RE in Namibia. As such, the study further examines the Organisation for Economic Co-operation and Development (OECD) guidelines and draws examples from other regimes, particularly Germany and Ghana, in order to provide a guideline for the enactment of a general Energy Act with a particular chapter on RE. It concludes with recommendations as to how Namibia can secure a sustainable energy future.

LIST OF ABBREVIATIONS

EC	Energy Commission
ECA	Energy Commission Act
ECB	Electric Control Board
EEG	Erneurbare-Energien-Gesetz
ESDP	Energy Sector Development Programme
FIT	Feed-In Tariffs
GEF	Global Environment Facility
GHGs	Greenhouse Gases
GIPC	Ghana Investment Promotion Centre Act
IEA	International Energy Agency
IPCC	International Protocol on Climate Change
MME	Ministry of Mines and Energy
MWs	Megawatts
NAMREP	Namibian Renewable Energy Programme
OECD	Organisation for Economic Co-Operation and Development
PNDC	Provisional National Defence Council
PURC	Public Utilities Regulatory Commission
PURC	Public Utilities Regulatory Commission
PV	Photovoltaic
RE	Renewable Energy
REEECAP	Renewable Energy and Energy Efficiency Capacity Building Programme
REEI	Renewable Energy and Efficiency Institute
RES	Renewable energy systems
SEFA	Sustainable Energy for All
SNEP	Strategic National Energy Plan
StrEG	Stromeninspeisungsgesetz
TWh	Terawatt-hours
UN	United Nations

UNDP	United Nations Development Programme
WPE	*White Paper on Energy Policy* of Namibia
WSSD	World Summit on Sustainable Development

CHAPTER ONE: INTRODUCTION

1.1 Background

Fossil fuels are the dominant source of energy in Namibia.[1] Over 70 % of the total energy consumption comes from fossil fuels.[2] Most of this energy, particularly electricity, petrol and coal, is imported from South Africa.[3] As a result Namibia is not self-sufficient in energy.[4] With the increasing demand for energy and energy shortages being experienced in South Africa, Namibia is expected to consider various alternatives in order to become self-sufficient in energy generation.[5] Moreover, the undesirable environmental impacts associated with fossil fuels,[6] fosters a growing awareness of the need to shift from the traditional way of generating energy to cleaner sources of energy generation.[7] Renewable energy (RE) is regarded as one of the many options for lowering greenhouse gases (GHG) emissions while still satisfying the demand for energy.[8]Namibia has significant RE potential that could constitute a comparative advantage if properly exploited to meet the country's energy demand.[9] At the moment, domestic electricity generation is inadequate, and unless drastic steps are taken, the country's demand will not be met.[10] The only alternative seems to be the exploitation of RE. This is not to say that RE technologies are not being used correctly, for example,

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[1] Renkhoff, "Renewable Energy Law and Regulation in Namibia, in *Environmental Law and Policy in Namibia Life* (2013) 201-227.

[2] Namibia, *Report General Operating Environmental* http://www.laurea.fi/en/ connect/results/Documents/Namibia%20Country%20Report.pdf (accessed 17.11.2014)

[3] Rama et al *Development of Namibian Energy Sector:* 8.

[4] Namibia, Report *General Operating Environmental*.

[5] Namibia, Report *General Operating Environmental* http://www.laurea.fi/en/ connect/results/Documents/Namibia%20Country%20Report.pdf (accessed 17.11.2014).

[6] Fossil fuels have been scientifically proven to be a threat to the environment due to the emissions of greenhouse gases, such as carbon dioxide and other gases which contribute to the rise in the global temperature. See Massai, *European Climate and Clean Energy Law and Policy* (2012) 10.

[7] Massai *European Climate and Clean Energy Law and Policy* (2012) 10.

[8]OECD *Policy Guidance for Investment in Clean Energy Infrastructure to the G20* 2013 3.

[9] Von Oertzen *National Issues Report on the Key Sector* (2010) 18.

[10] Konrad-Adenauer-Stiftung *Namibia's Energy Future: A Case of Renewables* (2012) 3.

as in the case of small-scale off-grid connection for energy and domestic water heating.[11] There are, however, several potentially bigger RE projects in the country. One of these is the Ruacana Hydropower station on the Kunene River in the far north of the country. This is Namibia's main domestic RE source, which generates about 240 megawatts (MWs) per annum.[12] It does not, however, contribute enough towards meeting Namibia's current energy demand, although it was initially planned to be able to do so.[13]

Namibia has other domestic power stations, namely; the Van Eck coal-fired power station in Windhoek, the standby diesel-driven Paratus Station (24MWs) at Walvis Bay and the diesel plant at Anixas (22.5 MWs).[14] All of these are energy generators based on fossil fuels. However, Namibia's demand at its highest is 511 MWs, so it is quite clear that these three internal sources are in- sufficient. Furthermore, Namibia has limited options for using existing resources to meet the increasing demand.[15] Yet there are opportunities to develop RE resources in terms of the abundant RE sources ranging from hydro, solar, wind to biomass and biogas.[16] There is thus a great need to put in place measures, especially those relating to policies and regulation, to ensure the successful exploitation of these abundant RE resources.

The Namibian government, through the Ministry of Mines and Energy (MME), has made some efforts to put in place laws and a policy relevant generally to energy as well as some programmes specific to RE as elaborated below. The Petroleum

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[11] REEEP Policy Database (2014).

[12] Renkhoff "Renewable Energy Law and Regulation" in *Environmental Law and Policy in Namibia Life* 201-227.

[13] Renkhoff "Renewable Energy Law and Regulation"in *Environmental Law and Policy in Namibia* 201-227.

[14] Renkhoff "Renewable Energy Law and Regulation in *Environmental Law and Policy in Namibia* 201-227.

[15] Carias &Lian *The World Bank & Electricity Control Board of Namibia National Integrated Resource Plan* 22.

[16] Carias & Lian *The World Bank & Electricity Control Board of Namibia National Integrated Resources Plan* 22.

(Exploration and Products and Energy) Act No. 13 of 1990 was the first Act aimed at the exploration of valuable energy sources.[17] It, however, focuses exclusively on the exploration and development of fossil fuel energy sources such as petrol and gas rather than on RE, as will be discussed in Chapter Two.[18] In 1993, the MME, as custodian of the country's energy sector, took the first steps to promote RE by launching a programme titled "Promotion of the Use of Renewable Energy in Namibia".[19]

After this programme, the next important step that the government took was to draft Namibia's 1998 *White Paper on Energy Policy*.[20] The policy recognised the importance of RE, and its potential role in realising the country's energy policy goals.[21] The White Paper forms the basis for Namibia's energy policy in general.[22] In terms of this policy document, the government is mandated to promote the use of RE through the establishment of an adequate institutional and planning framework, and to meet development challenges through improved access to RE sources.[23]

The Electricity Act 4 of 2007, which replaced the Electricity Act 2 of 2000, explicitly gives the MME the power to regulate the RE market. [24] Its inadequacies will be discussed below. In addition, the Namibian Environmental Management Act 7 of 2007 and the Petroleum Product and Energy Act 5 of 2005 also play a role in the overall

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[17] The Petroleum (Exploration and Production and Energy) Act. Before independence one of the applicable laws was the 1922 Electric, Power Proclamation which was then repealed by the Electricity Act and the Power of the SWA Water and Electricity Act.

[18] Section 2.

[19]Renkhoff "Renewable Energy Law and Regulation in Namibia" in *Environmental Law and Policy in Namibia* (2013) *201*-227.

[20] *White Paper on Energy Policy of Namibia* 45.

[21]Renkhoff "Renewable Energy Law and Regulation" in *Environmental Law and Policy in Namibia*205.

[22] *White Paper on Energy Policy of Namibia*.

[23] *White Paper on Energy Policy of Namibia* 45.

[24] Section 43 (j) of Electricity Act:.Renkhoff "Renewable Energy Law and Regulation" in *Environmental law and Policy in Namibia* 205.

regulation of RE. The first Act deals with the protection of the environment which advocates for clean energy as this has less impact on the environment as compared to traditional energy generated from fossil fuels.[25] The second Act regulates energy production which includes RE. Despite these efforts, however, RE still does not have national priority.[26] Even more important, is that there are very few incentives to encourage the use and development of RE.[27] Importantly, there is no legislation that specifically deals with RE or with energy in general. Many more proactive steps are needed before RE can begin to take its rightful place in Namibia's energy sector. This study will, therefore, look at the necessary steps that Namibia has to take in order to put in place a legislative framework that supports and encourages RE development.

1.2 Statement of the problem

Namibia is a developing country with vast energy needs required to achieve its vision of industrialisation as outlined in Vision 2030. The country is over reliant on fossil fuels as its main source of energy.[28]Nania and Vilsack state that Namibia's energy supply sector is an old, centralised system which relies largely on imported energy generated by fossil fuels from neighbouring countries.[29] The current reliance on imported energy (electricity) from South Africa and Zambia is clearly not sustainable; as such countries are also experiencing difficulties in securing their own electricity supply.[30]

RE is considered to be the fastest growing sector of the energy mix, yet in Namibia and the world generally, its continued growth depends upon the development of legal frameworks, policies and government intervention through incentives to support

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[25] Section 3 (2)(a) & (l).

[26] Section 3 (2)(a) & (l).

[27] Von Oertzen "Namibia National Issues" (2010)16.

[28]Renkhoff "Renewable Energy Law and Regulation" in *Environmental Law and Policy in Namibia* (2013) 201-227.

[29]Nania & Vilsack, *2010* (21) *Colo. J. Int'l Envtl. L. & Pol'y,* 6.

[30] Rama et al *Development of Namibian Energy* Sector, 2.

it.[31] There are some countries that have shown impressive progress in achieving national RE targets. Germany, for example, has done so through its legal framework.[32] Another example is Ghana, where, although RE use is still in its initial stage, the country shows promising progress in its deployment.[33] The regulatory and legal framework relating to RE in Namibia, however, lags behind that of both Germany and Ghana. The legal frameworks of Germany and Ghana are outlined in Chapters Three and Four respectively, with a view of drawing lessons for Namibia from them.

Most statutes referred to above as well as those outlined in Chapter Two, that are relevant to energy production or development in Namibia, contain provisions which are insufficient to support and regulate RE. In particular, the Electricity Act 4 of 2007 only provides rules of jurisdiction for RE in terms of which the MME is given jurisdiction to deal with it.[34] The Act does not contain provisions which deal with RE in detail, nor does it provide any specific provisions for the regulation of the RE market.[35] This raises a number of questions as to why this is still the case and what can be done to change or improve the situation. This study seeks to investigate what needs to be done in terms of the current regulatory and legal framework regarding the development of RE in Namibia, and will thus consider whether it would be more constructive to enact a general Energy Act with a view to integrating all relevant laws in order to facilitate a comprehensive energy security plan for Namibia that includes RE.

1.3 Significance of the study

The deployment and development of RE is not only a national concern, but is an ongoing international concern. Numerous international instruments have been put in

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[31]Nania & Vilsack 2010 (21) *Colo. J. Int'l Envtl. L. & Policy* , 6.

[32] Müller & Brown *Deploying Renewables*.

[33]Ahlijah *Energised Thinking* 2013; and in terms of the Renewable Energy Act in *Environmental Law and Policy in Namibia* (2013) 201-227.

[34]Renkhoff "Renewable Energy Law and Regulation" in *Environmental Law and Policy in Namibia* (2013) 201-227 205.

[35]Renkhoff "Renewable Energy Law and Regulation" in *Environmental Law and Policy in Namibia* (2013) 205.

place to deal with the issue of energy in general, and some specifically focus on the promotion of RE. For instance, the Okinawa Summit in 2000 has called for the formation of a Task Force to recommend actions to better encourage the use of renewables particularly in developing countries.[36] As result, the Group of Eight (G8) Renewable Energy Task Force was formed to carry out this vital task. The G8 Final Report of 2001 states that 'renewable energy resources can now sharply reduce local, regional, and global environmental impacts as well as energy risks.[37] The Report also emphasises that "providing clean, affordable, and reliable energy is a key element towards sustainable development".[38]

In 2002 the World Summit on Sustainable Development (WSSD), particularly in terms of the Johannesburg Plan for Implementation (Plan), has called for improved "access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services".[39] Moreover in 2010, the United Nations General Assembly at its 65th session adopted a resolution which declared the year 2012 as the "International Year for Sustainable Energy for All".[40] RE has an important role to play in this regard, thus, this resolution emphasised the need to provide sufficient financial resources and the transfer of technology to developing countries, primarily in the use of RE sources.[41] To set this into motion, in 2012 "A Framework for Action" was prepared by the UN Secretary-General's Group on Safe Energy for All (SEFA) which proposed national and international action to expand access to energy and invest in renewables.[42]

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[36] Group of Eight *G8 Renewable Energy Task Force Final Report* (2001) 5.

[37] Group of Eight *G8 Renewable Energy Task Force Final Report* (2001) 5.

[38] Group of Eight *G8 Renewable Energy Task Force Final Report*) 5.

[39] United Nations World Summit on Sustainable Development *Plan of Implementation of the World Summit on Sustainable Development* (2002) para 9(a) 5.

[40] International Year for Sustainable Energy for All, GA Res 65/151, 69th plenmtg (25.02.2015).

[41] International Year for Sustainable Energy for All, GA Res 65/151, 69th plenmtg (25.02.2015).

[42] Ban Ki-moon *A Vision Statement*.

Furthermore in 2011, a "Vision Statement" issued by the United Nations Secretary-General, launched a global initiative to attain "Sustainable Energy for All". The Vision Statement has three objectives, which are to be achieved by the year 2030, namely: doubling the share of RE in the global energy mix, ensuring universal access to modern energy services and doubling the rate of improvement in energy efficiency. [43]

More recently, the UN General Assembly adopted a resolution in *March* 2013, declaring 2014-2024 as the "United Nations Decade of Sustainable Energy for All"[44] which follows on from the International Year of SEFA in 2012. Importantly, the resolution recognises the importance of empowerment of developing countries as the way to achieve rapid growth of RE globally.[45] Finally in August 2013, a report was submitted by the UN Secretary General which revealed that many countries have considered the issue of energy as one of their main priorities to achieve sustainable development.[46]

It can thus be seen that RE is recognised as a significant source of energy at a global level.[47] The Organisation for Economic Co-operation and Development (OECD)[48] has been advocating for RE and assisting governments through guidelines on how to successfully deploy RE in their respective regimes.[49] The OECD's aim is to provide governments with guidance on the policy options that are available to make the most of

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[43] The Secretary-General's High-Level Group on Sustainable Energy for All, A Framework for Action (2012) 6.

[44] Resolution 215 para 2, 2.

[45] United Nations. General Assembly. International Year of Sustainable Energy for All: Report of the Secretary-General (2012) 2.

[46] Secretary General *Report on the United Nations Decade of Sustainable Energy for All* (12August 2013) para 25, 7.

[47] OECD *Renewable Medium-Term Market Report* (2012).

[48] The OECD an organisation whose aim is to promote policies that will improve the economic and social well-being of people around the world. It provides a forum in which governments can work together to share experiences and seek solution to common problems.

[49] OECD *Policy Guidance for Investment (*2013) 3.

investment opportunities in RE infrastructure, taking into consideration the collective expertise of the climate and investment communities.[50] This can be illustrated by the economic incentives and significant policy efforts made by countries such as Germany.[51] Namibia can thus use the OECD guidelines to its advantage and as yet another opportunity to successfully develop its RE regime.

As already stated, most of Namibia's energy is imported from its neighbours, in particular South Africa. This makes its energy supply dependent on imports.[52] Over the past years, however, the country's unexpected energy demand caused by population growth and its booming mining and construction industries have raised major concerns about Namibia's energy supply.[53]

Namibia has RE sources that can be successfully exploited. Besides the options on RE previously mentioned, Namibia has number of opportunities to harness RE sources. The most recent generator of RE— and probably one of the largest in terms of wind energy — is the wind park close to Luderitz. It was expected to be completed by the end of 2014 (but this has not been achieved) and it was estimated to generate a capacity of about 44 MW per annum that could have made a major contribution to the current domestic electricity generation.[54] In terms of hydropower, Nampower is considering the possibility of installing a second hydropower plant on the Kunene River, via the project of Bynes Hydro.[55] While there are initiatives being undertaken by the government to develop solar energy from the installation of small solar PV plants,

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[50]OECD *Policy Guidance for Investment (2013)* 3.

[51] OECD *"Policy guidance for investment in clean energy infrastructure: An OECD Report to the G20" 2013. Environmental Law and Policy in Namibia* 201-227.

[52] Renkhoff "Renewable Energy Law and Regulation" in *Environmental Law and Policy in Namibia* (2013) 201-227 205.

[53] Mushangwe & Nel *Namibia Energy Efficiency Programme in Buildings (NEEP*) 5.

[54] REEEP *Renewable Energy and Energy Efficiency Partnership policy (*2014).

[55] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

mainly used for home systems, to the setting up of larger commercial solar PV plants.[56] In addition biomass and biogas are expected to be extracted from invasive alien plants (largely acacias), known as “invader bush”, which covers approximately 26 million hectares and natural gas resources, which if used wisely, can lead to low-carbon emission energy in the future, particularly in the transport industry.[57] These RE resources are yet to be fully exploited.

1.4 The scope and key research questions

This study is intended to provide solutions for the current challenges of Namibia’s RE regime. As noted above, Namibia lacks a cohesive general energy law framework to adequately deal with RE. Because of this, the study will focus on two important options: first, whether there is a need to reform the existing laws, and secondly, whether it would be more viable to pass a new act, and if so, whether the legislation should address energy issues generally (with a chapter on RE) or focus specifically on RE. Thus the study will seek to answer the primary question: what is the best approach Namibia can take within its regulatory framework in order to build a successful RE regime? In answering this main question, the study will also try to answer the following key research questions:

a) To what extent has Namibia implemented a regulatory and legislative framework regarding energy and RE in particular?
b) What can Namibia learn from other regimes to successfully implement RE?
c) What are the OECD guidelines regarding the development/deployment of RE?
d) What are the possible opportunities and challenges Namibia may face in developing or building a successful RE regime and what can the country learn from Germany and Ghana in this regard?

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[56] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[57] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

In order to answer these questions, the study will begin by assessing the current state of Namibia's energy sources. Thereafter the legal framework relating to RE will be discussed, and the associated challenges and barriers to the deployment of RE, as well as its main drivers and opportunities will be examined. In so doing, it will analyse the OECD guidelines regarding the deployment of RE and assess which of these would best suit Namibia. In addition, the study will look at countries such as Germany and Ghana in terms of their experiences (successes, failures, and structures) and determine what lessons Namibia can learn from them in the conception of a successful RE regime.

1.5 The theoretical concepts underpinning the dissertation

RE has found increasing favour globally as well as nationally, prompting much debate about its further development in the energy sector.[58] RE may, if implemented properly, contribute to social and economic development, energy access, a secure energy supply, and the reduction of negative impacts on the environment.[59]

An increase in the share of RE in the energy mix is likely to require policies to stimulate changes in the energy sector.[60] Robinson emphasises that "law is, first and foremost, a tool for change". [61] Therefore without adequate laws and policies, the deployment and development of RE cannot be achieved. Kalamova et al, for example, warn that:

> "the free market in energy services in the absence of policy interventions, does not take into account the social and environmental benefits and costs that are associated with the generation of electricity".[62]

[58]Makuch & Pereira (eds) *Environmental and Energy Law* 120.

[59]Makuch & Pereira (eds) *Environmental and Energy Law* 120.

[60]Edenhofer et al *Summary for Policymakers* (2011) 7.

[61] Robinson 'Preface' in *Economic, Social, and Cultural Rights: A Legal Resources Guide* 274.

[62]Kalamova et al *Sources of Finance, Investment Policies* 10.

This leads to ongoing market inefficiency with respect to environmental protection and performance.[63] In particular, the environmental impact of the use of fossil fuels often results in real costs to society in terms of infrastructure decay, biodiversity deterioration and climate change.[64] Therefore, a well-founded legal framework is an essential component to successfully develop any RE regime.[65] The deployment of RE requires policies and laws that are passed or enacted to specifically deal with RE. Namibia, however, has an outdated or unclear an inadequate legal framework for its RE regime.[66] However, although most countries share the same objective in the deployment of RE (ie its development as a clean substitute for unsustainable energy sources), their choice of policy varies, depending largely on the national context.[67] This study will consider the OECD guidelines regarding the development of an RE regime and will also consider practical examples in terms of the RE regimes of Germany, as a developed country, and of Ghana, as a developing country respectively.

The aim here is to provide a conceptual framework for the development of Namibia regulatory and legal framework relating to energy in general, with specific emphasis on the deployment and development of RE.

1.6 The structure of the study

Chapter Two will begin by placing energy sources in Namibia in two main categories, namely: fossil fuels and RE. Fossil fuels will include gas, coal and petrol while RE includes hydroelectricity, wind, solar and biomass. The study will then discuss how these energy sources raise different legal issues in terms of the need to deploy RE. The chapter will focus on the current position of the Namibia's legal and regulatory framework by discussing what existing legislation and policies the country has in place

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[63]Kalamova et al *Sources of Finance, Investment Policies* 10.

[64]Kalamova et al *Sources of Finance, Investment Policies* 10.

[65]Lipp 2007 (35) Energy *Policy* 5481-5495.

[66] Rama et al *Development of Namibian Energy Sector*.3.

[67] Owen 2006 (34) *Energy Policy* 632-642.

regarding RE namely: the Namibian Environmental Management Act, the Electricity Act, the Petroleum (Exploration and Production) and Energy Act, the Uranium and Nuclear Energy Policy and the White Paper on Energy Policy. The aim of this chapter is to assess whether or not the existing laws and policies create an adequate regulatory and legal framework for energy in general and for RE in particular in Namibia. The chapter will further assess the current state of Namibia's opportunities, challenges and barriers, associated with building a successful RE regime.

Chapter Three will analyse the OECD guidelines which provides or outline elements and strategies that need to be addressed in order to build a regulatory framework that encourages the deployment of RE.
Chapter Four will look at how Germany as an OECD member and Ghana have put in place legal frameworks to develop their RE regimes. Germany, in particular, has developed an extensive RE legal framework which is worthy of emulation. The chapter will also discuss how Germany and Ghana have implemented elements and key strategies regarding the promotion of RE. The aim here is to set a conceptual framework against which the Namibian regime will be tested or compared, and from which it can learn lessons.

Chapter Five will consist of a conclusion and recommendations. It will outline the steps Namibia needs to take in order to put in place an effective energy regime which enables the deployment and development of RE.

CHAPTER TWO:
ENERGY SOURCES AND THE LEGAL FRAMEWORK OF RENEWABLE ENERGY IN NAMIBIA

2.1. Introduction

This chapter explores Namibia's energy sources. It was estimated that in 2007 alone; Namibia consumed approximately 15 TWh of energy.[68] Almost 60 % of this was attributed to liquid and gaseous fuel use, while some 25 % was in the form of electrical energy.[69] The remaining percentage was being produced from RE in which biomass counted for contributing the most.[70] While the generation capacity in the electricity sector includes a 240 MW hydro-electric plant, a 120 MW coal fired plant, and a heavy fuel-oil powered of 27 MW.[71] This chapter provides an overview of energy sources from two main categories namely; fossil fuels and RE. Whilst the general legal issues which these energy sources raise are significant to the development of RE regime. The link between energy use and supply and the anthropogenic emissions of greenhouse gases, has driven strong efforts to mitigate emissions by promoting the use of RE.[72] Even more recently, the concerns about the security of energy supply have also encouraged other alternative sources of generating energy.[73] The chapter will provide an overview of the development of policies and legal instruments which have been put in place by the Namibian government in support of the use energy in general including RE. The last part of this chapter will look at the opportunities in terms of deploying RE as well as the challenges and barriers that might be faced in developing a RE regime. All this will be based on policy and legal framework within the Namibian energy sector.

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[68] Von Oertzen *Namibia National Issues* (2010)6.

[69] Von Oertzen *Namibia National Issues* (2010) 6.

[70] Von Oertzen *Namibia National Issues* (2010) 6.

[71] Von Oertzen *Namibia National Issues* (2010) 6.

[72] Makuch & Pereira (eds) *Environmental and Energy Law* (2012)120.

[73] Makuch & Pereira (eds) *Environmental and Energy Law* (2012)120.

2.2 Fossil fuels

Much of the economic growth of the past century has been fuelled through the increasing use of fossil energy resources globally and Namibia is not an exception.[74] Currently, over 60 % of energy supply in Namibia is from fossil fuels.[75] Namibia offers exploitable fossil fuel reserves, in the form of its natural gas resources at the Kudu gas field that is still to be exploited.[76] Most, if not all, liquid and gaseous fossil fuels, including petrol, heavy fuel oil, jet fuel, liquid petroleum, gas and coal are imported, from South Africa (mainly) and other countries.[77] The following are some major fossil fuel sources and the vital roles they play in the Namibian energy sector.

2.2.1 Coal

At present Namibia has domestic coal resources that have not yet been exploited thus energy from this resource has proven to be minimal.[78] According to Namibia Report, coal only accounts for 6 % of the total primary energy supply in Namibia.[79] One of the three main electricity generators in Namibia referred to as the Van Eck power station situated outside Windhoek, operates on coal power and generates about 120 MW of power.[80] In addition, coal plays a major role in the Namibian energy sector indirectly, due to the fact that, it is the main source of electricity generation in South Africa from which Namibia imports most of its electricity supply.[81] According to the World Energy Council, Eskom, the South Africa electric utility, is responsible for about 65% of coal

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[74] Makuch & Pereira *Environmental and Energy Law* (2012) 120.

[75] Namibia, Report *General Operating Environmental*

[76] CCS*A Capacity Building Effort in Africa* 1.

[77] Von Oertzen *Namibian National Issues Sector of* (2010) 4.

[78] Von Oertzen *Namibian National Issues Report* 10.

[79] Namibia Report *Energy and Renewable Energy* (2014) 13

[80] Namibia Report *Energy and Renewable Energy* (2014) 13.

[81] Statistics South Africa *National Accounts: Environmental Economic Accounts Compendium* 2014 The key role played by the South African coal reserves is illustrated by the fact that the Electricity Supply Commission (Eskom) ranks first in the world as a steam coal user and seventh as an electricity generator.

consumption in South Africa.[82] The World Energy Council states, further, that coal resources exist in many developing countries, including those with significant energy challenges, and particularly those in southern Africa (Namibia and South Africa).[83] Coal can be exploited at extremely favourable costs and as a result, these countries are able to access coal resources in an affordable and secure way to fuel the growth in their electricity supply.[84] This situation is thus unlikely to change significantly, due to the relative lack of suitable alternatives to coal as an energy source.[85] Coal will therefore play a major role in supporting the development of base-load electricity where it is most needed.[86]

Due to the environmental challenges associated with coal, particularly climate change, the use of low emission coal technologies becomes increasingly important if international targets on climate change are to be achieved.[87] Even more so, other options of generating energy are increasingly being encouraged, particularly RE. Nonetheless, there are avenues of reducing carbon emissions from coal-fired power generation through the use of high efficiency, low-emission power plants and carbon capture, use and storage.[88] This may, however, result in the increase of costs of electricity generation from coal, hence making it difficult for countries, such as Namibia, to continue having a supply of more affordable electricity.

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[82] World Energy Council *World Energy Resources: Coal* (2013) 1.28.

[83] World Energy Council *World Energy Resources: Coal* 1.28.

[84] World Energy Council *World Energy Resources: Coal*1.28.

[85] Statistics South Africa *Natural Resources Account: Energy Accounts for South Africa* (2005) 9.

[86] World Energy Council *World Energy Resources: Coal* 1.3.

[87] World Energy Council *World Energy Resources: Coal* 1.4.

[88] World Energy Council *World Energy Resources: Coal 1.4*.

2.2 Off-shore/on-shore oil and gas

Namibia has reserves of natural gas but no oil has been discovered yet.[89] Oil contributes about 64 % of the total primary energy supply in Namibia which is imported.[90] In terms of electricity production, oil only accounts for 0.24% and the rest of the electricity production come from imports (54%), hydro (38%) and coal which contribute eight percent as mentioned above.[91] This percentage is mainly produced by the Paratus power plant (with the capacity of 24 MW) and Anixas power plant (22.5 MW) in Walvis Bay, as they use heavy-fuel oil to generate electricity.[92]
As mentioned, Namibia appears to have a greater potential for gas than for oil.[93] One major source of natural gas is found in the offshore Kudu gas field and was discovered as far back as 1974.[94]

The offshore Kudu reserve marks the transition from non-marine to marine oil and gas exploration in Namibia.[95] Conversely, this natural gas reserve has never been developed because of a lack of gas production and transport infrastructure.[96] The Kudu gas field could supply fuel for a combined gas turbine plant, and at an installed capacity of 400MW.[97] The source is estimated to provide a supply for some 40 years, yielding about 3 TWh per annum.[98]The use of natural gas for power generation remains the

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[89] SACU *Trade Policy Review* Annex 3 Namibia 2009 253.

[90] Namibia Report *Energy and Renewable Energy* 13.

[91] Namibia Report *Energy and Renewable Energy*13.

[92] Konrad-Adenauer-Stiftung *Namibia's Energy Future* (2012) 15.

[93] World Energy Council *World Energy Resources: Oil and Natural Gas* 3.49.

[94] World Energy Council *World Energy Resources: Oil and Natural Gas* 3.49.

[95] Brat, Lawrence & Swart 1998 *Oil & Gas Journal* 2.

[96] World Energy Council *World Energy Resources: Coal* 3.49.

[97] World Energy Council *World Energy Resources: Oil and Natural Gas* 3.49.

[98] Von Oertzen *Namibian National Issues Sector of Energy with a Focus on Mitigation* 6.

largest and most important growth sector, not only nationally but globally.[99] How much and how fast it will grow, depends on the fundamental economics, which, in turn, will be influenced by politics related to energy and to climate change.[100] With the ever increasing number of people needing electricity supplies, this sector is set for continuing growth in the coming decades.[101] This is particularly the case in Namibia where there is a pressing need to generate and supply electricity to most people in rural areas who are without electricity.[102]

2.3 Renewable energy sources

Namibia is blessed with abundant RE sources, ranging from solar, hydro, wind, biomass, biogas, and wave and tidal energy. At the moment, however, most of these RE sources have not been successfully exploited, even though the exploitation and development of RE has grown significantly globally.[103] Below is a brief discussion on some key RE sources in Namibia, in terms of their availability and accessibility and the extent to which they have been exploited and developed, as well as their potential to be further exploited and developed.

2.3.1.Hydropower

Namibia has a domestic hydro-electric plant based in the Kunene River known as the Ruacana Hydropower station. It is the main domestic hydropower plant with a generating capacity of 332 MW.[104] Since it is a run-of-river power station, its ability to generate electricity remains dependent on the continuous water flow from Angola, for in the absence of sufficient water flow, the plant will not be able to feed electricity into the

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[99] World Energy Council *World Energy Resources: Oil and Natural Gas* 3.4.

[100] World Energy Council *World Energy Resources: Oil and Natural Gas* 3.4.

[101] World Energy Council *World Energy Resources: Oil and Natural Gas* 3.10.

[102] Von Oertzen *Namibian National Issues Report* 6.

[103] International Energy Agency (IEA) *Deploying Renewables: Best and Future Policy Practice* (2011) 5.

[104] Konrad-Adenauer-Stiftung *Namibia's Energy Future* (2012) 14.

national grid on demand.[105] There are a number of proposed projects to expand hydropower in Namibia. One of them is the Bayne hydro-electricity scheme which will be based on the Kunene River downstream of Ruacana.[106] The project is planned to have a storage dam, and provided the dam holds sufficient water, Bayne is expected to contribute 1 TWh per annum to the national electricity grid.[107] Such a development would fill the gap of much-needed base-load power and power on demand.[108]In addition, there are prospects to develop small-scale hydropower on the Orange (Gariep) River in the far south and the Kavango River in the country's north east.[109] About 120 MW could be realised if these potentials are developed and will contribute about 0.3 TWh of green electricity per annum.[110]

The International Energy Agency (EIA) has acknowledged the potential impact of climate change on hydropower production.[111] It has further pointed out that although the global impact of climate change on hydropower is uncertain as a result of regional changes potentially cancelling out, the impact on river basin or region could be quite substantial.[112] Therefore Southern Africa major river basins including, Kunene River, Kavango River and Orange River, may experience more severe droughts and floods owing to global climate change.[113]

Namibia, in particular, is extremely vulnerable to climate change, and has in recent years experienced a number of droughts and floods. Since hydropower

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[105] Konrad-Adenauer-Stifting *Namibia's Energy Future (2012)* 14.

[106] Electricity Control Board *Green Energy in Namibia* (2009) 6.

[107] Electricity Control Board *Green Energy in Namibia* 6.

[108] Electricity Control Board *Green Energy in Namibia* 6.

[109] NamPower.

[110] Electricity Control Board Green *Energy in Namibia* 6.

[111]Cole, Elliot & Strobl *Climate Change, Hydro-dependency and the African Dam Boom* 2012

[112] Cole, Elliot & Strobl *Climate Change, Hydro-dependency and the African Dam Boom*5).

[113] CSIR *Documentation of Research on Climate Change and Water in Southern Africa* 1.

generation is highly dependent on the perpetual flow of water, this will have a major impact on feasibility of hydro- power generation, in Namibia. The World Bank also recognises the risks associated with hydro-dependency in a changing climate, and points out that there is a need to diversify the energy mix to ensure that energy supplies are sustainable given that an overreliance on hydropower makes economies vulnerable to hydrological conditions.[114] This is something that Namibia has to consider if it is to expand its RE generation through hydropower. In addition to being one of the driest countries in the world, the country is faced with water scarcity. The development of more hydropower stations will mean further strain on the availability of water that will be competing for other important activities such as agriculture.

2.3.2 Solar energy

Solar energy in Namibia is amongst the best in the world.[115] The generation of solar photovoltaic (PV) is not limited by the availability of the resource, or space requirement.[116] Therefore, under these prevailing conditions, there is potential for generating a capacity of about 50 MW which will contribute about 0.08 TWh to the Namibian grid per annum.[117] However, so far solar energy has mostly been utilised on a smaller scale and is run entirely by the small private sector.[118] Solar water pumping (PVP) on the cattle farms is one of the major solar PV applications in Namibia.[119] Others are used mostly in rural areas consisting of small systems equipped with an inverter and storage system (batteries) that provide enough electricity for lighting, the radio, fans and the television.[120]

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[114] Cole, Elliot & Strobl *Climate Change, Hydro-dependency* 5.

[115] Emcon Consulting Group *Electricity Supply and Demand Management Options for Namibia* 2008 12.

[116] Electricity Control Board *Green Energy in Namibia* 7.

[117] Electricity Control Board *Green Energy in Namibia* 7.

[118] The Namibian Electricity Supply Industry (1998) 3.

[119] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[120] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

Some larger solar home systems are also being utilised by households that require a great deal of electricity. They are also able to feed the grid with any excess they produce without a licence (if their system is smaller than 500 kV (kilo-volts)) without compensation from the power utility.[121] Nevertheless, there is as yet no large commercial solar PV plant in Namibia, as large-scale PV power generation remains expensive and requires storage capacities if output power is to be available continuously.[122]

2.3.3 Geothermal energy

Geothermal energy generates electricity using hot water found close to the Earth's surface, or from the heat trapped in geological formations deep underground.[123] Unlike wind and solar, geothermal does not depend on daily or seasonal variations, hence it is ideal for the base-load power generation.[124] Namibia's geothermal resource potentials remain unknown. There are number of hot springs, from Warmbad in the far south of Namibia, to Rehoboth, Windhoek and Gross Barmen, and a few in the Kunene Region.[125] There is insufficient evidence to conclude that enough viable high-temperature geological formations useful for geothermal power generation exist in the country.[126]

2.2.4 Wind energy

Wind energy sources occur along the coastal area of Namibia, particularly in the area south of Luderitz. The overall potential of wind energy in Namibia is estimated at 27.2001 MW and 36 TWh (terawatts-hour) per annum, with a relative land use of

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[121] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[122] Electricity Control Board *Green Energy in Namibia* 6.

[123] Electricity Control Board *Green Energy in Namibia* 6.

[124] Electricity Control Board *Green Energy in Namibia* 6.

[125] Personal communication with Dr Rainer Ellmies, Geological Survey of Namibia, Ministry of Mines and Energy, April 2009. Personal communication with Dr Branko Corner, Corner Geophysics Namibia, April 2009.

[126] Personal communications with Dr Rainer Ellmies.

824,268 km2.[127] According to the Electricity Control Board ((ECB) (the Namibian statutory regulatory authority), there is the potential of building several on-shore wind farms along the coast, with an installed capacity of between 20 MW and 50 MW that could contribute about 0.12 TWh every year.[128]As mentioned in Chapter One, there is an ongoing project of wind park generation near Luderitz that was expected to be completed by the end of 2014 and is estimated to have a generating capacity of about 44 MW.[129] Other additional potential sites with a good wind regime are likely to exist in areas located in the north (Henties Bay, Mowe Bay and Terrace Bay).[130] At the moment there is one wind turbine (220 kW) installed in Namibia, which feeds the distribution grid in the Erongo Region.[131]

2.3.2 Biomass

Invader bush is one of the feasible RE sources of biomass and biogas in Namibia as it grows in abundance, covering about 26 million hectares.[132] It has been estimated that if the same amount of bush were used to produce electricity, it would generate about 1, 100 TWh, which at the Namibian scale could be considered as unlimited.[133] The invader bush is also used to produce other sources of energy such as charcoal. Biomass counts for almost 15% of the remaining total national energy used in terms of RE, while other RE sources contributes the reminder which in most cases, is less than 1%.[134] For example, in 2007 about 13% of Namibia's total energy consumption was covered by biomass.[135]

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[127] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* 2014).

[128] Electricity Control Board *Green Energy in Namibia* 6.

[129] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[130] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[131] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[132]De Klerk *Bush Encroachment in Namibia* 2004.

[133] Electricity Control Board *Green Energy in Namibia* 4.

[134] Von Oertzen "Namibia National Issues" 6.

The conversion of biomass to electricity could contribute more than 100 MW to the national capacity and provide some 0.5 TWh to the national energy mix.[136] However, at the moment, proof-of-concept plant producing only 250 kW is expected to become operational in 2010. The financial feasibility of biomass from invader bush to electricity is considered marginal at most, but plants between 5 and 20 MW each may in the future prove that it is economically viable.[137] Such development will, however, not occur on its own as laws, policy support and incentives are needed, all of which are further discussed in Chapter Three.

A project known as Combating Bush Encroachment for Namibia's Development (CBEND) was initiated as from 2007. It established the first bush to electricity demonstration plant in Namibia with a capacity of 250 kW.[138] However, the power plant does not feed electricity yet due to the low power factor of the connecting line.[139]

To sum up, issues of how will the above RE sources develop; whether they will take over fossil fuels as predominant energy generation; and what their influence will be in the energy market and the environment, has been the topic of many discussions. In these it is most commonly suggested that if a RE regime or legal framework were correctly implemented the diffusion of RE in the energy market could be accelerated, thereby enabling it to compete with the other dominant energy source, namely, of fossil fuels.[140] Unless RE sources are able to meet the demands of a developing nation and provide energy security, they stand to lose ground against fossil fuels.

This is, in fact, the case at present, in respect of fossil fuels despite their negative impacts they have on the environment their economic viability combined with

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[135] Namibia Energy Database.

[136] Electricity Control Board *Green Energy in Namibia* (2009)4.

[137] Electricity Control Board *Green Energy in Namibia* (2009) 4.

[138] Electricity Control Board *Green Energy in Namibia* (2009) 4.

[139] Electricity Control Board *Green Energy in Namibia* (2009) 4.

[140] World Energy Council *World Energy Resources* 3.7.

qualities of efficiency, reliability, convenience and responsiveness to the consumers' needs, make an ideal choice for a wide range of uses in many parts of the world, including Namibia.[141] This, however, must not be the reason why RE resources should not be developed s to such an extent that they will be able to compete with fossil fuels and, perhaps, overtake the fossil fuel energy sector. This is especially in an era of the ever-increasing energy demand and a growing consciousness of adverse impact of fossil fuel on the environment.

2.3. Regulatory and legislative framework for renewable energy in Namibia: the status

2.3.1Introduction

At the moment, Namibia does not have an Energy Act, let alone an RE Act, but has the Electricity Act and the old policy which contains a small section on RE. This section, does not provide much in the way of regulation of RE in Namibia, resulting in the lack of an adequate RE regulatory framework.[142] However, any quick and unfounded conclusions regarding the regulatory and legislative framework of RE in Namibia can be made, it is necessary to discuss in outline the current *White Paper on Energy Policy* and the relevant legislation on RE.

2.3.2 Regulatory framework

2.3.2.1*White paper on renewable energy policy 1998*

The current energy policy is still expressed in the *White Paper on Energy Policy* (WPE) of 1998. It remains the main policy document regarding the government's intention to develop energy sources in Namibia. In terms of this policy document, the government is mandated to promote the use of RE through the establishment of an adequate institutional and planning framework, and to meet development challenges through improved access to RE sources.[143] RE development is critical to Namibia's energy sector as it has the potential to fulfil — or rather meet —most of the White Paper's

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[141] World Energy Council *World Energy Resources* 3.6.
[142] *White Paper on Energy Policy of* Namibia (1998).

[143] *White Paper on Energy Policy of Namibia*, 45.

strategic goals which are effective governance, security of supply, social up-liftment, investment and growth, economic competiveness and efficiency, and sustainability.[144] According to Ndhlukula, the policy recognises the importance of RE in Namibia's socio-economic development in terms of providing "sustainability" and "social up-liftment," especially in rural areas, where it will complement grid electrification, and provide "security of supply" to the country's energy requirements by virtue of diversification and the use of locally available resources.[145]

In addition, the WPE contains specific policies with regard to RE that have guided MME initiatives over the past years.[146] One of the initiatives put in place by the MME's RE division is the Namibian Renewable Energy Programme (NAMREP) whose aim is to remove financial, economic, political and public awareness barriers to RE, in particular solar energy.[147] By the same token, the Renewable Energy and Energy Efficiency Capacity Building Programme (REEECAP) was implemented to generate information for the implementation of the RE and energy efficiency policies formulated in the WPE.[148]

Furthermore, the Strategic Action Plan for the Implementation of RE policy was drawn up in 2006, as part of collaboration between the United Nations Development Programme (UNDP), the Global Environment Facility (GEF) and an MME project, the Barrier Removal to Namibian Removal Energy Programme (NAMREP).[149] The purpose of the project is to provide organisational support and to prioritise RE interventions that are in line with the WPE.[150] The Strategic Action Plan was based on the improvements and additions to the existing institutional environment, which resulted in the establishment of the Renewable Energy and Efficiency Institute (REEEI) as a regulatory

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[144] Ndhlukula "Namibian Policy Perspectives on Solar Energy'" in *Orange Deals* (1912) 18-29.

[145] Ndhlukula "Namibian Policy Perspectives on Solar Energy'" 18-29.

[146] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[147]Ndhlukula "Namibian Policy Perspectives on Solar Energy'" 18-29.

[148] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[149] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

[150] REEEP *Renewable Energy and Energy Efficiency Partnership Policy* (2014).

framework for RE.[151] REEEI serves as a national information resource base for sustainable energy use and management, and has played a major role in the coordination of programmes such as NAMREP and REEECAP.[152]

2.3.3 Legislative framework

2.3.3.1 Petroleum Products and Energy Act 13 of 1990

The Petroleum Production and Energy Act 13 of 1990 came into operation in August 1990. The main purpose of the Act is mainly to regulate and promote petroleum products.[153] The Act's objective focuses only on exploitation and development of petroleum by providing measures for the saving, cost and distribution of petroleum products. It also provides for the establishment of a National Energy Fund and a National Energy Council and the imposition of levies on fuel were provided for.[154] These two institutions have very important functions especially when it comes to the development of energy sources.

Hence among its objects and functions, the National Energy Council, advises the MME on all matters concerning the supply of energy in Namibia, as well as on the exploitation and utilization of existing and potential energy resources.[155] The Act was subsequently amended three times by the following amendment Acts: Petroleum Products and Energy Amendment Act 29 0f 1994, Petroleum Products and Energy Amendment Act 3 of 2000 and Petroleum Products and Energy Amendment Act 16 of 2003. Whether or not the Act has achieved its objectives since its inception particularly in developing other energy sources such as RE seems to be in the negative since RE development still stands as an issue which Namibia needs to tackle.

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[151]Ndhlukula "Namibian Policy Perspectives on Solar Energy'" 18-29. REEI was established in 2006 to promote RE and energy efficiency through, among others, research and the development of materials, standards, and the publication of reports to disseminate the information.

[152] REEEP *Renewable Energy and Energy Efficiency Partnership Policy (*2014).

[153] Petroleum Production and Energy Act 13 of 1990.

[154] Du Pisani *Rumours of Rain* (1991) 19.

[155] Du Pisani *Rumours of Rain* 19.

2.3.3.2 The Electricity Act

The initial Electricity Act 2 of 2000 has been repealed by the Electricity Act 4 of 2007 that is currently in force. The Electricity Act does not deal with RE in detail nor does it contain any specific provisions for the regulation of RE market.[156] However, the Act grants exclusive jurisdiction for RE and stipulates that:

> The Minister may make regulations in relation to…instalment and implementation of renewable energy technologies, the use thereof (including the placing of obligation on persons with regard thereto) and the provision of electricity thereof.[157]

According to Renkoff, the Electricity Act suggests that, under the Namibian law, the RE market can only be regulated by regulations promulgated by the Minister.[158] Sadly, these regulations do not exist to this day.[159]In addition, the Act has established the Electricity Control Board (ECB) as an independent regulator.[160] It also makes provision for the objectives, powers and functions of the ECB, which include the control and regulation of provision, use and consumption of electricity in Namibia,[161] to make recommendations to the MME with regard to issuing of licences in terms of generation, transmission and trade of electricity,[162] and extended its roles in terms of controlling electricity tariffs and issuing of licence.[163] However, the ECB only regulates matters pertaining to the generation of electricity. This is still not sufficient to regulate RE in general, thus the need to enact a law that will adequately regulate RE remains.

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[156] Renkhoff "Renewable Energy Law and Regulation in Namibia" 201-227.
[157] 43 (1) (j).

[158] Renkhoff 'Renewable Energy Law and Regulation in Namibia" 201-227.

[159] Renkhoff 'Renewable Energy Law and Regulation in Namibia" 201-227.

[160] Section 2.

[161] Section 3(1) (a).

[162] Section 3(2).

[163] REEEP *Renewable Energy and Energy Efficiency Partnership Policy (*2014).

2.3.3.3 The Environmental Management Act[164]

RE is said to be strongly embedded in issues related to the environment, particularly climate change.[165] Hence as a principal Act when it comes to environmental protection the Environmental Management Act has direct and indirect implications towards RE. According to Rupple, the Act promotes the coordinated principles for the management of the environment and natural resources.[166] It gives effect to Article 95 (I) of the Namibian Constitution by establishing general principle for the management of the environment and natural resources.[167] The Act requires adherence to the principle of optimal sustainable yield in the exploitation of all natural resources including RE.[168] It promotes inter-generational equity in the utilisation of all natural resources. Most importantly in terms of its objectives as provided in section 2, the Act specifically states that renewable resources must be used on a sustainable basis for the benefit of present and future generations.[169]

In addition, the Act clearly provides that damage to environment must be prevented and activities which cause such damage must be reduced, limited or controlled.[170] Therefore, activities such as energy generation sources from fossil fuels that cause greater damage to the environment should be limited, reduced or controlled if they cannot altogether be prevented. This stresses importance of promoting, encouraging and developing the use of RE (which has less impact on the environment) as a replacement for the dominant use of fossil fuel for energy generation.

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[164] No. 7 of 2007.

[165] Hirschl & Petschow U *Building a Global Renewable Energy Regime-What can be learned from other (environmental) regimes?* 1.

[166] Ruppel &Ruppel-Schlichting (eds) *Environmental Law and Policy in Namibia* 85.

[167] Ruppel & Ruppel-Schlichting (eds) *Environmental Law and Policy in Namibia* 85.

[168] Ruppel & Ruppel-Schlichting (eds) Environmental *Law and Policy in Namibia* 85.

[169] Section 3(2)(a).

[170] Section 3(2)(I).

It must be pointed out that the Ministry of Environment and Tourism is the institution and regulatory authority responsible for matters pertaining to the environment in general, while the Petroleum and Energy Act (and its amendments) and the Electricity Act fall under the aegis of the MME. Since the issue of developing RE affects all the above mentioned laws, directly or indirectly, this situation requires and institutional arrangement between these ministries. However, the lack of adequate laws pertaining to energy — and particularly to RE — is a clear indication that this aspect is not covered the legislation. There is thus need for the enactment of a law that will ensure these different institutions work together harmoniously in matters regarding the development of RE.

2.3.3.4 Namibia Water Corporation Act[171]

The Namibia Water Corporation Act is particularly relevant in terms generating electricity from hydropower as source of RE. The duty of the Corporation which is established in the Act is to conserve and protect water resources. [172] This is especially important because Namibia is a dry country and water is one of its scarcest resources. The Act further states that, the available water resources should be utilised on a long-term and sustainable basis and be protected from pollution caused by any operation.[173] Therefore any development of RE that would involve hydro energy, should consider the objective of this Act in terms of conserving and protecting water resources.

2.3.4 Regulatory authorities

There is one main regulatory authority pertaining to energy in general, namely, the MME. The MME has the overarching regulatory role regarding energy generation or production in general as provided for in all energy related statutes mentioned above.[174] The ECB was established as a statutory regulatory authority under the Electricity Act

[171] No. 12 of 1997.

[172] Section 11.

[173] Section 11 (1) (a) & (b).

[174] REEEP *Renewable Energy and Energy Efficiency Partnership Policy (*2014).

2000. The ECB is thus also a regulatory authority, but with particular focus on electricity generation. As mentioned above, the 2007 Electricity Act has expanded the ECB mandate to regulate electricity generation, transmission, supply, distribution, import and export in Namibia by setting tariffs and the issuing of licences. [175]

To conclude, RE input into Namibia's energy mix is negligible. This indicates the need for political intervention in the form of an enabling legislative and regulatory framework.[176] According to Ndhlukula, the purpose of a regulatory framework is to govern the direction of RE development in Namibia by facilitating fair market access, return on investment quality of supply, standards, market support structures and incentives, and legal issues.[177] The government has often stated its intention to improve the use and the development of RE in Namibia. Renkhoff describes this intention as follows:

> There is a mutual consent among all involved stakeholders, including those who raise environmental arguments about not using one of the world's best solar, wind and biomass resources, to pave the way for RE technologies, the government has begun to work on a comprehensive legal framework which is by no means an easy task. The Ministry of Mines and Energy is currently working on a number of projects, such as the review of the White Paper and the New Energy Regulatory Framework, which will eventually provide RE integration into the overall energy mix. Apart from that Renewable Energy Act and overall Energy Efficiency Act are in preparation.[178]

It is clear from the above quoted statement that although much has been said and planned, there has been very little progress when it comes to developing RE.

2.4 The challenges and opportunities for Namibia's RE development

There are number of persistent barriers to the development of RE in Namibia. At present, the exploitation of Namibia's RE sources is limited, not only due to a lack of

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[175] REEEP *Renewable Energy and Energy Efficiency Partnership Policy (* 2014).

[176]Ndhlukula "Namibian Policy Perspectives on Solar Energy" 18-19.

[177]Ndhlukula "Namibian Policy Perspectives on Solar Energy" 18-29.

[178]Renkhoff "Renewable Energy Law and Regulation in Namibia" 201-227.

adequate financing and infrastructure, but also a lack of proper laws and policies to develop RE.[179] Several studies have pointed out that Namibia's RE sector is vulnerable due to:

i) Limited investment opportunities;[180]
ii) one-sided market rules, particularly the single buyer arrangement;[181]
iii) absence of tax and investment incentives to introduce new technologies and encourage the use of RE;
iv) lack of national RE targets;
v) over dependence on fossil fuel as source of energy;
vi) lack of institutional support mechanisms that investors find in other parts of the world;
vii) challenges low electricity tariffs[182]

Often these have discouraged investors in the past. Oertzen reveals that, in an energy hungry world, investors have a wide choice of locations to go to, some with excellent short- and- long-time incentives in addition to good resource conditions.[183] In the long run, many investors will be lost to the country if investment conditions seem unattractive. [184] The investment framework and business conditions, thus, need to be made more investor friendly and attractive.[185] Furthermore, According to the Electricity Control Board of Namibia, in the absence of tax incentives and other barriers against RE, few local investors will manage to establish themselves successfully.[186]

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[179]Ndhlukula Namibian Policy Perspectives on Solar Energy'18-29.

[180] Electricity Control Board Green *Energy in Namibia* (2009) 13.

[181] Electricity Control Board*Green Energy in Namibia* 13.

[182] Von Oertzen *Namibian National Issues Report* 15.

[183] Von Oertzen *Namibian National Issues Report* 15.

[184] Von Oertzen *Namibian National Issues Report* 15.

[185] Electricity Control Board *Green Energy in Namibia* 13.

[186] Von Oertzen *Namibian National Issues Report* 15.

Despite the above-mentioned challenges, Namibia's RE sector offers very significant, and yet untapped, opportunities for investment, growth and development.[187] As discussed earlier in the chapter, Namibia has RE sources in abundance, specifically those with a proven resource base, including solar, wind and biomass, as well as other unqualified but yet plentiful indigenous sources such as geothermal, wave and tidal energies, all of which constitute a national comparative advantage that can and should be exploited.[188] In addition, Namibia is endowed with the Kudu natural gas reserve, which, if used wisely, can bridge the way towards Namibia's energy self-sufficiency.

With the cost of RE said to be declining and will continue to decline as the technologies mature, the exploitation of RE in Namibia can be achieved to its full potential.[189] An increased use of RE will require the introduction of new policies and laws. Countries that have managed to develop their RE regimes and record significant capacity have enacted pro-renewable energy regulatory frameworks and instruments, such as feed-in-tariffs. It is envisaged that such strategic and binding policies will create a critical mass that will eventually lead to a self-sustaining RE market.[190] At the moment the *White Paper on Energy* (1998) has, as stated earlier, set some objectives to develop RE.[191] A strategy for implementing this target needs to be formulated, focusing on specific projects and their financing. The government support and commitment to energy policy and programme subsidies remains essential to the development of RE—if it is to become more vibrant, diverse, and of greater interest to national or international investors.[192]

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[187] Von Oertzen *Namibian National Issues Report* 7.

[188] Von Oertzen *Namibian National Issues Report* 7.

[189] OECD/International Energy Agency (IEA) *Deploying Renewable: Best and Future Policy* (2011) 30.

[190] Ndhlukula "Namibian Policy Perspectives on Solar Energy"18-29.

[191] *The White Paper on Energy and Policy 2008* 1.

[192] Von Oertzen *"Namibian National Issues Report* 15.

2.6 Conclusion

The above has shown that Namibia has great potential of RE but the country is lacking an adequate regulatory framework, not only in terms of RE but also in the entire realm of energy. It was further shown that the laws and policy in place are insufficient, and those that are in place are considered as one of the major barriers to the development of RE. This situation has resulted in the number of challenges that the energy sector is currently facing. However, regardless of these challenges, Namibia has the potential to overcome them and develop an RE regime. Therefore, to encourage a greater use of RE resources, the government needs to develop its RE regime by adopting new laws, policies and programmes designed to integrate RE into the national electricity generation and energy supply and to encourage greater use of RE. With this in mind, the next chapter will look at the OECD guidelines in terms of adopting adequate laws and policies develop RE regime.

CHAPTER THREE:

THE INTERNATIONAL ORGANISATION OF ECONOMIC CO-OPERATION AND DEVELOPMENT'S GUIDELINES IN TERMS OF DEVELOPING A RENEWABLE ENERGY REGULATORY FRAMEWORK

3.1 Introduction

Concern over energy security, poverty reduction, climate change, and the transfer of RE technology to developing countries is of interest to many organisations all over the world.[193] In particular the Organisation of Economic Co-Operation and Development (OECD) provide assistance to governments on the design and implementation of a proper RE regulatory framework.[194] As a developing nation, Namibia need to harness RE resources for its social and economic development. Chapter Two has shown that, even though there is greater potential for the deployment of RE, Namibia is lacking a proper regulatory framework in order to realise this potential. Therefore this chapter will analyse the OECD guidelines on the elements and key strategies that need to be addressed in order to build a regulatory framework that encourages and supports RE.

3.2 The Organisation for Economic Co-Operation and Development (OECD)

The OECD is regarded as an international organisation with a unique forum where the governments of thirty democracies work together to address the economic, social and environmental challenges of globalisation.[195] The organisation provides opportunities in which governments can work together to share experiences and seek solutions to common problems, identify good practices and work to co-ordinate domestic and international policies, as mentioned above.[196] One of the challenges identified by the OECD is the development of RE. This can be linked to the first oil crisis of the early 1970s, which resulted in most of the OECD countries seeking energy security through

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[193] Wilkins *Technology Transfer for Renewable Energy* (2002), 1.

[194] Mendonca M *Feed-In Tariffs* (2007) 107.

[195] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policies* (2013) 4.

[196] OECD *Policy Guidance for Investment in Clean Energy Infrastructure* 3.

RE sources.[197] The issues related to RE are also well tackled through the International Energy Agency (IEA) as an autonomous body which is established within the framework of the OECD to implement an international energy programme.[198] The IEA carries out a comprehensive programme of energy co-operation among the OECD member countries and non-member countries.[199] Its basic aims include:

a) The improvement of the world's energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use;
b) To assist in the integration of environmental and energy policies;
c) To promote international collaboration on energy technology and;
d) To promote rational energy policies in a global context through co-operative relations with non-member countries, industry and international organisations.[200]

The above clearly shows that, the OECD provides assistance through research and development in RE, not only to its member countries but also to non-member countries.[201] Hence as a non-member country, Namibia does not fall short of this guidance and assistance as the organisation aims to tackle energy issues from a global perspective, and can only be done by co-operation with both member and the non-members countries.

3.2.1 The Deployment of RE in terms of the Organisation for Economic Co-Operation and Development

The urgent need for the deployment of RE cannot be overemphasised. Wilkins emphases that RE has a key role to play, not only in addressing emission targets nationally and globally, but also in accessing local energy sources which can help

[197] OECD *Linking Renewable Energy to Rural Development* 11.

[198] International Energy Agency (IEA) *Deploying Renewables: principle for effective policy (2008)* 2.

[199] International Energy Agency (IEA) *Deploying Renewables: principle for effective policy (2008)* 2.

[200] International Energy Agency (IEA) *Deploying Renewable: principle for effective policy* (2008) 2.

[201] OECD *Policy Guidance for Investment in Clean Energy Infrastructure* 3.

facilitate sustainable development and meet international developmental targets.[202] In developing countries, for instance, the drivers for RE deployment is based on energy access and social and economic development, whereas, security and environmental concerns have been important drivers for RE in developed countries.[203]

The principles for effective policies have highlighted success factors and key policy tools to fast-track the introduction of renewables into the mainstream energy sector at the global level.[204] It draws attention to the existence of significant barriers to accelerating renewables' penetration, and argues that the great potential of renewables can be exploited much more rapidly and to a much larger extent if good practices are adopted.[205]

More recently, the new International Energy Agency (IEA) Report gives, among others, a comprehensive review and analysis of RE policy and market trends.[206] It further analyses in detail the dynamics of deploying RE, and provides best-practice policy principles for different stages in the market.[207] It also assesses the impact and cost-effectiveness of support policies using new methodology, tools and indicators. Most importantly, it investigates the strategic reasons underpinning the pursuit of RE deployment by different countries and the prospects for the globalisation of RE.[208]

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[202] Wilkins *Technology Transfer for Renewable Energy* iii.

[203] Edenhofer at el *Summary for Policy Makers* 24.

[204] International Energy Agency (IEA) *Deploying Renewables: principles for effective policy* (2008) 2.

[205] International Energy Agency (IEA) *Deploying Renewables: principles for effective policy* (2008)2.

[206] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011)1. This is based on the new EIA report, *Deploying Renewables 2011 – Best and Future Policy Practice*. This builds on the 2008 IEA publication, drawing on recent policy and deployment experiences world-wide. It provides guidance for policy makers and other stakeholders to avoid past mistakes and to overcome new challenges and reap the benefits of deploying renewables – today and tomorrow.

[207] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 1.

[208] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 1.

The 2011 EIA/OECD Report indicates that there has been significant progress in the deployment of RE in many countries, something that is not only confined to, but extends beyond the OECD member countries.[209] The Report aptly expresses this progress as follows:

> Compared to 2005, many more countries are taking policy measures aimed at stimulating renewables' deployment, and the regional diversity is growing. No fewer than 45 of the 56 countries which have been considered in detail in the report, for example, now have renewable electricity targets in place, including 20 non-OECD members, whereas in 2005, such targets were largely confined to OECD and BRICS regions. In 2011, 53 of the 56 focus countries have electricity support policies in place, compared to 35 in 2005.[210]

Notwithstanding the above progress, it has been concluded in terms of the OECD analysis that, to date only a limited number of countries (including Germany) have implemented effective support policies for renewables.[211] However, much more can and should be done, not only at the global level, but also at national level, where all countries (not only OECD members) are required to address the urgent need of transforming our unsustainable energy present into a clean and secure energy future.[212] New countries, which are only just starting on their deployment journeys, will be able to make much better progress if they, too, take advantage of the technology and policy lessons now available.[213]

3.3 The OECD guidelines on the implementation of a successful regulatory framework for renewable energy

As mentioned earlier, the OECD sets out guidelines that can assist countries to effectively deploy RE by establishing a proper regulatory framework, depending on the

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[209] International Energy Agency (IEA) *Deploying Renewables: Best Practice* 29. See also, Kalmova et al *Sources of Finance, Investment Policies and Plant Entry* 13.

[210] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 1.

[211] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 22.

[212] OECD *Policy Guidance for Investment* 3.

[213] OECD *Policy Guidance for Investment* 3.

specific technology and country.[214] Through a considerable number of years in research and analyses of member states regarding their success and failure in terms of the deploying RE and developing policies, regulations and enacting laws both from a global and national level, the organisation today has the capacity to give guidance on this aspect.[215] It provides a range of important issues that need to be considered in establishing a general RE regulatory or legal framework, from a global level to a national level.[216] Particularly, on a national level, the organisation provides guidance not only by giving an evaluation as to the successes and failures recorded by some of its member countries in terms of empirical evidence, but also by discussing issues related to how a country can develop a regulatory framework which supports RE.[217] The next section will thus discuss key elements that policy makers and legislators alike must consider when drafting policies and/or enacting laws in order to establish a proper RE regulatory framework.

3.3.1. Implementation of policies that support renewable energy

A policy is an important step for any government seeking to implement a regulatory or legal framework. Due to the growing importance of RE on a global scale, a need for effective support policies arises in many countries.[218] Government policies play a crucial role in accelerating the deployment of RE technologies.[219] Policy instruments in some countries, particularly OECD members, have shown good results that are often referred to as "good practice", and thus recommended for adoption in other countries.[220] However experts often use so-called "good practice policies" as an example that promises high effectiveness and efficiency, as the basis to design similar polices for

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[214] International Energy Agency (IEA) *Deploying Renewables: principle for effective policy* (2008) 2.

[215] International Energy Agency (IEA) *Deploying Renewables: Best Practice* 29.

[216] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policy* (2008) 2.

[217] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policy* (2008) 2.

[218] Liptow & Remler *Legal Framework for Renewable Energy*" iii.

[219] Edenhofer at el "Summary for Policy Makers": in IPCC *Special Report on Renewable Energy Sources and Climate Change Mitigation* 24.

[220] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 23.

other countries, hoping that they would work as successfully in the target country as in the country of origin.[221]Liptow & Lemler warn against this practice, considering it problematic and, in many cases, even leading to complete failure.[222] This is because, other factors such as the political, economic, and social climate often differ from country to country can heavily influence the functionality and impact of policies.[223]

It is thus thought essential that before a country decides to adopt another's structural policy design, important issues and concerns need to be considered when d a new policy is drafted or an already existing policy is improved.[224] Liptow and Remler assert that policy makers must understand the following general key questions;

a) Why do policies work or do not work?
b) Which factors of influence are relevant for success or failure?
c) How can these factors be isolated and their effect be understood in details?[225]

Depending on the circumstances of each country, the above questions will be able to give clear indication as to whether or not the intended policy adoption will be able to succeed.[226]

Müller and Brown provides key elements for policy implementation in terms of the three phases of policy development, namely the inception, take-off and consolidation phase.[227] These three phases of policy implementation are very important as they deal with key policy priority at their respective stage as they go through the stages. They are summarised in the table below:[228]

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[221] Liptow & Remler *Legal Framework for Renewable Energy* 9.

[222] Liptow & Remler *Legal Framework for Renewable Energy* 9.

[223] Liptow & Remler *Legal Framework for Renewable Energy* 9.

[224] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policy* 1.

[225] Liptow & Remler *Legal Famework for Renewable Energy* 9.

[226] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policy* (2008) 1.

[227] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 23.

[228] International Energy Agency (IEA) *Deploying Renewables: Best Practice* (2011) 23.

Inception	Take-off	Consolidation
A need to develop a clear roadmap, to include targets that generate confidence.	Ensure a predictable support environment, backed by credible and ambitious targets.	Deal with integration issues (such as the biofuels blending wall or system integration of variable renewable power), and focus on enabling technologies.
To provide a suitable mixture of support, which may include both capital and revenue	Provide appropriate incentives to ensure continued growth in deployment, managing them dynamically to control total policy costs, and to encourage improved cost competiveness.	Ensure that energy market design is commensurate with high levels of RE penetration and economic support can be progressively phased out.
To ensure that the necessary regulatory framework is in place and efficient.	Ensure that adaptability to market and technology developments is built in as key characteristics of the policy package.	Maintain public acceptance as deployment levels grow and projects have higher visibility and impact.
	Focus on non-economic barriers and implementation details.	

3.3.2. Guiding principles recognised by the OECD on the implementation of policy for renewable energy

In order to achieve a smooth transition towards the integration of renewables, RE policy design should reflect a set of fundamental principles in an integrated approach.[229] The principles should be reflected in establishing and implementing RE policies.

a) Predictable and transparent renewable energy policy framework

In terms of this principle, emphasis is placed on the need to integrate RE policy into the overall energy strategy. This can be done by taking a portfolio approach by focusing on technologies that will best meet the policy needs in the short and long term. The policy objectives have to be ambitious and have reliable targets.[230]

b) Dynamic approach

The dynamic approach accommodates rapid technological development. It entails differentiating RE technologies individually according to their current maturity, rather than using a technology neutral approach. In doing so, closer attention must also be given to national and global market trends through monitoring and adjusting policies accordingly.[231]

c) Non-economic barriers

The principle deals with issues relating to non-economic barriers. These barriers should be tackled in a comprehensive, streamlined process and use procedures as much as possible.[232]

d) System integration

This principle is responsible for providing guidance at an early stage, in identifying and addressing overall system integration issues, such as infrastructure and market design, that might become constraints as deployment level rise.[233]

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[229] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 21.

[230] International Energy Agency (IEA) *Deploying Renewables: best practice (*2011) 21.

[231] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 21.

[232] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 21.

[233] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 21.

Although the process of implementing a policy may be required to differ from country to country depending on their circumstances, in many ways, policy journeys need to be repeated in each new country.[234] This makes it much easier through the use of technology and cost reduction along with the lessons which can be learned in countries that have reached maturity in deploying RE.[235] Nonetheless, the journey does not end here, as the drafting of proper policies should subsequently act as a road map for the enactments of laws and regulations to support RE.

3.3.3. Key Strategies for promoting RE

3.3.3.1. Policy Instruments

The following are some of the policy instruments or strategies that policy drafters need to consider when pursuing a policy which supports RE.

a) Setting targets for renewable energy

Policies should set out clear targets to support RE. According to Kalamova et al, government support policies can promote investment in RE when they are bound by clear policy targets that guarantee stability and commitment.[236] This target should be a priority at the national level, for instance in the share of RE supply in total electricity production.[237] Germany, for example has set a mandatory RE target in terms of its national electricity production, which is set at 18 %on the final consumption of energy in 2020 and at least 10 % share of RE in the final consumption of energy in transport by 2010.[238] Most importantly, the government has to commit itself to the achievement of these targets.[239]

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[234] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policy* 2.

[235] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 100.

[236] Kalamova et al *Sources of Finance*26.

[237] Kalamova et al *Sources of Finance* 26.

[238] Renewable Energy Policy Review Germany.

[239] *Renewable Energy Policy Review Germany*.

a) Feed-in tariff

RE Feed-In Tariffs (FIT) aim to support the market development of RE technologies, specifically for electricity generation.[240] FIT place an obligation on utilities and energy companies to purchase electricity from RE producers at a favourable price per unit.[241] This price is usually guaranteed over a certain period of time.[242] In most cases, to ensure profitability FIT rates are determined for each renewable technology due to their differences.[243] Therefore the FIT rates set by a particular government for solar, -geothermal- or wind-generated electricity may vary depending on the costs associated with each of these technologies.[244] However, the implementation of FITs alone does not guarantee success. Some countries have used these systems but, because of other challenges such as the level of remuneration which might be unattractive, have seen a limited level of deployment.[245] FIT have been so far the most effective instrument in promoting RE.[246] If well designed and implemented, FIT can give rise to the fastest, lowest-cost deployment of RE.[247]

b) Renewable energy certificate

A renewable energy certificate, also known as a green certificate, is one of the instruments that can be used to promote or support the use of RE.[248] This instrument is based on a scheme which provides a fixed quota of the electricity sold by operators on the market as to be generated from RE sources.[249] It operates in such a way that liable

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[240] *Success Story* http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit (accessed 26.11.2014)

[241] Maneanteauet al" 2003 (31) Energy *Policy* 31 802.

[242] Manenteau et al 2003 (31) *Energy Policy* 31 802.

[243] *Success Story* http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit (accessed 26.11.2014).

[244] *Success Story* http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit (accessed 26.11.2014).

[245] International Energy Agency (IEA) *Deploying Renewables: Principles for Effective Policy* 105.

[246] Du Toit *Promoting Renewable Energy in South Africa* iv.

[247] Du Toit *Promoting Renewable Energy* 118-119. See also Mendonça *Feed-In Tariffs* xix.

[248] Mentanteau et al 2003 (31) *Energy Policy* 800.

[249] Mentanteau et al 2003 (31) *Energy Policy* 800.

entities that have the possibility of generating the required amount of electricity, purchase RE electricity via long-term contracts from a specialised RE generator or via a purchasing certificate for specific amounts from other operators.[250] The scheme has been proposed in Denmark, were the green certificate market obliges consumers to include in their consumption a certain amount of renewable-based electricity in their consumption.[251] The liability will then lie with the distributor, who every year will have to justify the purchase of a proportion of renewable electricity for their consumers.[252]

Other optional instruments include tax credit, which applies in cases (for example, with respect to commercial systems) in which these costs are exempted from tax, such as investment costs for planning and installation. For example, in Germany, VAT is exempted at 19 %.[253]

3.3.3.2. Enactment of laws to support renewable energy

One of the interesting dynamics which is emerging is that most governments in world, particularly those of the OECD countries, are adopting legal measures to move towards a cleaner energy economy.[254] Besides drafting and developing RE policies as discussed above, they have ,to varying degrees, committed themselves to the enactment of a number of laws and regulations to support the use of RE.[255] The purpose of law in terms of RE, is stated by Bradbrook et al as follows:

> The purpose of the Law on Promoting Renewable Energy Resources should be defined as 'the regulation of government administration with respect to investment and innovation in, as well as the development and use of, renewable energy resources, the promotion of the renewable industry, the sustainable utilisation of energy resources, and environmental protection'. The proposed law is designed to improve government regulation of the energy sector. The law on Promoting Renewable Energy Resources

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[250] Mentanteau et al 2003 (31) *Energy Policy* 800.

[251] Mentanteau et al 2003 (31) *Energy Policy* 800.

[252] Mentanteau et al 2003 (31) *Energy Policy* 800.

[253] *Renewable Energy Policy Review Germany.*

[254] Lyster & Bradbrook *Energy Law and the Environment* 139.

[255] Lyster & Bradbrook *Energy Law and the Environment* 139.

> should define the responsibilities of each governmental department and clarify and coordinate various administrative responsibilities related to the development of renewable energy resources. The Law on Promoting Renewable Energy Resources should strictly regulate and harmonise the relationship between government and non-governmental entities. Finally the law should provide rules for regulating all aspects of the development and use of renewable energy resources.[256]

Bradbrook et al further emphasise that, the ultimate goal of the law is to achieve the sustainable utilisation of energy resources and environmental protection.[257] This is arguably what Namibia needs, the Law on Promoting Renewable Energy Resources, which will serve as a framework for the systematic development of the entire body of law governing renewable energy resources.[258]

It is often suggested that a regulatory framework which seeks to create a conducive environment for the deployment of RE, has to bear in mind a number of well-considered generic elements or components.[259] The OECD sets out these generic elements in terms of dealing with basic issues such as the penetration of RE into the energy market and barriers against the development or deployment of RE.[260] These issues should be addressed from a legislative perspective in order to create efficient, effective and accountable laws and policies intended to support RE.[261] Furthermore, these generic elements are regarded as crucial in dealing with different challenges that may impede the success of the deployment and development of RE. For this reason, the elements will be discussed in the context of this study in terms of their potential success through the enactment of laws and policies and in relation to the need for

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[256] Bradbrook et al *The Law of Energy for Sustainable Development* 318.

[257] Bradbrook et al *The Law of Energy for Sustainable Development* 318.

[258] Bradbrook et al *The Law of Energy for Sustainable Development* 318.

[259] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 100.

[260] Popp et al 2011 (33) Energy Economics 646-662.

[261] Popp et al 2011 (33) Energy *Economics* "646-662.

establishing a proper regulatory framework. The following is an overview of the most common generic elements which need to be considered when enacting laws in order to create a conducive environment for a successful RE deployment.

3.3.3.3. Guarantee penetration of renewable energy within the energy sector

It is vital to create an enabling environment to promote RE, one in which RE technologies can easily penetrate into the energy sector to become competitive with conventional energy (fossil fuels). However, the entry of these environmentally more benign energy technologies (RE) into the main stream of the energy sector has been constrained by a range of obstacles, in addition to their (generally) higher cost of power production as compared to conventional energy sources.[262] Nonetheless efficient legislative mechanisms can overcome these obstacles through policy measures such as FITs, as discussed above, and others described below.

3.3.3.4 Introduce incentives

Incentives are becoming increasingly popular and, most importantly, are being acknowledged and encouraged by scholars and lawmakers alike. They have a key role to play in complementing the traditional compliance and enforcement mechanisms.[263] Incentives to invest in renewables have been widely available.[264] Some OECD member governments have successfully introduced incentives in support of RE. In Germany, for example, wind power benefited from several funded demonstration programmes, which contributed to the formation of markets in the second half of the 1980s, while a demonstration programme for larger solar power applications which was initiated in 1986.[265]

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[262] Owen 2006 (34) *Energy Policy* 632-642. These obstacles are viewed from three different but overlapping, perspectives. The first is the research, development and deployment perspective, which focuses on the nature of innovation, strategies and the learning process associated with new technologies. Secondly the market barriers perspective which characterizes the adoption of a new technology as the market process and focuses on the frameworks within which decisions are made by investors and consumers. Thirdly, the market transformation perspective which focuses on what needs to be done in practical terms to build markets for new energy technologies.

[263] Paterson & Kotze *Environmental Compliance and Enforcement* (2009) 296.

[264] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 29.

[265] Jacobsson & Bergek 2004 (13/5) *Industrial and Corporate Change* 831.

According to Paterson there are a number of incentive-based instruments that can be introduced, namely market-based incentives, regulatory incentives and information-based incentives.[266] Among these three instruments, the most viable in terms developing RE are the market-based instruments briefly discussed below.

a) Market-based incentives

The market-based incentives, commonly known as fiscal or economic incentives, are used to influence economic behaviour in order to achieve certain desired objectives; in this case they can be used to manipulate the relative prices that individual industry and organisations face in the provision and use of energy services in order to encourage the use of more RE.[267] Market-based incentives can be both positive, seeking to reward efficient and sustainable behaviour (use of RE), or negative in nature, seeking to discourage inefficient and unsustainable behaviour (use of more conventional energy).[268] Examples of positive instruments include tax benefits[269] and direct subsidies[270].

On the other hand, negative-based instruments, which are applicable here, include, licence fees[271] and product taxes.[272] If however, well introduced, these

[266] Paterson & Kotze *Environmental Compliance and Enforcement* (2009).

[267] Paterson & Kotze*Environmental Compliance and Enforcement* 297.

[268] Paterson & Kotze *Environmental Compliance and Enforcement* 297.

[269] Tax benefits are given to given to individuals, industry or organisation to encourage them and reward their conduct, related to the use or development of RE in this regard. They can be in a form of income tax, donation tax, transfer duty and estate duty. See Paterson & Kotze *Environmental Compliance and Enforcement* 300.

[270] A direct subsidy is normally a financial grant given by the state to individuals, industry and organisations to promote activities which are considered beneficial and of strategic importance to the development of RE. See Paterson & Kotze *Environmental Compliance and Enforcement* 301.

[271] Licence fees can be imposed by relevant authorities on individual, industries or organisations who are undertaking activities on for example energy generation from fossil fuels, as activities which are competing against the use of RE. Product taxes can be imposed on products used to encourage the use of conventional energy (fossil fuels) such as those used to produce energy from coal or petrol.

incentives can encourage individuals, industry and organisations to use or invest more in RE, which will result in its development.[273]

3.3.3.3 Support for technological innovation markets

Jacobsson and Bergek suggest some basic functions for technological systems which include market formation for technological innovation.[274] According to Torrens, innovation can play significant role in reducing RE generation costs.[275] More importantly, laws, policies and regulations should create or stimulate a market for innovations, since innovations rarely find ready-made markets.[276] However, this market may be affected by governmental actions to clear legislative obstacles and by various organisations implement measures to legitimise the technology.[277]

3.3.3.6. Attracting investor to invest in renewable energy

In the context of RE laws, a provision related to investments becomes critical. As mentioned above, the laws and regulations should create enabling conditions, to attract both local and international investors to invest in RE. Lyster & Bradbrook comments on the importance of legal certainty in relations to investment:

> Before private investment can occur, legal certainty as to the rights and duties of the Parties is required. It is difficult to conceive of large-scale private investment occurring in any part of the energy industry if investors are not certain as to their legal position…..comprehensive legal regulation has always preceded private investment. Legal certainty is required even in respect of small-scale private investment. For example, why would a private individual or company wish to invest in a solar energy appliance without an assurance that they will have a guaranteed right to solar access? Without such a right the appliance will be essentially worthless."[278]

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[273] Paterson & Kotze *Environmental Compliance and* Enforcement 296. Paterson & Kotze *Environmental Compliance and Enforcement* 301.

[274] Jacobsson & Bergek 2004 (13/5) *Industrial and Corporate Change* 831.

[275] Johnstone et al 2010 (45) *Environ Resource Econ* 133-155. 151.

[276] Jacobsson & Bergek 2004 (13/5) *Industrial and Corporate Change* 818.

[277] Jacobsson & Bergek 2004 (13/5) *Industrial and Corporate Change* 831.

[278] Lyster & Bradbrook *Energy Law and the Environment* 139.

Empirical evidence from some countries (OECD members) suggests that a short-term investment offered by their respective support system were insufficient to stimulate sufficient investor interest or lead to investors requiring high risk premiums.[279] Kalamova et al state that, depending on the circumstances, capital markets may demand a premium in lending rates for financing RE projects due to the higher up-front capital risks associated with the investment in renewables rather than is the case with conventional energy projects and legislative/political risks at the operational stage.[280] However, supporting investment in RE can be achieved in various ways, such as by modifying the rules of the energy market and trade; by promoting equity or debt investment through direct financial transfers; by means of tax rules; or by direct government provisions of energy-related services.[281] All these can be legitimised through the enactment of legislation.

3.3.3.7. Governments support

The government can give support to local investors though subsidies, loans and grants to deploy RE. In most OECD member countries, governments have invested large amounts of public money to support renewable energy development.[282] Government support is justified as a way of correcting negative externalities resulting from the use of fossil fuels and of achieving optimum diffusion of renewables into the energy sector.[283] However in doing so, the government has to find the balance in attracting both the local and international investor.

3.3.3.8. Consideration of non-economic barriers

To date, non-economic barriers such as administrative hurdles (including planning delays and restrictions, lack of co-ordination between different authorities long lead times in obtaining authorisations), grid success, electricity market designs, lack of information can

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[279] Lyster & Bradbrook*Energy Law and the Environment* 139.

[280] Kalamova et al *Sources of Finance* 21.

[281] Kalamova et al *Sources of Finance* 27.

[282] OECD *Linking Renewable Energy* 11.

[283] Mentanteau et al (2003) *Energy Policy* 799-812 802.

significantly hamper the development of RE.[284] It must be noted that, these non-economic barriers have significantly hampered the effectiveness of renewable support policies and driven up costs in many countries, irrespective of the type of incentive schemes.[285] Hence closer attention should also be given to non-economic barrier to avoid unnecessary delays in deploying RE.

Besides the above outlined general criteria, governments who are not yet committed to larger-scale RE deployment (especially developing countries who are just starting or lack the capacity of large-scale RE deployment) should first consider the following as emphasised by the OECD:

> "Re-evaluate, in light of dramatic recent cost reduction, the opportunity of RE technologies to provide affordable, safe and clean energy, particularly of RE technologies to help meet rising energy demand and; Increase the penetration of renewables by stimulating deployment as part of a strategy to develop a sustainable low-carbon energy system, taking advantage of technology progress and policy experience now available."[286]

To sum up, the above criteria or elements are set out in relation to the OECD member countries, in terms of their experiences in deploying RE through adopting and implementing appropriate laws and policies. It is important to note that some of these elements have, in practice, successfully worked in some countries and failed in others.[287] However, countries such as Germany has demonstrated a greater success in their RE deployment, hence the next chapter will discuss, inter alia, Germany's approach, not only towards the success of deploying RE but also towards a RE regulatory framework. The Chapter will also discuss RE situation in Ghana from a developing countries perspective, which has to a certain extend proved to be doing successfully well in deploying RE.

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[284] Mentanteau et al (2003) *Energy Policy* 799-812 800.

[285] International Energy Agency (IEA) *Deploying Renewables*: best practice (2011) 23.

[286] International Energy Agency (IEA) *Deploying Renewables*: best practice (2011) 30.

[287] Kalamova et al *Sources of Finance* 27.

3.5 Conclusion

In order to ensure a high deployment level of RE, necessary policies and laws need to be implemented. Although not explicitly displayed in this chapter, the OECD has clearly suggested in general that for a country to succeed in deploying RE, it has to adopt more and more stringent policies and laws that support and promote RE. More specifically, the OECD has outlined important elements or key strategies that need to be considered — or rather included — in the drafting and enactment of these stringent policies and laws. These elements, as discussed above, deal with issues including feed-in tariffs, tradable RE certificates, incentives, subsidies (through government support), technological innovation and attracting investors to invest in RE and non-economic barriers. Nevertheless, this chapter has provided the general overview of the OECD guidelines to assist and guide countries seeking to deploy and develop their RE. Consequently, the next chapter will look at Germany and Ghana's approach in developing their RE regimes and in order to consider lessons that Namibia can learn from them.

CHAPTER FOUR:
LEGAL AND REGULATORY FRAMEWORK FOR RENEWABLE ENERGY IN TERMS OFGERMANY AND GHANA'S PERSPECTIVE

4.1 Introduction

Chapter Three has looked at the OECD guideline on the elements to be considered and key strategies that need to be put in place in order to implement a successful RE regime. The development of RE in Germany, for example, is founded on a number of relevant piece of laws, regulations and policy, aiming to provide for green and sustainable energy generation.[288] This chapter will consider how these elements and key strategies have worked in the OECD counties, in particular Germany.[289]It will, in addition, discuss Ghana's position as a developing country in promoting the development of RE though it's legal and regulatory framework. The aim here is to provide evident workable examples upon which Namibia can learn or consider in developing an adequate RE regime.

4.1. German's renewable energy regime and its success in deploying renewables

Germany is regarded as one of the countries with the highest effectiveness in the deployment of RE, particularly in wind energy.[290] Based on a combination of far-reaching energy and environmental laws that stretch back nearly three decades now, Germany's experience with RE promotion is often cited as a model to be replicated elsewhere.[291] RE tariffs were among first mechanisms which were introduced as far back as 1970 to stimulate the demand for renewable electricity, obliging electricity contribution companies to purchase RE produced in their supply areas based on avoided costs.[292] However, little support was provided to the RE sector until the late 1980s.[293] Furthermore, the

[288] Ruppel & Alhusmann *Perspective on Energy Security* 94.

[289] International Energy Agency (IEA) *Deploying Renewables* (2013) 4.

[290] International Energy Agency (IEA) *Deploying Renewables: best practice (2011)* 27.

[291] Frondel, et al "2010 (38) *Energy Policy* 4048-4056. The first oil crisis and the Chernobyl nuclear accident in 1987, combined with the growing alarm about climate change, marked RE policy era in Germany.

[292] Lipp 2007 (35) *Energy Policy* 5481-5495.

[293] Lipp 2007 (35) *Energy Policy* 5481-5495.

Chernobyl nuclear accident in 1987, combined with a growing alarm about climate change around the same time, triggered the development of RE and marked the beginning of the new energy policy era in Germany.[294] Since then, other mechanisms and programmes were introduced, such as the 1000 roofs programme for solar cells in 1989.[295] The following section discusses Germany's RE success through policies implementation as well as the enactment of a number of laws. The section will have a particular focus on German's history of RE legislation, from the Feed–In Tariff Law (Stromeinspeisungsgesetz) to the Renewable Energy Sources Act (EGG), the latter being Germany's current legislation.

4.4.1 Renewable energy policy review

Germany's stable and predictable policy framework has created a favourable condition for RE penetration in the energy sector.[296] This stability is as a result of the adoption of the necessary elements in its policy design and the approach that the government took regarding its policy implementation.[297] For example, RE targets were set by the Directive on the Promotion of the Use of Energy from Renewable Sources (18% share of renewable energy source on the final consumption of energy in 2020 as well as 10% share of renewable energy in the final consumption of energy in transport by 2020).[298]

As proof of success, the targets on the share of electricity produced from RE sources have almost double from 6.3% in 2000 to 12.0 % in 2006.[299] In addition, the

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[294] Lipp 2007 (35) *Energy Policy* 5481-5495.

[295] Jacobsson & Bergek 2004 (13/5) *Industrial and Corporate Change* 831.This programme was subsequently upgraded to the 100 000 Roof Programme in 1999.

[296] Frondel et al (38) 2010 *Energy Policy* 4048-4056.

[297] Germany's successful approach to policy implementation towards the deployment and development of RE are,to a large extent, similar to those provided by the OECD guidelines, as discussed in the previous chapter.

[298] *Success Story*: http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit.p (accessed 26.11.2014).

[299] Frondel et al 2010 (38) *Energy Policy* 4048-4056.

country has also set out its national commitments.[300] This resulted in Germany's having the highest wind power capacity in the world — wind power currently being the most important of the supported RE technologies.[301] Various programmes, mechanisms and strategies were also incorporated into the policy framework for RE.[302] RE policy instruments such as feed-in tariffs for renewable electricity, market incentives for renewable heat, and tax exemptions for biofuels, have proven a successful policy mix leading to a very dynamic market for RE resources.[303]

4.2.1. Renewable energy legislation

4.2.1.1. The feed-in law: Stromeinspeisungsgesetz 1990

Much of Germany's RE success is put down to the feed-in tariffs (FIT) and it is generally regarded to have the best example of an effective FIT law.[304] This FIT law has been developed since 1979, and has enjoyed sustained support from the government and the wider population, even though several factors have been at play in enabling RE diffusion and policy development.[305] According to Mendonça, it first took the form of a relatively simple one-page bill aimed at assisting producers of electricity from small hydro stations and wind energy installations.[306]

Later it became the Electricity Feed-In Law of 1990, otherwise known as Stromeninspeisungsgesetz (StrEG).[307] One of the stated purposes of this law was to level the playing fields for renewable energy systems (RES) by setting FITs that took

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[300] Herbert Smith Freehills 2014file:///C:/Users/User/Downloads/20140801%20-%20Changes%20to%20German%20renewable%20energy%20regime.htm (accessed 04.08.2014).

[301] Frondel et al 2010 (38) *Energy Policy* 4048-4056.

[302] Frondel et al (2010) (38) Energy *Policy*4048-4056.

[303] Lipp 2007(35) *Energy Policy* 5481-5495.

[304] Lipp 2007 (35) *Energy Policy* 5481-5495.

[305] Lipp 2007 (35) *Energy Policy* 5481-5495.

[306] Mendonca *Feed-In Tariffs* 27.

[307] Mendonca Feed-*In Tariffs* 27.

account of the external costs of conventional power generation.[308] The law gave considerable financial incentives to investors, backed by programmes such as the 100/250 and subsidies from various state programmes.[309] Even though there were still major challenges, particularly the cost of production for solar electricity, which was at about ten times the cost of coal or nuclear electricity, the StrEG provides a fair price for electricity from RE in general.[310] Therefore the StrEG is regarded as the first stepping stone for Germany's RE regime.

4.2.1.2 The Renewable Energy Sources Act: Erneuerbare-Energien-Gesetz 2000

The StrEG was later modified with the adoption of the Energy Supply Industry Act in 2000, the Erneurbare-Energien-Gesetz (EGG), also known as the 2000 Renewable Energy Sources Act.[311] The EGG was introduced to deal with a number of problems faced in respect of the StrEG.[312] German RE policy was thus updated, refined and, where necessary, replaced by the EGG, [313] which introduced changes, including a differentiation in tariff rates depending on the RE type, size and site.[314] It also replaced the StrEG's percentage-based rates with fixed rates over fixed periods (for instance over 20 years).[315] The Act also provided adjustments in rates to be proposed every two years in order to keep up with the technological progress and market development.[316]

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[308] Mendonca *Feed-In Tariffs* 28.

[309] Mendonca Feed-*In Tariffs* 28.

[310] Lipp 2007 (35) *Energy Policy* 5481-5495.

[311] Frondel et al 2010 (38) *Energy Policy* 4048-4056.

[312] Frondel et al 2010 (38) *Energy Policy*) 4048-4056. See also, Du Toit Promoting *Renewable Energy in South Africa* 130.

[313] *Success Story*: http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit.p (accessed 26.11.2014)

[314] Frondel et al 2010 (38) *Energy Policy* (4048-4056.

[315] *Success Story*: http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit.p *(accessed 26.11.2014).*

[316] *Success Story* http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit.p (accessed 26.11.2014).

The EEG was amended in 2004. It commits Germany to increase the share of RE in the country's total electricity supply by setting ambitious goals: increasing the share of renewables to at least 4.2 %of the total energy consumption by 2010, at least 10 % by 2020, 12.5 %by 2010 and about 50 per cent by mid-century.[317] The amendment also included changes regarding the tariff rates ranging from the type of RE sources. For example, electricity generated from wind was rated at 0.0539 pounds, and solar electricity at 0.5953 pounds. .[318] Germany has demonstrated that it is not only committed to reaching this goal, but has the public support necessary to do so.[319] According to Mendonça, this effort and belief have been based principally on demonstrable successes, and the careful planning behind them. [320]

4.2.1.3 Renewable Energies Heat Act 2004

In 2009 the Renewable Energies Heat Act (GesetzzurForderungErneuerbarerEnergienimWarmbereich – EewarmerG), mainly consisting of market incentives, came into force.[321] For instance, the German government pledged to make available 350 million euro in 2008 and 500 million euro from 2009 to 2012, to support REs in existing projects.[322] RE sources, such as solar radiation, biomass, geothermal energy and ambient heat, were particularly addressed by the Act. The share of renewables depended on the energy source used, namely, at least 15 %for solar radiation, 30 % for biogas and 50 % for all other REs. In addition, the Act provides the RE sources technical requirements for addressed to be environmentally sound and efficient.[323]

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[317] Du Toit Promoting *Renewable Energy in South Africa* 142. See also Mendonça *Feed-in Tariffs* 34.

[318] Mendonca *Feed-in Tariffs* 34.

[319] Mendonca *Feed-in Tariffs* 34.

[320] *Success Story:*http://climateparl.net/cpcontent/pdfs/080603%20FIT%20toolkit.p(accessed26.11.2014).

[321] EREC *Renewable Energy Policy Review.*

[322] EREC *Renewable Energy Policy Review*.

[323] EREC *Renewable Energy Policy Review*.

4.2.1.4 The Renewable Energy Sources Act 2014

The Renewable Energy Sources Act (EGG) is a reform Act which came into force on 1 August 2014.[324] The main purpose of the EGG is to facilitate the sustainable development of energy supply — particularly for the sake of protecting the climate and the environment — to reduce the cost of energy supply to the national economy, to conserve fossil fuels, and to promote the further development of technologies for the generation of electricity from RE resources.[325] The Act has four main objectives:

i) Continuing and controlling the expansion of renewable energy
ii) Lowering the cost of funding
iii) Spreading the financial burden more fairly
iv) Improving the market integration of renewable energy[326]

The Reform Act also set out its main objectives which were to reconcile cost effectiveness, environmental compatibility and security of supply, the three concerns that have often been referred to as the "energy trilemma".[327] Regardless of the challenges of costs, the German government is still keen to achieve its target of the long-term objective of generating 80 % of electricity through renewable resources.[328] It is clear from this Act that the expansion of RE in Germany is set to continue.

4.3. The main driver of Ghana's renewable energy development

Cassell expressed his views on the pressing issue of RE in Africa as follows:

> Nowhere is the need for renewable energy more pressing than in Africa but nowhere can offer greater potential for its successful implementation. Most

[324] Herbert Smith Freehills *Germany Renewable Energy Regime 2014.*

[325] Section 1 para 1 of EEG 2014.

[326] Herbert Smith Freehills *Germany Renewable Energy Regime 2014.*

[327] Herbert Smith Freehills *Germany Renewable Energy Regime 2014.*

[328] Herbert Smith Freehills *Germany Renewable Energy Regime 2014*.

> African nations have renewable energy capacities many times current demand, which could be utilized with proven technology.[329]

As an African nation, Ghana, like Namibia, is proof of the veracity. Ghana is one of the African countries blessed with abundant renewable resources. The country's renewable energy resources has been extensively studied as potential sources for energy production and utilisation, including bioenergy (particularly, solid biomass and biogas), wind, solar, and small hydro.[330]

Since the mid-1990s Ghana has launched two long-term developmental plans aimed to transform the country's status of being a low-income developing country to an upper-middle-income country by 2020.[331] As a result of an expanding economy and large growing population, Ghana is faced with major challenges of providing the required energy in a reliable and sustainable manner, while considering at the same time, the environmental and economic impact of energy production and the nexus between energy and development.[332] The country has noted that energy is one of the major requirements for its economic growth and development.[333]

The dominant source of energy in most countries is conventional energy. Ghana's the dominant source of energy, however, is biomass Ghana.[334] Approximately more than 60 % of the total energy consumption in Ghana comes from biomass sources, and over 70 percent of Ghanaians rely on it, particularly for wood fuels and charcoal.[335] It is mostly used in the domestic sector by over 70 percent of the population

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[329] Cassell 2013 (11) *African Renewable Energy Review* 11/20132.

[330] Kemausuor F et al 2011 15 '5145; see also I Edjekumhene et al *Implementation of Renewable Energy Technologies* (2001) 41-63.

[331] Ahlijah L *Energised Thinking: Ghana's Renewable Energy Regime* (2013).

[332] Gboney W "Policy and regulatory framework for renewable energy and energy efficiency development in Ghana" 2.

[333] Essandoh-Yeddu J *Strategic National Energy Plan 2006-2020 (*2006) 4.

[334] Bradbrook et al *The Law of Energy for Sustainable Development* 348.

[335] SERN REEP Policy Database Ghana 2014. See also Bradbrook et al *The Law of Energy for Sustainable Development* 348, Painuly &Fenhann Summary *of Country Studies*, 20.

for cooking and heating and for commercial activities that require heat.[336] These figures indicate that electricity in Ghana is not accessible to many, [337] thereby indicating that a paradigm shift in the energy sector was therefore necessary. As part of Ghana's Shared Growth and Developmental Agenda, the country has begun to focus on reducing its reliance on wood fuels and charcoal by expanding access to its national electric grid through the development of other alternative energy sources, particularly RE.[338]

Ghana is endowed with abundant renewable energy resources including solar, wind, biomass and hydro power.[339] The supply of these energy resources can be harnessed in order to diversify the country's energy sources and ensure energy security.[340] The country is engaged with providing sustainable energy for all, and in order to achieve this is developing a national action plan to increase its RE capacity and extend reliable energy access to all of its citizens.[341] The energy strategy for Ghana sets a goal of renewable energy which will constitute at least 10 %of the national energy generation by 2020.[342] In order to be able to reach this goal the country has passed the Renewable Energy Act,[343] which provides for the legal; and regulatory framework that is needed to enhance and expand the country's RE sub-sector.

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[336] Bradbrook et al *The Law of Energy for Sustainable Development* 348.

[337] Even though Ghana generates most of its electricity from two hydro power plants namely; Akosombo & Kpong. See Energy Commission *Strategic National Energy Plan 2006-2020*: (2006) 70.

[338] Essandoh-Yeddu J*, Energy* Commission *Strategic National Energy Plan 2006-2020*: 70.

[339] Gboney W "Policy and regulatory framework for renewable energy and energy efficiency development in Ghana" 2.

[340] Gboney W "Policy and regulatory framework for renewable energy and energy efficiency development in Ghana" 2.

[341] Gboney W "Policy and regulatory framework for renewable energy and energy efficiency development in Ghana" 2.

[342] Gyamfi et al 2015 (43)*Renewable and Sustainable Energy* Review, 1035-1045 1038

[343] Renewable Energy Act 832 of 2011.

4.3.1. Ghana's Legal and regulatory framework for renewable energy

The revolution of Ghana's energy policies can be traced to an enactment of the Provisional National Defence Council (PNDC) 62 in 1983.[344] The PNDC provided the regulatory background for the national policies and legislation concerning RE technologies in Ghana.[345] The law remained in force as the primary enactment governing the implementation of RE projects until 1996, when the Energy Sector Development Programme (ESDP) was introduced.[346] The Energy Commission Act, 1997 (Act 538) (ECA) and the Public Utilities Regulatory Commission Act, 1997 (Act 538) followed, of them are currently governing the RE technologies. The ECA has established an Energy Commission (EC) and provided for those of its functions related to the regulation, management, development and utilisation of energy resources in Ghana.[347] The EC is required in terms of the Act to "recommend national policies for the development and utilization of indigenous energy sources". [348]

According to Bradbrook, the phrase "indigenous energy resources" includes RE resources that can be found in Ghana, namely, biomass, hydropower, solar energy, wind energy and geothermal.[349] However, regardless of all these laws, RE was still under regulated, besides being mentioned or referred to in provisions of some of these statutes.[350] Furthermore, worth noting that in the above list of statutes, there is no mention of the Energy Act, which means Ghana has also not adopted a general Energy

[344] Painuly &Fenhann Summary *of Country Studies* (2002) 20. See also Bradbrook et al *The Law of Energy for Sustainable Development* 348.

[345] Bradbrook et al *The Law of Energy for Sustainable Development* 348.

[346] Bradbrook et al *The Law of Energy for Sustainable Development* 348.

[347] Section 2(1).

[348] Section 2(2)(a). In addition, the EC provides technical regulation in terms of licensing and issuing of permits for powers sub-sector. See Ministry of Energy and Petroleum Expression *of Interest to Participate in SREP* 2.

[349] Bradbrook et al *The Law of Energy for Sustainable* Development 348.

[350] For instance, Section 42 (b) of the Energy Commission Act, which provides for the objectives of the Energy Fund, stipulates that the monies of the Fund can be applied for "promotion of project for the development and utilisation of renewable energy resources, including solar energy".

Act. Nonetheless, Ghana has adopted policies and laws which are currently regulating RE, as discussed below.

4.3.2 Ghana's renewable energy policy framework

Ghana has passed two important policies to develop and support RE: The Ghana National Energy Policy of 2010 and the Strategic National Energy Plan 2006-2020 (SNEP).[351] The Strategic National Energy Policy 2006-2020 was implemented in 2006 as strategy with the aim of contributing to the development of a well-functioning energy market and creating a pathway for the sector until 2020.[352] In addition, it also considers RE as an important pillar in Ghana's energy mix, helping to improve rural electrification, decrease the use of firewood for cooking and heating and slow down deforestation.[353] It defines the long-term goals for the RE share in power production and aims to achieve penetration of 30% of rural electrification with RE technologies by 2020.[354] In terms of implementation, it covers Government's strategies, programmes and projects for developing among others, the Renewable Energy Sub-Sector.[355]

The 2010 Ghana National Energy Policy, on the other hand, is the recent policy framework that focuses on renewable energy development. The policy's main objective is to increase RE sources and technologies at an ambitious target of 10 % in the national energy mix by 2010.[356]The policy contains areas dealing with renewable energy deployment, waste-to-energy management and energy efficiency. These underline the need for improved support policy, and for the private sector's involvement in fostering sustainable and efficient energy generation.

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[351]Apotogse OW *A Review of Ghana's Renewable Energy Policy)* 2014) 36.

[352] Liptow & Remler Legal *Framework for Renewable Energy Policy* 65.

[353] Apotogse *A Review of Ghana's Renewable Energy Policy* 36.

[354] Liptow & Remler *Legal Framework for Renewable Energy* 67.

[355] Liptow & Remler *Legal Framework for Renewable Energy* 67.

[356] ERN REEP *Policy Database Ghana* 2014.

The goals of the renewable energy sub-sector are to increase the proportion of renewable energy in the total national energy mix and ensure its efficient production and use. The Government launched an "energy economy" initiative with mandates to increase renewable energy production, with particular a focus on the electrification of rural communities by 2020. Rural areas cannot be covered only by grid extensions but also by off-grid solutions. Government and the regulator are working towards removing existing fiscal and market barriers, such as custom duty and value-added tax.

The policy also calls for the introduction of adequate policy instruments for the support of RE in power production.[357] Of importance is the fact that the policy suggests that the country focus on promoting mini-hydro, pointing to the country's excellent potential and identifying more than 20 sites for suitable power generation.[358] The objectives of the renewable energy sub-sector are to increase the share of renewable energy in the total energy mix and to ensure its efficient production and use.[359] It has been suggested that RE policies, if well implemented, can enable a country to meet an increased demand of energy at least cost.

4.3.3. The Renewable Energy Act 2011

The Renewable Energy Act, 2011 (Act 832) was adopted to specifically regulate the development of RE. The Act aims to promote, develop, manage, utilise, sustain and ensure adequate supply of RE resources for power and heat and other related purposes.[360] RE is defined in Section 2 to include wind, solar, hydro, biomass, bio fuel, landfill gas, sewage gas, geothermal energy and ocean energy. The Minister of Energy, however, is permitted to designate other sources of energy as RE in order for those sources to benefit from the advantages provided under the Act in terms of section 3.

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[357] Liptow & Remler *Legal Framework for Renewable Energy* 67.

[358] Liptow & Remler *Legal Framework for Renewable* Energy 67.

[359] SERN REEP Policy Database Ghana 2014.

[360] Section 1.

Alhlijah states that "To give more impetus to the Act, the Energy Commission (EC) has published the License Manual for Service Providers in the Renewable Energy Industry (the RE Manual) to flesh out the bare provisions of the Act' and the manual sets out extensive requirements for various segments of the sector.[361]

The EC is responsible for implementing the provisions of the Act. More specifically, the Commission is responsible for: advising the Minister of Energy on RE matters; facilitating collaboration between government and the private sector and civil society for the promotion of RE sources; and recommending exemptions from customs, levies and other duties, equipment and machinery necessary for the development, production and utilisation of RE sources.[362] These exemptions relate to incentives as one of the instruments which seeks to reward those involved in the deploying of RE.[363]

The EC, in collaboration with the Public Utilities Regulatory Commission (PURC), may recommend to the Minister of Energy financial incentives necessary for the development, production and utilisation of RE sources.[364] The PURC, as the 'financial' regulator of the Energy Sector, is mandated under the Act to set rates and charges for the purchase, connection and transmission of RE resources.[365] The PURC is also charged with protecting the interests of consumers and utility providers, as well as the setting and monitoring of standards of performance for the RE sector.[366]

The Act gives the PURC the responsibility to set the FIT as the pricing mechanism for Renewable energy technology in Ghana.[367] The FIT scheme as per the Act consists

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[361] Alhlijah *Energised Thinking: Ghana's renewable energy regime* 2013.

[362] Ahlijah *Energised Thinking*: *Ghana's renewable energy regime* 2013.

[363] Paterson & Kotze *Environmental Compliance and Enforcement in South* Africa 297.

[364] Ahlijah *Energised thinking: Ghana's renewable energy regime* 2013.

[365] Ahlijah *Energised thinking: Ghana's renewable energy regime* 2013.

[366] Ahlijah *Energised Thinking: Ghana's renewable energy regime*2013.

[367] Section 25.

of The Renewable Energy Purchase Obligations I and II, the rate of FIT and a connection transmission and distribution system.[368]

4.3.3.1. The Renewable energy purchase obligations I and II

According to Section 26(1) and (2) of the Renewable Energy Act, an Electricity distribution utility or bulk customer must procure a specified percentage of its total purchase of electricity from renewable energy sources.[369] The PURC in consultation with the Energy Commission will specify the percentage level of electricity to be purchased by the electricity distribution utility or bulk customer.[370] However, Section 26 (3) of the Act further provide that PURC must take into account the technology being used to generate electricity from renewable energy sources; assurance of the financial integrity of public utilities; and net effect of the cost of renewable energy on the end-user tariff.[371]

4.3.3.2 The feed-in-tariff rate

The PURC is mandated in section 5 of the Renewable Energy Act to approve: Rates chargeable for the purchase of electricity from renewable sources by public utilities; Charges for grid connection; and Rates chargeable for wheeling of electricity from renewable energy sources.

The PURC when setting the rates in terms of section(s) 16(3) (a)-(d), s 17 and 20 should take into consideration the following objectives under the Act:

i) Consumer interest;
ii) Investor interest;
iii) Assuring reasonable cost of production of the service;
iv) Assurance of the financial viability of the public utility;

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[368] Section 25.

[369] Section 26(1) of the Renewable Energy Act.

[370] Section 26(2) of the Renewable Energy Act. See Painuly & Fenhann *Summary of Country Studies* (2002) 21.

[371] Section 26(3) (a)-(c) of the Renewable Energy Act. See Painuly & Fenhann *Summary of Country Studies* (2002) 21.

v) Economic development of the country;
vi) Best use of natural resources;
vii) Uniformity of prices throughout the country;
viii) Competition among utility companies;

Under this, Renewable energy generated on site may be delivered to the local utility to offset the cost of electricity provided by the utility.[372]

It is worth noting that the Act was created to provide fiscal incentives and regulatory frameworks for the promotion and attainment of at least 10 %of RE in the generation of the energy mix by the year 2020.[373] In order to achieve the above, the Act has established a Renewable Energy Fund, from which the monies are to be used to fund measures, particularly the Feed-in-tariffs (FITs) for the promotion and development of RE sources.[374] More importantly Ghana has introduced some measures in terms of the Renewable Energy Act to achieve its renewable energy policy target in 2020. This will be discussed in part below.

4.3.4. Measures in place

4.3.4.1 Feed-in tariff scheme

The Renewable Energy Act of Ghana under Section 25 introduces the Feed-in-tariff (FIT) scheme. The FIT scheme is one of the key provisions of the ACT, under which electricity generated from RE sources would be offered a guaranteed price.[375] In terms of implementation, the Renewable Energy Feed-in-Tariffs (RE-FIT) was approved and gazetted on the 28 August 2013. The RE-FIT became effective from 1st September 2012 and were set to be applicable for the purchase of electricity from renewable resources utilities.[376] The approved rates for biomass, solar, hydro, wind, landfill gas

[372] Section 5.

[373] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP* 7.

[374] Section 25 & 31.

[375] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP* 7.

[376] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP 7*.

and sewerage gas were set at a fixed rate for a period of ten years, to be subsequently reviewed every two years.[377]

4.3.4.2 Net-metering

It provides incentives and allows for the integration of renewable energy into the distribution network through own-consumption and export of the excess into the network.[378]

4.3.4.3 Licensing regime

This is provided for commercial RE services providers, among other, in order to ensure transparency of operation in the RE industry.[379]

4.3.4.4 Renewable energy purchase obligation

In terms of this measure, power distribution utilities and bulk electricity consumers are obliged to buy a certain percentage of their energy required from electricity generated from RE sources.[380]

4.3.4.5 Tax instruments

The government of Ghana has financed sustainable energy projects since 1980, using small levies on petroleum products.[381] These levies on petroleum were paid into the Energy Fund and were used to promote renewable energy and energy efficient projects.[382]

Furthermore, a Financing Scheme was established under Section 41 of the Energy Commission Act which was fed primarily by a government levy on petroleum

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[377] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP* 7.

[378] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP* 7.

[379] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP* 7.

[380] Ministry of Energy and Petroleum, *Expression of Interest to Participate in SREP* 7.

[381] Edjekimhene et al *Implementing of Renewable Energy Technologies Opportunities and Barriers* (2002), 39.

[382] Edjekimhene et al *Implementing of Renewable Energy Technologies Opportunities and Barriers* (2002), 39.

products, electricity and natural gas.[383] Once again, the monies generated from the Fund are used to promote projects for the development and utilisation of RE resources and rural electrification.[384] Regardless of these funds the promotion and development for renewables were still relatively under financed.[385]

The Ghanaian law provides that investors or individuals will not pay tax on any renewable energy equipment.[386] The main reason for this is to boost the confidence of investors and individuals who believe that renewable energy technologies are very expensive.[387]

In addition, the Act also imposes minimum renewable energy purchase quotas on the distribution companies. It also includes a provision on consequential amendments in section 52. The Act will stimulate a significant increase in the country's solar, wind and biomass installed capacity, and provides renewable power producers with rights of grid access.[388]

In the light of the above, the Act establishes a favourable framework for the development of green field RE projects in Ghana through domestic and foreign investment. With the incentives and measures put in place, it is expected that more players will get into the sector to enable Ghana meet its 2020 target.[389]

4.3.5 Other relevant laws

Beside the above-mentioned laws, Ghana has in place other relevant laws which play a role in the promotion and development of RE either directly or indirectly. This include Companies Act, 1963 (Act 179) and Incorporated Private Partnerships Act, 1962 (Act

[383]Edjekimhene et al *Implementing of Renewable Energy Technologies Opportunities and Barriers* (2002), 39.

[384]Section 42 (b).

[385]Edjekimhene et al Implementing *of Renewable Energy Technologies Opportunities and Barriers* (2002) 39.

[386] Apotogse *A Review of Ghana's Renewable Energy Policy* (2014) 40.

[387]Apotogse *A Review of Ghana's Renewable Energy Policy* (2014) 40.

[388] Norton Rose Fulbright *Investing in the African Electricity Sector: Ghana* 5.

[389] Kemausuor F et al 2011 (15) *Sustainable Energy Reviews*) 5145.

152) as they deal with the registration of companies. For instance any investor venturing into the RE industry must be registered under these laws. In addition to the incorporation requirement, investors must take note of the Ghana Investment Promotion Centre Act, 1994 (478) (the GIPC Act) and the Ghana Free Zone Act, 1995 (Act 504) (the Freezone Act).

4.4 Regulatory authorities

In order to integrate RE into the energy sector, the government also established two regulatory agencies in 1997, the EC and the PURC.

4.4.1 Public Utilities Regulatory Commission

The Public Utilities Regulatory Commission (PURC) was established in 1997, with the main aim to regulate and oversee the provision of the highest quality of electricity and water services to consumers.[390]

4.4.2 Energy Commission of Ghana

The EC was established in 1997. The commission is required by law to regulate, manage and develop the utilisation of energy resources in Ghana, through the provision of the legal, regulatory and supervisory framework for all providers of energy in the country.[391] The commission does this by the granting of licences for the transmission, wholesale supply, distribution, and sale of electricity and natural gas.[392] The EC, in collaboration with the PURC, may recommend to the Minister of Energy, financial incentives necessary for the development, production and utilisation of RE sources.[393]

From the above, it can be seen that the current RE regulatory framework assisted Ghana in promoting and developing RE and consequently resulting in achieving some of its national target.[394] Even though some targets were seen as too

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[390] Miller 2011 (36) *Renewable Energy* 671-675 672.

[391] Miller: 2011 (36) *Renewable Energy* 673.

[392] Miller 2011 (36) *Renewable Energy* 672.

[393] Renewable Energy Act, 2011 (Act 832).

[394] Behrile S *Ghana – GIS-based Support for Implementing Policies and Plans to Increase*

ambitious and the country failed to achieve them, this gives as good indication that Ghana is on the right track.[395]

4.4.5. Challenges and opportunities

Regardless of the above discussed policy, legislation, measures put in place to promote RE, the Ghana is still not without challenges. As such, RE has not made much contribution to the energy mix in Ghana.[396] The country faces several challenges which frustrate its efforts to achieve national energy targets and goals as discussed above.[397] These challenges include the ever-growing demand for energy that is a result of inadequate investment to match the demand, the under-exploitation of RE sources and the over-reliance on wood fuels.[398]

However, with the current policy and regulatory framework in place, there are a good opportunities for investments in RE, particularly in terms of the recently published tariffs which are deemed to be attractive to investors.[399]With the government aiming to further reduce energy subsidies, tariffs are expected to increase in the future, hence the Ghana is expecting the following opportunities to materialise.

(a) Small-scale hydropower (off-grid and on-grid);

(b) Efficient cooking stoves using fuel wood and charcoal;

(c) PV equipment for large scale applications in public places and institutions;

Access to Energy Services" 2009-2011. For instance the 36 % access to rural electrification targets which was set in terms of ECOWAS and the Millennium Development Goals (MDG).

[395] Behrile *Ghana – GIS-based Support for Implementing Policies and Plans to Increase Access to Energy Services*2009-2011. The 100 % target for urban electrification by 2015 is seen as too ambitious to achieve, particularly because of the 2008 access rate which indicated that access to modern fuel in Ghana was only 12 %, implying that the country will not be able reach this target.

[396] Kemausuor et al 2011 (15) *Energy Reviews* 5143-5154.

[397] Kemausuor et al 2011 (15) *Energy Reviews* 5143-5154.

[398] Kemausuor et al 2011 (15) *Energy Reviews* 5143-5154.

[399] Seger M & Smiet F *Business Opportunities for Renewable Energy in Ghana* 11

(d) PV equipment for small scale domestic applications in off-grid area: lighting with roof panels, mobile phone chargers, lanterns.[400]

It is common sense that it is practically impossible to deal with all the related challenges at first glance. The process of developing a successful RE regime requires time[401] and the government has to continue adopting and implementing more applicable laws, policy and measures. What is important is that, because Ghana has taken the initial steps to do so, and is going in the right direction, with time these challenges will be resolved. Clearly Ghana's renewable energy regulatory framework is not that strong and still needs to grow. However, compared with most African countries including Namibia, Ghana is a step ahead, particularly in terms of adopting a Renewable Energy Act. Hence Namibia can certainly learn some lessons from Ghana in this regard.

4.4 Conclusion

This chapter has shown that Germany and Ghana have experienced successes in deploying RE through the adoption of laws and policies and the implementation of key strategies to promote their RE. Germany in particular, as an OECD member, has shown the greater success. Germany's success has been the result of a long history of policies implementation and the enactment of number of legislation, all of which have played vital roles in the deployment of RE. There is also an important distinguishing feature in Germany's approach when it comes to developing its RE regulatory framework. Not only did Germany enact a number of laws and adopt a considerable number of policies, but the government has also constantly updated its policies and legislation to deal with constant emerging opportunities and challenges related to the deployment of RE. This has thus ensured the continued success of RE deployment in

[400] Seger M & Smiet F *Business Opportunities for Renewable Energy in Ghana* 11.

[401] It took nearly three decades for Germany to reach at a point where it is now regarded as one of the countries in the World with the best RE regime, and the country is still constantly amending its laws in order to deal with new emerging challenges. See International Energy Agency (IEA) Deploying Renewable: principle for effective policy (2008) Torrens R 'International Energy Agency/OECD Reports' (2008) 27.

Germany. In addition, as a developed country, Germany's RE regime, as discussed above, can be considered as an example upon which other countries can learn from, keeping in mind their unique circumstances (especially developing countries), which may influence their degree of success.

It was further shown from the African context, that Ghana as an emerging country in the deployment of RE, has so far proven that, through suitable legislative and policy framework, the development and deployment of RE in developing countries is viable, irrespective of the many challenges that they are facing. Comparing the two countries (Ghana and Namibia), Ghana is clearly a step ahead in several aspects, particularly in terms of adopting a Renewable Energy Act. Being both developing counties, Namibia can certainly learn a lot from Ghana. Therefore, having examined both Germany and Ghana's position, the next chapter will conclude and make recommendations for Namibia by drawing examples from Ghana and Germany. The Chapter will also consider the OECD guidelines in the aim of attaining a successful RE regime.

CHAPTER FIVE:
CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The study has found that, despite the increasing evidence of environmental damage from the use of fossil fuels, Namibia continues to be largely dependent on these as the source of energy. Namibia is, however, blessed with abundant RE sources such as solar, wind, a considerable supply of biomass, and other plentiful clean energy resources, such as geothermal, wave and tidal energy. These sources of RE constitute a national comparative advantage that could be exploited, not only to limit the dependency on fossil fuels but also to meet the increasing demand of energy. This situation is currently compelling the Namibian government to take the necessary steps to shift from fossil fuel-based energy generation to a sustainable way of energy generation from RE sources.

It is acknowledged that the Namibian government has legislation in place which could have an impact on the establishment of a well-founded RE regime. These legislative enactments include the Petroleum and Energy Act, the Electricity Act, the Petroleum (Exploration and Production and Energy) Act and one main policy document, namely; the *Draft White Paper on the Energy Policy.* However, as discussed above, these laws have only to a certain extent mentioned RE and have failed to specifically deal with it. Nonetheless, the overall lack of a proper legislative framework is one of the reasons for a slow growth of RE within the energy sector and, consequently, the continuing reliance on fossil fuels. There is thus an urgent need to provide a more comprehensive and integrated legal framework to ensure Namibia's energy security.

The study further shows that, in the realisation of abundant RE sources, the increasing energy demand and particularly the lack of proper legislative framework, the Namibian government though the Ministry of Mines and Energy (MME) has further initiated and established programmes to promote and develop RE. These programmes include, among others, the Strategic Action Plan (SAP), which was based on

improvements to the existing institutional environment and resulted in the establishment of the Renewable Energy and Energy Institute (REEI) and the Barrier Removal to Namibian Renewable Energy Programme (NAMREP). While some of these development objectives have been met, such as the establishment of the REEEI, others are still being implemented or have not been addressed as yet. It is not disputed that Namibia has enacted certain legislation in an attempt to rectify this, but, Namibia has either outdated or insufficient laws, a situation which can no longer continue.

In finding a solution to this problem, the study looked at the OECD guidelines to assist the Namibian government in order to successfully deploy its RE. These guidelines, as illustrated above, provide, among others, elements and issues that the government needs to consider in achieving this aim. One of these elements of particular importance is to enact laws, policies and developing programmes that support RE. In addition to the OECD guidelines, the paper also looked at other countries such as Germany and Ghana, both of which have progressed in terms of developing and deploying RE in their respective regimes. These countries are used as practical exemplars in this study, and have provided lessons which Namibia can learn from. The progress in deploying RE in both of these countries were mostly based on the enactment of legislation that specifically deals with RE. For instance, Germany is the first nation to enact a Feed-In Law in 1990 that was subsequently amended to the current Renewable Energy sources Act of 2014.

As once seen in Chapter Four, Germany has successfully put in place effective RE policies and programmes for over a period of time, as is evident in its over ten years of experience regarding the deployment of RE. The said policies and programmes are mostly focused on encouraging investors to initiate projects in RE by providing, among others, attractive opportunities for attract investment in technology, the possibility of removing economic barriers, as well as a predictable and transparent support framework to attract investment. These basic provisions were further provided for in the Renewable Energy Act which clothed them with more legal power.

In the case of Ghana, a Renewable Energy Act 2011 was adopted to specifically to regulate the development of RE. The objectives of the Act as stated above include the promotion and development of RE sources. Ghana has also implemented a policy and number of RE instruments that have resulted in the country achieving some of its national targets on RE. However, as developing country and a new player, in the industry, Ghana is still faced with several challenges, thus its RE regulatory framework is far from perfect. Nonetheless, if Ghana is compared with Namibia, Ghana is indeed a step ahead, and therefore Namibia can certainly learn something from it, particularly in terms of adopting a Renewable Energy Act. Ghana has also passed two policies to develop and support RE and has put in place measures such as feed-in-tariff schemes and a renewable energy purchase obligation. As a result, Ghana has achieved some of its RE targets and succeeded in integrating RE into the overall energy mix, as discussed in Chapter Two above.

It is thus concluded that in order to successfully establish a RE regime there should be put in place laws, policies and programmes aimed at creating a suitable environment , one in which RE can develop and be deployed to its full potential. The evidence suggests that proper laws, policy designs and commitment are the key factors for success.

5.2. Recommendations

As can be seen from the above, the study suggests and recommends that in order to development a successful RE regime, the Namibian government should consider the enactment of new legislation dealing specifically with RE. Because Namibia has not yet enacted an Energy Act (although one has been considered) it is suggested that the proposed Act should contain a chapter on RE that will ensure that RE in Namibia will be adequately regulated. More importantly, the proposed Energy Act should act as an overarching law regarding the regulation of energy in Namibia. The Act should make possible an appropriate legislated integration and cooperation with other relevant statutes pertaining to energy generation, such as the Namibian Environmental Management Act and the Namibia Water Corporation Act.

This is necessary to ensure an extensive and integrated legal framework for the development of Namibia RE regime. Therefore when drafting this important chapter of the Act, the drafters should carefully consider the following elements provided by the OECD as discussed in Chapter Three, in particular to deal with the challenges which Namibia is currently facing in terms of deploying and developing its RE as outlined in Chapter Two.

a) The law should guarantee penetration of renewable energy within the energy sector by creating an enabling environment to promote RE.[402] This can be done through government supports in terms of provision of loans and incentives. It can also be achieved by introducing instruments such as the FIT.

b) Introduce stable incentives to help RE markets to take off.[403] This element should be closely considered, as it is needed especially at the inception stage, were incentives play important roles in deploying and developing RE. Incentives are important because they can be used to benefit programs intended to develop most of Namibia's viable RE sources such as solar and wind. Many countries, including the OECD members —, and Germany in particular — have successfully introduced incentives to support RE. Germany introduced incentives by way of several funded demonstration programmes to fund its major RE, wind power during its inception stages in 1980s.[404]Nonetheless, the main purpose of introducing incentives is to encourage investors to invest in RE.

c) Setting national targets in terms of developing RE is very important as it does not only indicate whether there is progress or not, but also generates confidence in the continuing deployment and development of RE.[405] Germany, for instance,

[402] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 29.

[403] Johnstone, et al (2010) Environ Resource Econ 45: 133-155 151.

[404] Lipp 2007 (35) *Energy Policy* 5481-5495.

[405] International Energy Agency (IEA) *Deploying Renewables: best practice* (2011) 23.

has constantly set its national targets in terms of its RE policy which were successfully achieved.[406] These impressive results have increased Germany's confidence and hence the country continued to set ambitious targets and continues to impress the world in terms of its achievement in deploying RE. Hence, since Namibia lacks national targets on RE, it needs to set targets in drafting policy as road maps towards developing its RE.

d) Since RE technologies are always changing and new ones emerging, there should be support for technological innovation in the market.[407] The law should stimulate and create the penetration of new technologies in the market by getting rid of the obstacles such as governmental actions, legislative obstacles and various organisational measures which might impede their penetration. This will be able to deal with lack of investment incentives to introduce new technologies and encourage the use of RE, this being one of the challenges Namibia is currently facing.

e) Attracting investors to invest in RE: In order to deal with limited investment opportunities in Namibia, once again the chapter on RE in the intended proposed Energy Act should create a favourable environment for investors to invest in RE. Kalamova suggests ways in which to achieve this and includes in these a modification of the rules of the energy market and trade by promoting equity or debt investment, or by government provisions of energy-related services.[408] However, it is argued that this can only be legitimised by a law, which Namibia lacks and needs to have it in place.[409] In addition, other laws and regulations related to investments should also be considered in order to safeguard the development of RE in this regard. Such laws and regulations include intellectual

[406] Frondel et al 2010 (38) *Energy Policy* 4048-4056.
[407] Lyster &Bradbrook *Energy Law and the Environment* 139.

[408] Kalamova et al *Sources of Finance, Investment Policies and Plant Entry in the Renewable Energy Sector* 27.

[409] The proposed Energy Act must cover all these issues.

property and tax laws.[410] The former, particularly patent laws, should enhance the protection of technical innovations in the RE technologies to encourage their development and promotion.[411] Tax laws should provide for favourable tax treatment in order to stimulate interest and creativity in enterprising individuals in the context of the renewable energy industry.[412]

f) Introduce a feed-in tariff scheme: With the challenge of low electricity tariffs which impedes the development of RE, feed-in tariffs (FIT) is the most viable solution.[413] The FIT scheme has proven to be the most efficient for RE development.[414] In Germany, the feed-in law led to a rapid increase in installed capacity and development of commercial RE market.[415] Tariff has strongly contributed to the large deployment of wind and solar power in Germany.[416] In addition, as a developing country with similar challenges, Namibia can consider Ghana's FIT approach, as introduced in its Renewable Energy Act, as an appropriate pricing mechanism for RE technology.[417] Even so, the success of this implementation is mainly dependent on the level of commitment from government.[418] Furthermore, well-defined rules have to be applied in order to ensure workable mechanism.[419] In addition, technology and programme caps,

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[410] Bradbrook et al *The Law of Energy for Sustainable Development* 317.

[411] Bradbrook et al *The Law of Energy for Sustainable Development* 317. See also, Jacobsson & Bergek (2004) 13/5 *Industrial and Corporate Change* 818.

[412] Bradbrook et al *The Law of Energy for Sustainable Development* 317.

[413] Von Oertzen *Namibian National Issues Report* 15.

[414] Le Fol *Renewable Energy Transition for A Sustainable Future in Namibia* 9.

[415] Beck & Martinot "Renewable Energy Policies and Barriers" (2004) 365-383 372.

[416]Jacobsson & Bergek (2004) (13/5) *Industrial and Corporate Change* 831.

[417] Section 25.

[418] Le Fol *Renewable Energy Transition for aSustainable Future in Namibia* 9.

[419] Le Fol *Renewable Energy Transition for a Sustainable Future in Namibia* 9.

specific tariffs per technology, are relevant measures in this regard.[420] Hence if properly implemented, feed-in tariffs can be the answer to this challenge in terms of developing RE in Namibia as it is in the case of Germany.[421]

g) The government can also provide support to investors particularly local investors, through the establishment of an RE fund. This fund can be incorporated as a provision under the RE chapter in the Energy Act, as in the case of Ghana.[422] The RE fund can also be used to support RE projects and programmes such as REEI, REECAP and NAMREP as outlined in Chapter 2 to ensure optimal deployment and development of RE.

h) Finally, drafters should also pay closer attention to non-economic barriers such as administration hurdles (including lack of co-ordination between different authorities and long lead time in obtaining authorisations).[423] The RE chapter should try to avoid these barriers as much as possible to avoid unnecessary delays in the development of RE.

In addition to the suggestion of an RE chapter in the proposed Energy Act, the Namibian government should first consider drafting and implementing an RE policy to act as road map towards the drafting of a RE chapter in the proposed Energy Act as well as to give more impetus to RE regulatory framework in general. In implementing the policy, the Government should reflect on the OECD guiding principles as provided in Chapter Three of this study. Policy instruments such as FIT and other RE incentives, have to be chosen wisely and implemented properly by drawing lessons from Germany and Ghana, as they are essential for the actual deployment and development of RE. Last but not least, other relevant laws such as tax laws and investment laws should also

[420] Le Fol *Renewable Energy Transition for a Sustainable Future in Namibia* 9.

[421] Le Fol *Renewable Energy Transition for a Sustainable Future in Namibia* 9.

[422] Edjekimhene et al *Implementing of Renewable Energy Technologies Opportunities and Barriers* 39.

[423] Mentanteau et al (2003) *Energy Policy* 799-812 800.

be considered to see whether amendments are required to ensure a successful RE legal and regulatory framework.

To conclude, in the process of enacting a new Act, Namibia has to critically investigate its circumstances in terms of the opportunities and benefit of RE potentials and associated challenges. In doing so, the Namibian government can get guidance from the OECD guidelines to ensure that it incorporates all the necessary elements so as to provide provisions that are best applicable to its own circumstances and consequently to achieve in the long run, a well-established RE regime. All of this is necessary for Namibia to have a secure sustainable energy future.

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