

**Enhancing Renewable Energy Deployment In Malawi Through Climate  
Finance Instruments: Policy Challenges and Prospects**

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## **Declaration**

I hereby declare that this dissertation is the result of my original research carried out at the Brandenburg University of Technology Cottbus-Senftenberg, Germany within the framework of the doctorate programme Environmental and Resource Management. I hereby admit that this dissertation has never been published by another person or submitted to any examination board for the award of any other degree. All the sources used have been duly acknowledged.

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## **Dedication**

This dissertation is dedicated to my family, friends and numerous people that have supported and encouraged me as I was at various stages of the PhD journey.

**Others have achieved more with less (opportunities) than what I had and others have achieved less with more (opportunities) than what I had. What I know is that I have achieved my best with what I had.**

*Soli Deo Gloria*

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## **Abstract**

Malawi is a Least Developed Country located in Southern Africa to the East of Zambia. Malawi has a low electrification rate of 9%. Furthermore, unreliable and inadequate power supply are estimated to reduce Malawi's GDP by 7%-9%. These energy sector challenges diminish the country's prospects for sustained growth, poverty reduction, and improved delivery of health and education services. Various studies have been undertaken to determine how Malawi can improve its energy sector through the deployment of renewable energy. However, these studies have not specifically examined how climate change related financing mechanisms such as the Clean Development Mechanism (CDM) could be utilised to mobilise financing and capacity development for renewable energy deployment in the country. This is despite the assertion that developed countries are committed to jointly mobilising US\$100 billion per year by 2020 to support climate change mitigation and adaptation activities such as renewable energy deployment in developing countries. Through the use of questionnaires, case study analyses, policy reviews, academic literature reviews and interviews, this research sought to determine Malawi's regulatory and institutional challenges and prospects for enhancing renewable energy deployment through climate finance instruments. Among some of the research findings was that Malawi has relied on external support in order to develop capacity in the field of climate finance, hence in the absence of external assistance there are limited opportunities to incentivise various stakeholders to implement projects and to enhance awareness about climate finance. The study also discovered that Malawi's climate finance determinants resemble a non-market seeking Foreign Direct Investment profile, hence the presence of opportunities for cheap and abundant emission reductions could improve climate finance investment patterns rather than the opportunities for emission reductions and co-products such as electricity through renewable energy technologies. The study therefore recommended that Malawi should create a Renewable Energy and Climate Finance Promotion Agency to assist with soliciting funding for renewable energy projects from concessional and non-concessional sources and drafting and implementing renewable energy policies. Another recommendation was that the country must create a Renewable Energy Fund to reduce the funding constraints that the media, project implementers and financiers have in undertaking various roles related to enhancing renewable energy deployment. Lastly, the study concluded that Malawi's prospects for accessing

various forms of climate finance and deploying climate finance projects can be improved through improvements in Malawi's renewable energy and climate change institutional framework, and the modifications of climate finance instruments and methodologies to encourage flexibility and reduce institutional constraints.

**Keywords: Africa, Clean Development Mechanism (CDM), Climate Finance, Renewable Energy, Nationally Appropriate Mitigation Action (NAMA), Voluntary Carbon Market (VCM)**

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## **List of Acronyms and Abbreviations**

ACP	African, Caribbean and Pacific
AfDB	African Development Bank/African Development Fund
AFOLU	Agriculture, Forestry and Other Land Use
AMTT	Adaptation and Mitigation Technology Transfer
BPC	Botswana Power Corporation
CCATD	Climate Change Adaptation Technology Development
CCMTD	Climate Change Mitigation Technology Development
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFL	Compact Fluorescent Lamp
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon Dioxide
DFID	Department for International Development
DNA	Designated National Authority
DRC	Democratic Republic of the Congo
DSM	Demand-Side Management
EDM	Electricidade de Moçambique, E.P.
EE	Energy Efficiency
ENE	Empresa Nacional de Electricidade de Angola
ERP	Economic Recovery Plan
ESCOM	Electricity Supply Corporation of Malawi Ltd
EU	European Union
EUA	European Union Allowance Units
EU-ETS	European Union Emissions Trading Scheme
FDI	Foreign Direct Investment
FIT	Renewable Energy Feed-in Tariff
GDC	Geothermal Development Company Ltd
GDP	Gross Domestic Product
Gg	Gigagram
GHG	Greenhouse Gas
GNI	Gross National Income
HFC	Hydrofluorocarbons
INDC	Intended Nationally Determined Contribution

IPP	Independent Power Producer
IPPU	Industrial Processes and Product Use
IRP	Integrated Resource Planning
JCM	Joint Crediting Mechanism
LDC	Least Developed Country
LEC	Lesotho Electricity Company
LED	Light-Emitting Diode
LEDS	Low-Emission Development Strategies
LPG	Liquefied Petroleum Gas
LREBRE	Lesotho Renewable Energy-Based Rural Electrification Project
LTWP	Lake Turkana Wind Power Project
MAREP	Malawi Rural Electrification Programme
MCC	Millennium Challenge Corporation
MDG	Millennium Development Goal
MEA	Multilateral Environmental Agreement
MERA	Malawi Energy Regulatory Authority
MGDS	Malawi Growth and Development Strategy
MK	Malawi Kwacha
MRV	Measuring, Reporting and Verification
MW	Megawatts
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Programme of Action
NCCIP	National Climate Change Investment Plan
NGO	Non-Governmental Organisation
N <sub>2</sub> O	Nitrous Oxide
PDD	Project Design Document
PES	Payment for Ecosystem Services
PESTLE	Political, Economic, Social, Technological, Legal and Environmental
PFC	Perfluorocarbons
PoA	CDM Programme of Activity
PV	Photovoltaic
REDD+	Reduction of Emissions from Deforestation and Forest Degradation



RES	Renewable Energy Source
RET	Renewable Energy Technology
RIDMP	Regional Infrastructure Development Master Plan
SADC	Southern African Development Community
SAPP	Southern Africa Power Pool
SEC	Swaziland Electricity Company
SF	Sulfur Hexafluoride
SNEL	Société Nationale D'électricité
SSA	Sub-Saharan Africa
TANESCO	Tanzania Electric Supply Company Limited
TNC	Transnational Corporation
UNFCCC	United Nations Framework Convention on Climate Change
US	United States of America
VCM	Voluntary Carbon Market
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Corporation Limited

Change is often said to be driven either by desperation or inspiration. In the energy sphere, change can be driven by concerns about energy security and the negative impacts of unstable energy prices and long-term energy access (desperation). Change can also be stimulated by a willingness to support actions to improve the global and local environment, or to provide stimulation for innovation and economic development (inspiration).

(Müller et al., 2011: pp. 26)

*What Will Drive Change in Malawi's Renewable Energy Sector?*

## **Chapter 1 Introduction**

### **1.1 Introduction to Chapter One**

This chapter presents a general introduction to the study. It starts by providing the status of renewable energy deployment in Malawi. This is then followed by a commentary on why climate finance instruments could be important in enhancing renewable energy deployment in the country. The chapter further provides an insight into the problem statement, aims, objectives and justification for this research. The structure of this study is provided at the end of this chapter.

### **1.2 Background to the Study**

The supply and generation of energy in many developing countries (such as Malawi) is from both commercial and traditional sources. The types of commercial energy are electricity, coal, and petroleum products while those of traditional energy are biomass and animal power. Malawi has implemented various projects, initiatives, plans and policies in order to improve its energy sector and make it responsive to the needs of the people and country. For example, the National Energy Policy (2003) was implemented with an aim of making the energy sector sufficiently robust and efficient to support the Government's socio-economic agenda, and the World Bank supported Malawi Power Sector Reform Programme aimed at improving the country's energy sector through regulatory and institutional reforms (i.e. improving financial and technical efficiency of utilities, facilitating divestiture and guaranteeing future electricity supply in an open globalised energy market (UNECA, 2007)). Despite these interventions, Malawi's energy sector has not significantly transformed, and is said to be deficient and in need of improvements (AfDB, 2013). As shown in Table 1.1 not only are actual energy mixes and electrification rates falling below government set targets, but the deployment of renewable energy is over 50% below its target. Malawi has various renewable energy sources (RESs)<sup>1</sup> such as wind, solar and hydro power that can improve the country's energy security as well as facilitate climate-resilient, low-carbon development that is in keeping with global trends and aspirations as contained in the Sustainable Development Goals (SDGs) (UNSDKP,

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<sup>1</sup> Throughout the study, renewable energy sources mean solar systems, micro, mini and small hydroelectric power stations, biomass, biogas, wind, and other thermal electricity generation systems and technologies to be in keeping with the definition provided in the Malawi National Energy Policy (2003) (GoM, 2003a). Hydro projects above 10 Megawatts (MW) are excluded as renewable energy sources unless specifically stated.

2014; APP, 2015). Over 80% of the electricity generated in Malawi is from hydro power. Malawi's hydro power estimated potential capacity is well over 900 Megawatts (MW).<sup>2</sup> However, the country's peak demand is 350MW against an installed capacity of 287MW, of which 277MW is available<sup>3</sup> (AfDB, 2013). For example, as shown on table 1.2, there are a variety of untapped hydropower sites in the country which can be developed using conventional financing modalities (e.g. loans and grants) or through climate finance modalities such as the Clean Development Mechanism (CDM). In order for a project to be eligible for financial and technical support through climate finance modalities, more particularly through the CDM, renewable energy projects have to demonstrate "additionality". Renewable energy projects that are "additional" therefore demonstrate that they will displace electricity that would otherwise be generated by fossil fuel fired power plants but they cannot be implemented through commercial channels because the proposed technologies to be used in the projects are not yet mature or are unknown in the specific region; and that there are investment barriers whereby the proposed projects have high cost of electricity relative to baseline technologies/alternative fossil fuel technologies (Yunna and Quanzhi, 2010).

Additionally, most parts of the country also have high levels of solar energy in the range of 1,200 W/m<sup>2</sup> in the warm months and 900W/m<sup>2</sup> in the cool months which are arguably ideal for the performance and operation of photovoltaic systems and solar thermal systems. For wind energy systems, there are quite a good number of areas in the country with mean wind speeds above 5 meters per second almost throughout the year (Zalengera et al., 2013; Gamula et al., 2013a). Some practitioners have therefore commented that RESs in the country are arguably being underutilised as such they are not sufficiently addressing the country's energy requirements and socio-economic development aspirations (Gamula et al., 2013b). In addition to this, Malawi is making slow progress in reducing poverty levels to reach its targets for the Millennium Development Goals (MDGs) because major challenges still persist in

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<sup>2</sup> The technically proven potential of untapped hydropower for electricity generation in Malawi is 2,000 MW (GoM, 2011a).

<sup>3</sup> In January 2014, Kapichira II Hydro Electric Power Plant was commissioned. This added another 64MW to the national grid. This theoretically puts Malawi's energy supply (generation capacity) at 351 MW against a demand of 350MW. However, this does not mean Malawi's power supply is adequate as demand has been suppressed by limiting electricity connections and industries have not been able to scale up or to be established due to power limitations. Additionally, the electricity distribution losses in Malawi range from 20-25% (MCC, 2011) hence the country still has significant energy deficits.

reducing income inequality and mitigating environmental degradation as caused by poverty, increasing population growth, inadequate alternative livelihoods and lack of affordable energy technologies (GoM, 2010a). The energy and poverty dilemmata therefore need to be addressed comprehensively and concurrently if the country is to attain its vision to transform from being a Least Developed Country (LDC) to a Middle Income Country by 2020 (GoM, 1998).

Table 1.1 Energy mix projections, targets and actual (contribution of energy sources to total energy demand)

Energy Source	2000 (actual)	2010 (target)	2010 (actual)	2020 (target)	2050 (target)
Biomass	93	75	80	50	30
Coal	1	4	4	6	6
Electricity	2.3	10	8	30	40
Liquid Fuels	3.5	5.5	5.5	7	10
Nuclear	0	0	0	0	4
Renewable Energy	0.2	5.5	2.5	7	10
Total (%)	100	100	100	100	100

Source: Gamula, 2013b

Table 1.2 Untapped hydropower potential sites and estimated development costs

River	Site	Estimated Capacity (MW)	Estimated development cost (USc/kWh)
Songwe	Manolo	60-130	4.2-4.8
	Proposed multipurpose dam	300	-
Wowve	Expansion of existing mini-hydro site	15	-
South Rukuru	Low Fufu	75-140	2.3-2.4
	Low Fufu Transfer	90-180	2.4-2.5
	High Fufu	90-175	3.7-5.4
	Henga Valley	20-40	8.7-9.3
	Rumphu (pumped storage system)	3-13	12.3-21.8
Dwambazi	Chimgonda	20-50	7.2-9.8
Dwanga	Vipya site	50	-
Bua	Chizuma	25-50	7.1-8.5
	Chasombo	25-50	9.5-11.8
	Malenga	30-60	17-29.1
	Mbongozi	25-50	14.1-17.3
Shire	Kholombidzo	140-280	2.7-2.9
	Mpatamanga	135-300	2.3-2.9
Ruo	Zoa Falls	20-45	4.6-5.8
<b>Total untapped potential</b>		<b>Up to 1,928 MW</b>	

Source: Kaunda and Mtalo, 2013

Among the various challenges that the world is confronted with, climate change and improving the accessibility and affordability of modern energy in the developing world and more particularly in Sub-Saharan Africa (SSA) deserve special consideration. Climate change impacts such as changes in extreme weather events and increased frequencies of droughts and floods could exacerbate human migration, population dislocation, health problems, and economic and human losses (Boko et al., 2007: pp. 437). Climate change will also impinge on the sustainable development of most developing countries as it compounds the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation and economic development (Cruz et al., 2007: pp. 494). To add to this, many developing nations such as Malawi are highly vulnerable to climate change because of their lack of access to modern energy and because of poor infrastructure which lead to low agricultural productivity, income poverty and inequitable distribution of wealth (Modi et al., 2006; Kanagawa and Nakata, 2008; Rong, 2010; Lior, 2012). Whilst there is a need for many developing countries to improve access to modern energy,<sup>4</sup> it can also be seen that energy sector developments can exacerbate climate change and the accumulation of greenhouse gases (GHGs) in the atmosphere if conventional energy systems/fossil fuel based systems are used (IPCC, 2011: pp. 7). With due regard to population growth and rapid increases in energy demands, Renewable Energy Technologies (RETs) are therefore considered as solutions for environmental problems like climate change whilst expanding access to energy services and contributing to local and national development objectives (Silveira and Khatiwada, 2010; Nautiyal and Varun, 2012; Subbarao and Lloyd, 2011). In the case of Malawi, the deployment of RESs is lagging even though the country can access various climate change management support mechanisms/climate finance modalities (e.g. the CDM, Plan Vivo, etc.) which have been specifically developed to promote sustainable development and the deployment of renewable energy in developing countries such as Malawi.

Sustainable development can be viewed as an approach to development which focuses on integrating economic growth with environmental protection and social

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<sup>4</sup> In this study, modern energy is used to describe the use of secondary energy carriers such as electricity and mechanical power as opposed to the use of primary energy sources such as solid fuels and traditional biomass (i.e. fuelwood, charcoal, agricultural residues, etc.).

concerns. Sustainable development should meet the essential needs and aspirations for jobs, food, energy, water and sanitation; ensure a sustainable level of population; conserve and enhance the resource base; re-orientate technology and manage risk; and include and combine environmental and economic considerations in decision making (Perdan, 2011: pp. 5-6). Energy sector interventions therefore have a significant role in promoting sustainable development. Factors such as a lack of commitment to tap into other energy sources; a lack of competition in the energy sector; acute urban-rural dichotomies; plummeting public investment; unstable international oil prices; high urbanisation rates; and heavy dependence on biomass for energy (GoM, 2007; GoM, 2003a) as well as the inter-related nature of the issues presented in figure 1.1 continue to make the Malawi’s modern energy services to be inadequate, unreliable and inaccessible to many communities. Arguably, the aforementioned aspects are significantly hampering the growth and potential for RESs to contribute towards the sustainable development of the country.

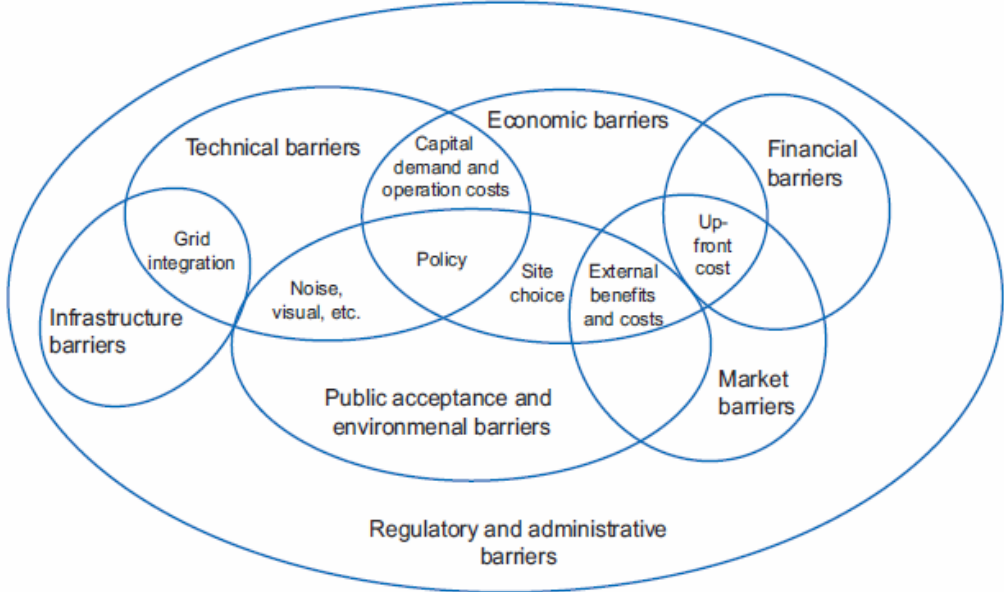


Figure 1.1 The interlinked nature of barriers to renewable energy deployment  
 Source: Müller et al., 2011

Malawi is classified as a LDC<sup>5</sup> hence arguably it is imperative to improve the energy sector in Malawi because access to energy is widely recognised as one of the main

<sup>5</sup> LDCs are low-income countries suffering from the most severe structural impediments to sustainable development (i.e. low level of human resource development and a high level of structural economic

factors necessary to overcome poverty and achieve sustainable development (Herran and Nakata, 2008). It has also been pointed out that access to electricity should be adapted as a human right globally because the provision of electricity improves health and education, generates income, increases productivity, reduces inequality, and enhances the quality of life (Lahimer et al., 2013). In the context of developing nations such as Malawi, the provision of reliable energy services has both economic and environmental benefits because sustaining socio-economic development is vital in order to create jobs, increase education levels, etc. which are vital in order to mitigate unsustainable practices resulting from rising populations and pressure on natural resources (UNDP, 2010).

Although there is no specific MDG relating to energy, the MDGs cannot be met without significant investments in improving the accessibility and affordability of modern energy services<sup>6</sup> to facilitate income generating activities and indirectly enhance education, health, environment and gender issues (UN-Energy, 2005; Meisen and Akin, 2008). Furthermore, in situations where RESs are utilised to provide energy services, additional socio-economic benefits such as a guarantee of environmental protection, energy security and economic efficiency are achieved hence creating a sustainable energy supply system which can facilitate sustainable development (figure 1.2).

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vulnerability). Some of the factors that characterise LDCs are the vulnerability of the countries to natural shocks (in particular impacts of droughts and disturbances in rainfall patterns), high prevalence of under-nourishment in the total population, low Gross National Income (GNI) per capita, and low adult literacy rates (UNDESA, 2014).

<sup>6</sup> Energy services are referred to as the desired and useful products, processes, or services that result from the use of energy, such as cooking, water heating, lighting, refrigeration, water pumping, etc.



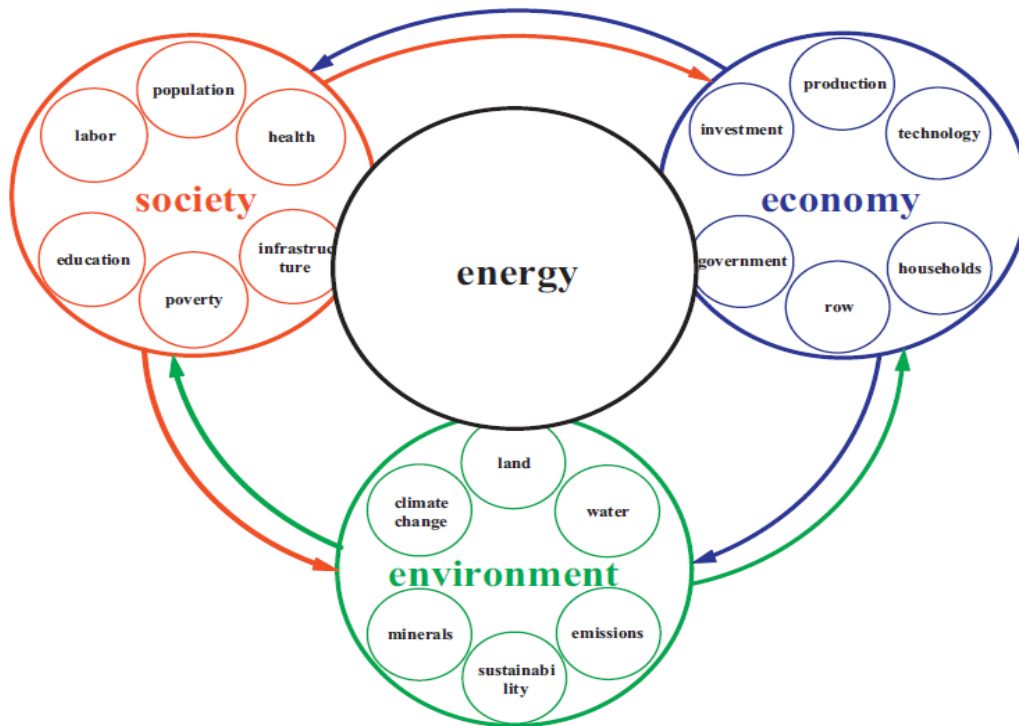


Figure 1.2 Interrelationship between access to energy and sustainable development  
 Source: Amigun et al., 2011

### 1.3 Motivation for the Work

RESs represent the most environmentally friendly and cost-effective means of providing electricity to those living in developing countries (Urmee et al., 2009) as well as contributing towards socio-economic development without damaging the environment and human health (Akella et al., 2009). Renewable Energy Technology (RET) deployment varies from country to country depending on the stage of development, the role of markets and competition in the economy, institutional and regulatory practices, socio-cultural dimensions, availability of specialised personnel and so on (Patlitzianas et al., 2006). Malawi is well endowed with a wide variety of RES which include good insolation levels and potential sites for small, mini and micro hydro schemes that would be able to supply energy to local communities at reasonable costs but these remain underexploited (Tenthani et al., 2013). Arguably, the utilisation of these RESs can assist with the socio-economic development and conservation of natural resources for the country by reducing the rates to which trees are cut down to be used for heating, lighting and cooking (figure 1.3).

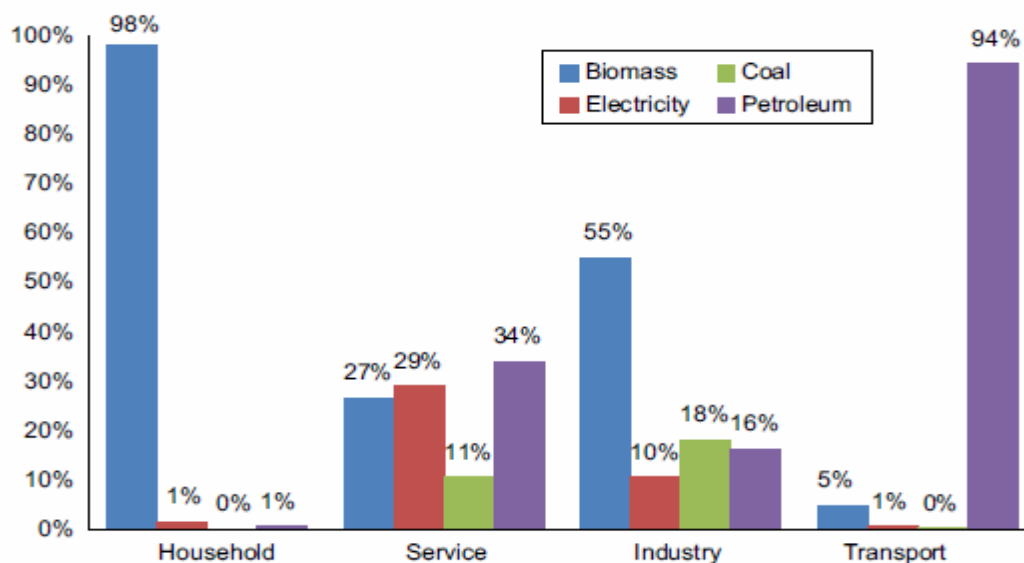


Figure 1.3 Percentage share of energy consumed in various sectors in Malawi  
Source: Kaunda, 2013

The provision of reliable, secure and affordable energy services is central to addressing many of today's global development challenges, including climate change, food security, wealth creation, poverty and inequality (Bazilian et al., 2012). While there are no fundamental technical obstacles preventing universal energy access, there is, however, a lack of effective institutions, good business models, transparent governance, and appropriate legal and regulatory frameworks (ibid) to ensure that universal energy access can be attained by all countries. Or to put it in another way, a large number of barriers in the realms of policy, regulation, financing, and business frameworks are what prevent the accelerated development of markets for low-carbon energy technologies and universal energy access through RETs (Parthan et al., 2010), but not the unavailability of suitable technologies.

Global concerns about climate change and energy related GHG emissions have motivated various stakeholders and policy makers to develop investment and funding mechanisms to facilitate the implementation of renewable energy projects in Africa (and Malawi) that can potentially improve the financing, accessibility and affordability of modern energy whilst minimising GHG emissions. For example, the United Nations Framework Convention on Climate Change (UNFCCC) Cancun Agreement has committed developed countries to jointly mobilising US\$100 billion per year by 2020 to support climate change mitigation and adaptation activities in developing countries

(Glemarec, 2012).<sup>7</sup> However, Malawi has not been able to appreciably benefit from most of these global initiatives more especially in the field of renewable energy deployment and as such an investigation into the factors hindering Malawi from tapping into these facilities would be beneficial to the Malawi nation, scientific community and global policy makers as it can identify how best future global climate change architectures and climate finance modalities should be structured in order to benefit various categories of developing nations.<sup>8,9</sup>

Climate finance instruments and modalities (e.g. UNFCCC/Kyoto Protocol Mechanisms such as the CDM) are now arguably considered as integral elements for enhancing the deployment of renewable energy sources and technologies (figure 1.4). The other factors affecting the level and pattern of the spread of new RETs include national institutional frameworks (energy laws and policies) and national endowments of RES (Freitas et al., 2012; Egute et al., 2017). However, even though climate finance and energy policies can improve the development of energy projects in Malawi and improve access to electricity in the country, there has been limited research as to how Malawi's regulatory frameworks are promoting or hindering the

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<sup>7</sup> Paragraph 98 of Decision 1 of the UNFCCC Conference of Parties 16 (held in Cancun in 2010), Recognises that developed country Parties of the UNFCCC commit, in the context of meaningful mitigation actions and transparency on implementation, to a goal of mobilising jointly US\$100 billion per year by 2020 to address the needs of developing countries. Paragraph 102 of Decision 1 of the UNFCCC Conference of Parties 16, Decides to establish a Green Climate Fund, to be designated as an operating entity of the financial mechanism of the UNFCCC under Article 11, with arrangements to be concluded between the Conference of the Parties and the Green Climate Fund to ensure that it is accountable to and functions under the guidance of the Conference of the Parties, to support projects, programmes, policies and other activities in developing country Parties of the UNFCCC using thematic funding windows (UNFCCC, 2011a, pp. 17).

<sup>8</sup> Malawi still has no registered project under the regular Clean Development Mechanism (CDM) activities but has three projects registered as CDM Programme of Activities (PoA) (UNFCCC, 2014a).

<sup>9</sup> Under the Kyoto Protocol, different countries have different commitments depending on whether they are categorised as Annex I Parties (mostly industrialised countries), Annex B Parties (i.e. OECD members of Annex I, but not the economies in transition parties), or Non-Annex I Parties (developing countries) (Lo, 2010). However, due to the unequal distribution of CDM projects and disagreements among policymakers at various annual Meeting of the Parties of Kyoto Protocol, it is conceivable that future climate change architectures might have to categorise and apportion commitments differently. Other socio-economic classifications for countries include by income groups as used by the World Bank and International Monetary Fund (i.e. four income groups of Low income: US\$1,025 or less; Lower middle income: US\$1,026 to US\$4,035; Upper middle income: US\$4,036 to US\$12,475, and High income: US\$12,476 or more). Another classification uses terms such as advanced, emerging or developing economies. The United Nations instead, relies on a more complex classification that includes geographic regions as well as such categories as least developed countries (like Afghanistan and Malawi); landlocked developing countries (e.g. Botswana, Azerbaijan); small island developing states (e.g. Bahamas, Mauritius); transition countries (e.g. Belarus, Croatia); developed regions (Japan, Northern America); developing regions (Central America, Asia excluding Japan); and newly industrialised countries (e.g. China, India, Brazil, Malaysia, etc.) (Aridas and Pasquali, 2010).

utilisation of climate finance modalities to improve renewable energy deployment in the country.

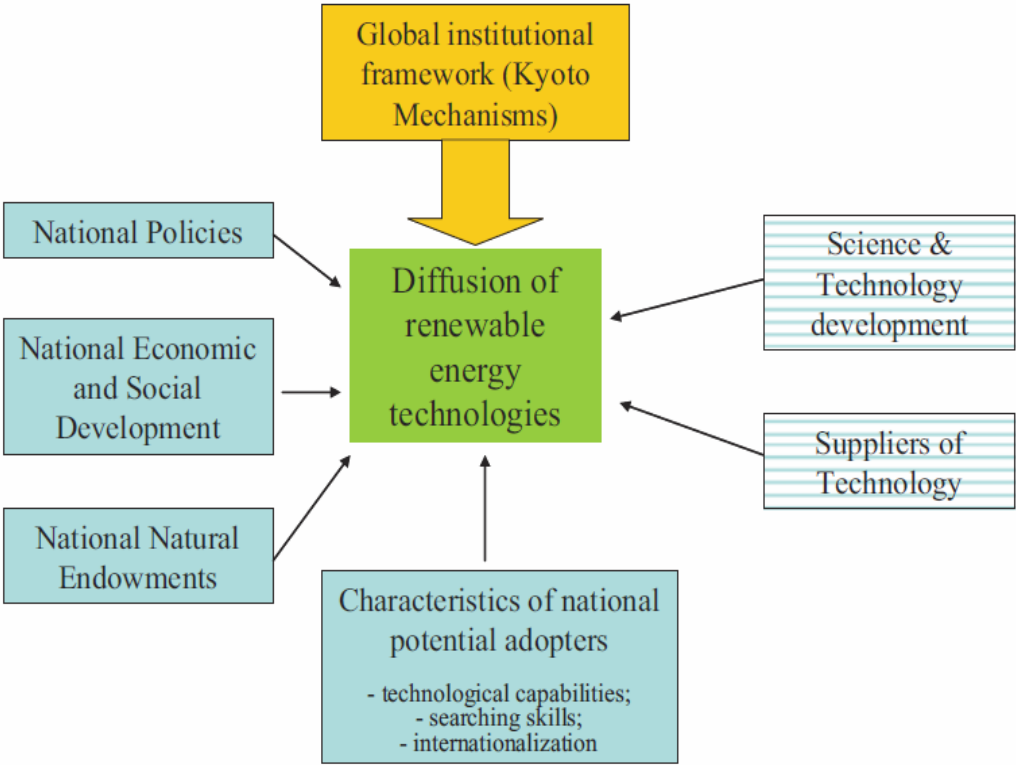


Figure 1.4 The factors affecting the diffusion of renewable technologies  
 Source: Freitas et al., 2012

Various studies, projects and programmes have been undertaken in Malawi in order to determine the challenges and opportunities in the renewable energy sector, and to highlight the issues which policy makers and developers should address in order to increase the contribution of renewable energy to Malawi’s energy mix. The studies have covered a range of perspectives ranging from how specific RESs and RETs can be utilised better in the country, to what economic and political conditions can facilitate both public and private investment in the renewable energy sector. Such studies include O’Reilly & Young (2015) who looked at policy options that can enhance the development of Malawi’s renewable energy sector. In their findings, they noted that Malawi needs to undertake reforms to establish a legislative, institutional and regulatory landscape which provides stability, clarity and direction. This should also encompass developing enforceable standards for renewable energy equipment, and mainstreaming energy efficiency requirements into public and social infrastructure planning, training the skilled workforce that will be required to manage and maintain complex renewable energy systems, and developing a wider

understanding of the limitations of systems installed and managed at the community level. Sgurr Energy (2013) looked at Malawi's wind energy potential by providing an analysis of windfarm development and a guide to potential wind farm site selection within Malawi. Barry et al. (2011) looked at factors that should be taken into account for the selection of renewable energy technologies in order to improve the long-term sustainability of projects. Zalengera et al. (2014) provided a PESTLE analysis outlining a methodology for addressing the political (P), economic (E), social (S), technological (T), legal (L), and environmental (E) challenges that constrain the development of renewable energy technologies in Malawi. Gamula et al. (2013a) presented the opportunities and challenges in the development of RETs in Malawi, and concluded that little progress has been made in improving renewable energy supply and utilisation due to poverty, lack of political will, lack of information on RETs and wrong approaches in addressing the problem. Kaunda (2013) provided an analysis Malawi's small-scale hydropower potential sites, and recommended that Malawi should accelerate the process of developing a Renewable Energy Feed-in Tariff (FIT) and a Standard Power Purchase Agreement in order to encourage investments into hydropower generation and other renewable energy systems.

Various researchers have investigated the utilisation of climate finance in Malawi and Africa. Byigero et al. (2010) looked at the implementation of CDM projects in SSA and noted that the relatively low CDM penetration in SSA and the East African Community countries was a result of endogenous barriers, particularly the inadequate general investment climate, the low level of industrialisation of many countries, and the lack of CDM capacity, particularly with regard to institutional infrastructure. Byigero et al. (2010) concluded that a combination of capacity-building efforts on human resource development (i.e. training courses) and improving the general investment climate of host countries or improving investors' perceptions of the investment climate could improve the implementation of climate finance in the two regions. Arens et al. (2011) analysed climate finance capacity building activities in SSA carried out by multilateral organisations as well as by individual Annex I governments in order get an overview of the donor activities landscape. Nyirenda (2011) in his assessment of climate change adaptation financing in LDCs argued that in LDCs, additional finances alone cannot guarantee better adaptation but there is a need for related reforms and investments that have to be made within LDCs for

adaptation to climate change to be sustainable including: institutional arrangements, appropriate capacity building, stakeholder engagement, long-term in-country planning, political will and having adequate learning phases from previous initiatives. Burian et al. (2011) looked into how to integrate Africa's LDCs into the global carbon market. This was done by analysing the barriers and obstacles to CDM implementation in eleven Sub-Saharan LDCs namely Burkina Faso, the Democratic Republic of the Congo (DRC), Ethiopia, Malawi, Mali, Mozambique, Rwanda, Senegal, Tanzania, Uganda, and Zambia. The study recommended that Nationally Appropriate Mitigation Action (NAMA) approaches should be encouraged due to the volatility of Certified Emission Reduction (CER) prices.

Thomas et al. (2010) looked at why there were so few CDM afforestation or reforestation projects despite the many economic, social and environmental benefits that such activities potentially offer. The study argued that the CDM needed to be reformed to support the development of more CDM afforestation or reforestation projects, particularly with regards to incorporating greater flexibility, and simplifying the methodological and documentation procedures of CDM registration. UNEP RISØ (2013) evaluated the emissions reduction profile of Malawi with a view of highlighting the potential climate finance projects that could be implemented in the country. The study was part of the ACP-CD4CDM Project/European Commission Programme for Capacity Building related to Multilateral Environmental Agreements (MEAs) in African, Caribbean and Pacific (ACP) Countries. Arguably, despite the knowledge that climate finance projects can potentially increase financing for renewable energy deployment, most of the literature suggests that most of the studies have looked at the opportunities and barriers to accessing and utilising climate finance but have not significantly focused on how national legal and institutional frameworks, and a country's climate change policy affect and influence access to climate finance and the deployment of renewable energy projects.

Consequently, there are gaps in knowledge and expertise on how Malawi's regulatory frameworks can improve the country's access to climate finance modalities in order to facilitate wide scale RET deployment. This research therefore aims to fill in this gap by providing an analysis of Malawi's policy challenges and prospects for enhancing renewable energy deployment through climate finance instruments.

#### **1.4 Scope of the Study and Specific Objectives**

The overall aim of this study was to understand how regulatory and policy reforms in Malawi were affecting the development of the renewable energy sector and climate finance projects/modalities. The study investigated the influence of governance structures and public policies on the development of the renewable energy sector. The study further analysed actions that can be undertaken in order to enhance the renewable energy sector to enable it to contribute towards the socio-economic development of Malawi and enhance climate change and environmental management strategies.

To achieve the overall aim, the specific objectives of the research were to:

1. Analyse major factors undermining the development of renewable energy sources in Malawi.
2. Assess the challenges and opportunities of Malawi's existing laws and policies as instruments for promoting renewable energy in Malawi.
3. Determine regulatory and policy instruments that can promote the development and implementation climate finance and CDM projects in Malawi.
4. Identify approaches, mechanisms and innovations that can assist with the development of a sustainable renewable energy sector in Malawi.

#### **1.5 Structure of the Thesis**

The thesis is presented in eight chapters as outlined below:

Chapter 1 introduces the topic and gives the background information on the issues related to the development of renewable energy and access to climate finance. The chapter also includes the objectives and motivation for the study.

Chapter 2 provides an analysis of the fundamental issues influencing the development of the renewable and non-renewable energy sectors in Malawi. This is done by evaluating the Malawi National Energy Policy (2003) (since it is the overarching strategy for energy sector developments) as well as other programmes that have been prioritised in the country.

Chapter 3 then follows by focusing on the implementation of climate finance modalities in Malawi and globally. Malawi's main climate change strategies and ambitions are also presented in this chapter.

Chapter 4 gives the research methodology and design. It gives the context of the research, outlines variables that were used in the study, explains and justifies the analytical framework and methods that were used.

Chapter 5 provides the results and discussion of the first pre-test that was undertaken as part of Phase One of the research.

Chapter 6 provides the results and discussion of the second pre-test that was undertaken as part of Phase One of the research.

Chapter 7 provides the results and discussion from the key informant interviews that were undertaken as Phase Two of the research.

Chapter 8 concludes the study by linking the findings of the study with the objectives of the study. The chapter also explains the limitations of the study and provides suggestions of areas that require further research.



## **Chapter 2 Renewable Energy Deployment in Malawi: Key Drivers and Obstacles**

### **2.1 Introduction to Chapter Two**

This chapter presents the fundamental issues influencing the development and deployment of renewable energy, and the development of the energy sector in Malawi. This is done by providing a socio-economic overview of Malawi, focusing on the interplay between the country's economic structure, energy use profile and the country's national development strategies. Through a review and analysis of secondary data, this chapter provides insights into the challenges and opportunities of Malawi's energy sector so as to identify areas that require interventions to enhance the renewable energy sector. Since institutional weaknesses and sustaining progress made on socio-economic development agendas remain a significant challenge for the country and its people, this chapter also identifies actions that policymakers can undertake to enable the (renewable) energy sector to serve the nation and its people better.

### **2.2 Fundamental Issues Influencing the Development of the (Renewable) Energy Sector in Malawi**

#### **2.2.1 Geographical, Demographic and Economic Information**

Malawi is a landlocked country located in Southern Africa, between latitude 9<sup>0</sup>22' and 17<sup>0</sup>7' south and between longitudes 32<sup>0</sup>40' and 35<sup>0</sup>55' east (GoM, 2003b). Malawi is bordered to the north and northeast by the United Republic of Tanzania, to the west by the Republic of Zambia and to the southwest and east by Mozambique. The area of the country is approximately 118,483km<sup>2</sup> of which 94,275km<sup>2</sup> is land and 24,208km<sup>2</sup> is water (Kaunda, 2013). The topography comprises of plateaus between 750m and 1,350m above sea level, highland elevations rising to over 2,440m in the Nyika Plateau in the north of the country and to over 3,000m on Mulanje Mountain (ibid). Figure 2.1 shows the location of Malawi on the African continent.

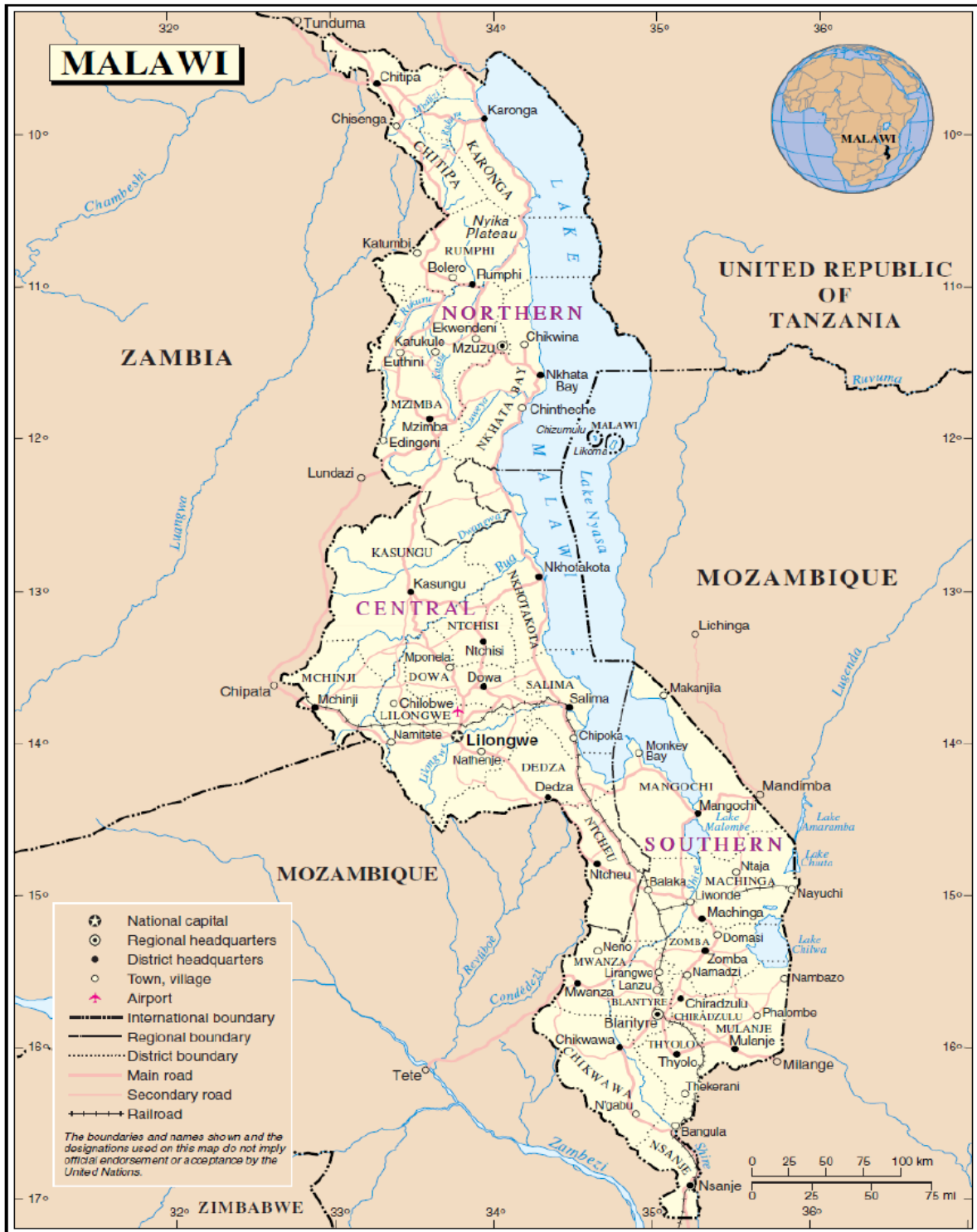


Figure 2.1 Map showing the location of Malawi on the African continent  
 Source: UNEP RISØ, 2013

Malawi has an estimated population of 17 million people (GoM, 2015). Approximately 85% of the population lives in rural areas but it is anticipated that this figure will decrease due to rapid urbanisation as the country had an annual urban population

growth rate of 5.2% in 2010 making it one of Africa's fastest urbanising nations (surpassed only by Rwanda (9.2%), Burundi (6.1 per cent), Eritrea (6.0%) and Sierra Leone (5.9%) (Brown, 2011). A summary of the demographic and economic information on Malawi is given in Table 2.1.

Table 2.1 Demographic data and economic indices for Malawi

Parameter	Value	Year
Population (est., millions)	17	2015 (projection)
Population density (persons per square km)	129.8	2011
Population growth rate (average annual %)	3.2	2010-2015
Urban population (%)	15.8	2012
Population aged 0 -14 years (%)	45.9	2012
Life expectancy at birth (females and males, years)	55.2/54.9	2010-2015
Gross Domestic Product (GDP) (million current US\$)	5,966	2011
Gini index <sup>10</sup>	43.9	2010
Human Development Index <sup>11</sup>	0.414 (rank 174 of 195)	2012
GDP per capita (current US\$)	388.0	2011
Balance of payments, current account (million US\$)	-765	2011
Energy production, primary (000 mt oil equivalent)	167	2009
Forested area (% of land area)	34.0	2010
CO <sub>2</sub> equivalent emission (metric tons per capita)	1.4	2010
Energy consumption per capita (kilograms oil equivalent)	30	2009

Source: Author's compilation with data from UNDATA, 2013; UNDP, 2014, World Bank, 2014a and GoM, 2015

<sup>10</sup> Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. The Gini index values for Malawi's neighbouring countries are Mozambique 45.7, Tanzania 37.6 and Zambia 57.5 (UNDP, 2014).

<sup>11</sup> The Human Development Index (HDI) measures development by combining indicators of life expectancy, educational attainment and income into a composite human development index, the HDI. The HDI sets a minimum and a maximum for each dimension, called goalposts, and then shows where each country stands in relation to these goalposts, expressed as a value between 0 and 1. Given the imperfect nature of wealth as gauge of human development, the HDI offers a powerful alternative to GDP and GNI for measuring the relative socio-economic progress at national and sub-national levels. Comparing HDI and per capita income ranks of countries, regions or ethnic groups within countries highlights the relationship between their material wealth on the one hand and their human development on the other. A negative gap implies the potential of redirecting resources to Human Development. The Gini index values for Malawi's neighbouring countries are Mozambique 0.393 (rank 178 of 195), Tanzania 0.488 (rank 159 of 195) and Zambia 0.561 (rank 141 of 195) (UNDP, 2014).

Malawi's major exports include food, live animals, beverages and tobacco whilst imports include petroleum products, fertilisers, machinery and transport equipment, and manufactured goods (UNDATA, 2013). For the period 2009 to 2010, Malawi's overall external trade indicated that imports had accelerated more than exports. During the period under review, total merchandise exports registered an increase estimated at 41.3%. The total export value in 2012 was MK296.5 billion (€542,047,531), while in 2011 exports recorded MK209.4 billion (€382,815,356). In 2012, Malawi imported merchandise goods worth MK661.5 billion (€1,209,323,583) compared to MK345.3 billion (€631,261,425) in 2011. The trade balance gap worsened from MK135.5 billion (€247,714,808) in 2011 to Mk365.2 (€667,641,681) in 2012. Malawi's trade deficit arguably highlights the country's vulnerability to economic shocks and currency volatility. Agriculture is the backbone of Malawi's economy, accounting for 34% of Gross Domestic Product (GDP) and employing about 80% of the country population. However, agriculture productivity is noted to be developing slowly and operating below its potential due to the dependence on smallholder farming systems that are characterised by low input use, over-reliance on rain-fed agriculture, inadequate access to agricultural credit, inadequate access to output and input markets, and failures in technology development and transfer. This is further exacerbated by climate change effects such as erratic rains and droughts (GoM, 2007).

## **2.2.2 Energy Sector Background Information**

Malawi is relatively well endowed with a wide variety of energy resources but the full potential of the energy sector remains far from being realised. The economic cost of power outages in Malawi is estimated at 6.5% of GDP as compared to 5.5% of GDP in Uganda and 4% of GDP in Tanzania (Yadoo and Cruickshank, 2012) (figure 2.2). Other studies point out that the economic costs of an unreliable and inadequate power supply, as well as the costs of inappropriate pricing and high technical and non-technical losses, are estimated at 7% to 9% of Malawi's GDP hence diminishing the country's prospects for sustained growth, poverty reduction, and improved delivery of health and education services (MCC, 2011). Moreover, apart from inadequate and irregular supply of electricity diminishing GDP growth and increasing operational costs for enterprises, erratic electricity supply also compounds a social crisis whereby the discrimination in power cuts between the poor and the rich widens

the unequal access to energy and fundamental services within societies (Khennas, 2012).

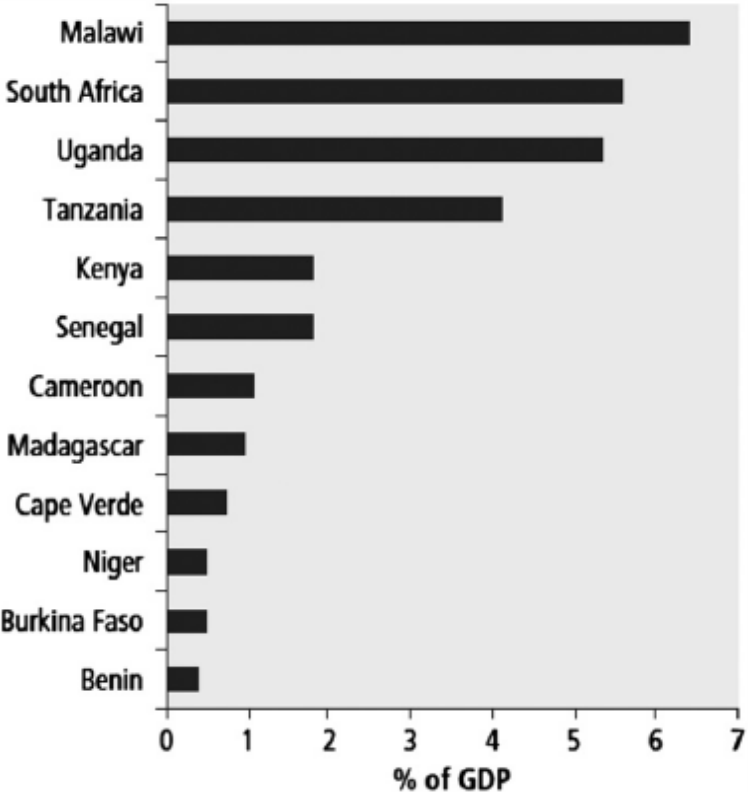


Figure 2.2 Economic impact of non-reliable energy supply  
Source: Khennas, 2012

The African Development Bank considers Malawi’s energy sector as deficient and in need of improvements which will entail substantial investments in rehabilitation of existing generation, transmission and distribution systems as well as constructing new power stations in order to eliminate capacity deficits (AfDB, 2013). Historically, various programmes and projects have been undertaken to improve the country’s energy sector but they have achieved mixed results. Such programmes include the National Sustainable and Renewable Energy Programme (NSREP: 1999), Powers Sector Reforms (1990s), Barrier Removal to Renewable Energy in Malawi (BARREN: 2002-2006), Programme for Biomass Energy Conservation (ProBEC: 2004-2010), etc. In addition to the items listed in table 2.2, the other factors that have led to the under-investment in the energy sector include a lack of competition in the sector; acute urban-rural dichotomies; lack of progress on regional interconnection; lack of commitment to tap into other energy sources; non-functioning power plants; widespread vandalism of equipment; plummeting public investment; minimal industrialisation; inefficient and monopolistic energy supply industries; high

urbanisation rates; and heavy dependence on biomass for energy (GoM, 2007; GoM, 2003a). Consequently, Malawi needs to develop innovative mechanisms and frameworks to enable her to improve her electrification rate which was at 9% against a 24% average electrification rate for the Southern African Development Community (SADC) region, hence was amongst the lowest in the region.

Enhancing the energy sector in Malawi is not only of national interest but also of regional significance as SADC member states are required to promote the regional aspiration of infrastructural developments to enhance trade and investments within the region.<sup>12</sup> Table 2.3 shows the electricity access rates in selected countries in SSA as well as the number of people in the region that are affected by energy sector inadequacies and their country’s inability to provide universal energy access. Table 2.4 further shows the electricity problems in the SADC region by highlighting that the available capacity in all but one country, Angola, falls short of their requirements hence highlighting that the majority of utilities in the Southern Africa Power Pool (SAPP) have generation capacity challenges because of a variety of reasons. Arguably, the other countries in SADC could equally benefit from utilising climate finance to improve their deployment of renewable energy.

Table 2.2 Summary of different types of under-investment

Type of under-investment	Underlying reasons	Solutions
Low aggregate investment	Low saving rates, poor financial sector, macroeconomic uncertainty	Provide favourable interest rate policies, improve property rights and promote foreign direct investment
Low investment in the energy sector	Inefficient energy regulations, higher transaction costs of energy investment	Provide higher investment incentives
Low investment in particular energy technologies	High technology-specific risk premium	Provide specialised finance

Source: Ekholm et al., 2013

<sup>12</sup> SADC is a grouping of fifteen African States with objectives related to achieving economic development; peace and security; alleviating poverty; and supporting the socially disadvantaged through Regional Integration. The 15 SADC member states are Angola, Botswana, DR Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. The SADC Energy Sector Plan (2012) is a component of the Regional Infrastructure Development Master Plan (RIDMP). The RIDMP defines the regional infrastructure requirements and conditions to facilitate the realisation of key infrastructure in the energy, water, transport, tourism, meteorology and telecommunications sectors by 2027. The development of such infrastructure would enable the SADC region to attain regional integration, economic growth and poverty eradication (SADC, 2010: pp. 26) and also enable Africa to attract more Foreign Direct Investment (FDI) (AfDB, 2009; Dupasquier and Osakwe, 2006).

Table 2.3 Electricity access and population relying on traditional biomass in SSA

Country	Population without electricity (millions)	National electrification rate (%)	Urban electrification rate (%)	Rural electrification rate (%)	Population relying on traditional use of biomass (%)	Population relying on traditional use of biomass (millions)
<i>Sub-Saharan Africa</i>	621	32	59	16	80	727
Angola*	15	30	46	6	56	12
Benin	7	28	55	6	94	9
Botswana*	1	66	75	51	37	1
Burkina Faso						
Burundi	9	10	34	7	98	10
Cameroon	10	54	88	17	75	16
Cape Verde	0	94	100	84	31	0
Central Africa Republic	4	3	5	1	97	4
Chad	12	4	16	0	93	12
Comoros	0	45	72	35	71	1
Congo	3	35	52	5	76	3
Cote D'Ivoire	15	26	42	8	79	16
Dem. Rep. of Congo*	60	9	24	1	93	61
Djibouti	0	50	61	14	14	0
Equatorial Guinea	0	66	93	48	78	1
Eritrea	4	32	86	17	63	4
Ethiopia	70	23	85	10	95	87
Gabon	1	60	64	34	21	0
Gambia	1	35	60	2	95	2
Ghana	7	72	90	52	84	21
Guinea	10	12	28	3	96	11
Guinea-Bissau	1	20	37	6	98	2
Kenya	35	20	60	7	84	36
Lesotho*	2	28	55	17	62	1
Liberia	4	2	3	0	98	4
Madagascar*	19	15	37	4	98	22
Malawi*	15	9	33	5	97	15
Mali	11	27	55	12	98	15
Mauritania	3	21	47	2	56	2
Mauritius*	0	100	100	100	0	0
Mozambique*	15	39	66	27	69	24
Namibia	2	30	50	17	55	1
Niger	15	14	62	4	94	16
Nigeria	93	45	55	35	68	115
Reunion	0	99	100	87	10	0
Rwanda	10	17	67	5	98	11
Sao Tome and Principe	0	59	70	40	71	0
Senegal	6	55	90	28	56	8
Seychelles*	0	97	97	97	0	0
Sierra Leone	6	5	11	1	98	6
Somalia	9	15	33	4	96	10
South Sudan	11	1	4	0	97	11
Sudan	24	35	63	21	72	27
Swaziland*	1	27	40	24	62	1
Tanzania*	36	24	71	7	96	46
Togo	5	27	35	21	95	6
Uganda	31	15	55	7	97	35
Zambia*	10	26	45	14	83	12
Zimbabwe*	8	40	80	14	70	10

\*SADC member state.

Source: Hancock, 2015 (with data from IEA, World Energy Outlook (2014))

Table 2.4 SAPP 2013 generation statistics

Country (Utility)	Installed Capacity	Peak Demand*	Available Capacity	
	MW	MW	MW	% Peak Demand
Angola (Empresa Nacional de Electricidade de Angola (ENE))	1,793	1,341	1,480	110
Botswana (Botswana Power Corporation (BPC))	352	604	322	53
Democratic Republic of Congo (Société nationale d'électricité (SNEL))	2,442	1,398	1,170	84
Lesotho (Lesotho Electricity Company (LEC))	72	138	72	52
Mozambique (Electricidade de Moçambique, E.P. (EDM))	233	636	204	32
Mozambique (Hidroelectrica de Cahora Bassa (HCB))	2,075	-	2,075	-
Namibia (NamPower)	393	635	360	57
South Africa (ESKOM)	44,170	42,416	41,074	97
Swaziland (Swaziland Electricity Company (SEC))	70	255	70	27
Tanzania (Tanzania Electric Supply Company Limited (TANESCO))	1,380	1,444	1,143	79
Zambia (ZESCO Limited)	1,870	2,287	1,845	81
Zimbabwe (Zimbabwe Electricity Supply Authority (ZESA))	2,045	2,267	1,600	71
All	57,182	53,833	51,702	96
Interconnected	53,722	50,636	48,792	96

\*figures include estimates of suppressed demand

Source: IRENA, 2014

### 2.2.3 Energy Policy and Climate Change

Malawi's energy supply system is made up of five components namely biomass, electricity, liquid fuels and gas, coal, and other renewables. The National Energy Policy for Malawi (2003) (GoM, 2003a) is focused on making the energy sector sufficiently robust and efficient to support Malawi's socio-economic agenda of poverty reduction, sustainable economic development, and enhanced labour productivity; catalysing the establishment of a more liberalised, private sector driven energy supply industry; and transforming the country's energy economy from one that is overly dependent on biomass to one with a high modern energy component in the energy mix. The National Energy Policy (2003) proposed the enactment of six key pieces of legislation in order to assist with the implementation of the policy objectives. The proposed six complementary pieces of legislation to enhance Malawi's energy sector were the Energy Regulation Act, Electricity Act, Rural Electrification Act, Liquid



Fuels and Gas Supply Act, Coal Supply Act, and Other Renewable Energy Sources Act. To this effect, various positive developments have occurred in the energy sector including the enactment of the Malawi Electricity Act 2004,<sup>13</sup> the enactment of the Malawi Energy Regulation Act 2004,<sup>14</sup> and the establishment of the Malawi Energy Regulatory Authority (MERA) to regulate the energy sector in Malawi in a fair, transparent, efficient and cost effective manner for the benefit of the consumers and operators. These developments have possibly assisted with the marginal decline in the use of firewood for energy use as shown in figure 2.3. However, whilst the energy policy suggested the implementation of six pieces of legislation working in a complimentary manner so as to make the energy sector effective, two pieces of legislation (i.e. Coal Supply Act and Other Renewable Energy Sources Act) have not been drafted/enacted to date. Legislation relating to the development of renewable energy sources can arguably not only improve renewable energy deployment but can also enhance climate change management issues in Malawi hence the non-enactment of this piece of legislation could have weakened both the energy sector and climate change management legislative frameworks.

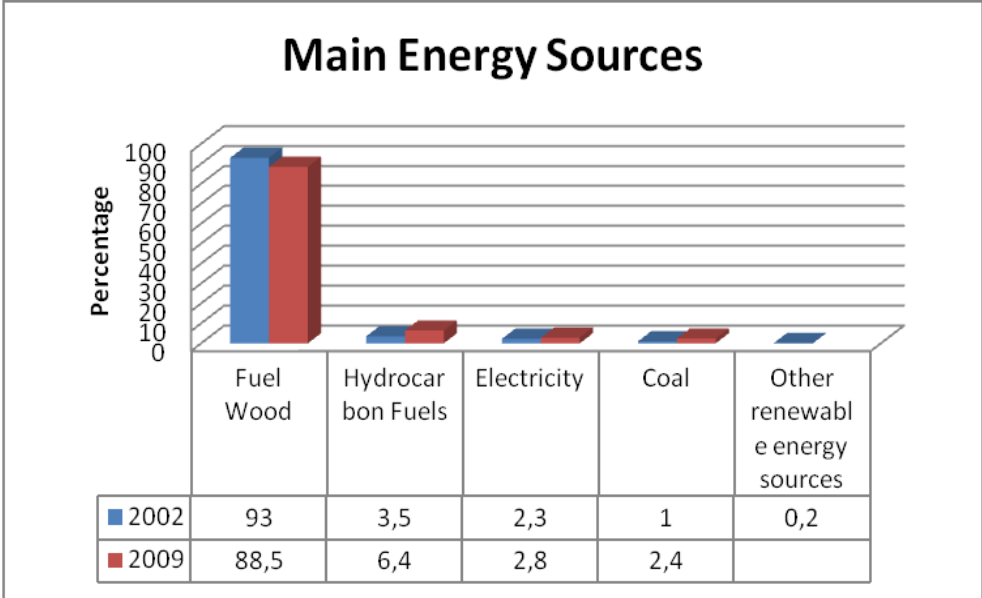


Figure 2.3 Contribution of main energy sources to Malawi's energy mix  
Source: GoM, 2010b

<sup>13</sup> An Act to make provisions for the regulation of the generation, transmission, wheeling distribution, sale, importation and exportation, use and safety of electricity and for matters connected therewith or incidental thereto (The Electricity Act 2004: Act No. 22 of 2004. Passed in Parliament on 19.03.2004.) (GoM, 2004a).

<sup>14</sup> An Act to establish an Energy Regulatory Authority to regulate the energy sector, to define the functions and powers of the Energy Regulatory Authority, to provide for licensing of energy undertakings, and for matters connected therewith and incidental thereto (Energy Regulation Act 2004: Act No. 20 of 2004. Passed in Parliament on 19.03.2004.) (GoM, 2004b).

An analysis of energy sector climate change mitigation and adaptation measures is arguably missing from the National Energy Policy. Whilst it can be argued that climate change might not have been as prominent an issue in 2003 when the National Energy Policy was being adopted, as it is today, records indicate that from as early as the 1990s research was undertaken to inventorise Malawi's GHG emissions by source and sinks where it emerged that Malawi was a net emitter of GHGs mainly because of deforestation, land clearing and agricultural practices (Smith, 2001). The National Energy Policy highlights that the Government of Malawi will promote the efficient use of energy resources with minimal adverse effects on the environment and climate change but does not elaborate on how this will be achieved. The policy is therefore weak on linking the energy use profile of Malawi and climate change mitigation and adaptation (i.e. the policy neither addresses how climate change can affect how people use energy in Malawi nor the influence of climate change impacts on people's energy use patterns, and how these two issues can affect other energy policy objectives). However, it has been reported that Malawi has drafted a Climate Change Policy which is under consultation hence it is possible that the policy will improve the identification of pertinent climate change issues to be managed and establish appropriate frameworks to enable a better coordination of climate change issues.

Malawi's National Adaptation Programme of Action (NAPA) (GoM, 2006), points out that there are eight vulnerable sectors that require urgent climate change adaptation interventions. The vulnerable sectors are (i) agriculture, (ii) water supply and quality, (iii) human health, (iv) energy, (v) fisheries, (vi) wildlife, (vii) forestry and (viii) gender equality. It can therefore be seen that climate change has both direct and indirect bearings on issues to which the energy sector policy is trying to address. Directly, climate change impacts such as increased incidences of flooding and droughts can affect electricity generation capacity especially since over 80% of Malawi's electricity is generated by hydropower. Since fuelwood accounts for over 80% of the total energy demand, the energy sector therefore also has strong links with the forestry sector. Climate change induced threats to forests in a Savanna climate like Malawi's include loss of soil fertility and increased risk of forest fires when there are increased occurrences of droughts (GoM, 2006). This scenario points out to how significant the energy sector (i.e. biomass) is to Malawi's rural society directly and indirectly and

how the energy sector and the people that depend on it can be affected by climate change.

From an urban perspective, the National Energy Policy does not address or make a strong link between the energy needs of the urban poor people with energy and climate change issues. Poverty is more pronounced in rural areas but is still prevalent in urban areas (i.e. about 17% of the population in urban areas are living in poverty compared to 57% in rural areas (GoM, 2012a)) hence the need for specific interventions to address the energy needs of the urban poor. Regardless of the rapid and widespread urbanisation occurring in Malawi, climate change (adaptation) and sustainable development policies in Malawi focus largely on rural areas hence consequently, the new environmental and demographic challenges facing cities are not addressed (Brown, 2011).

Urban societies in developing countries are dual in nature with some segments of the society having high incomes and high energy-consumption patterns that are similar to those of industrialised countries, whilst the remaining segments of society, which constitute the overwhelming majority of the population, having consumption patterns that are similar to those in rural areas or even having urban residents living in informal settlements in conditions identical to or in some cases worse than their rural poor counterparts (UN-ENERGY/Africa, 2007). From an energy policy perspective this brings to light not only the issue of how to provide modern energy infrastructure and services to the urban poor and people in informal urban settlements, and how to ensure that low income households can afford modern energy services, but also how to sustainably manage natural resources (forests, trees, etc.) in urban and peri-urban area as there is a likelihood that poor urban dwellers will need a supply of fuelwood and/or charcoal for their energy needs. In addition to this, there are also the threats of climate change on people's livelihoods outlined earlier hence all these factors suggest that there could be serious challenges in sustaining woodlots and trees in urban and peri-urban areas should the necessary precautions not be undertaken.

#### **2.2.4 Biomass Misconceptions**

Biomass (i.e. fuelwood, charcoal, agricultural residues, etc.) is without a doubt a major source of energy for the majority of Malawians. Over 80% of Malawi's population lives in rural areas and a majority of them are subsistence farmers. The

electrification rate of Malawi is 9% (in urban areas 33% of households have electricity in their households, whilst in rural areas only 2% of households have electricity). Consequently, 97% of all households use biomass for cooking (GoM, 2012a), and this has adverse consequences on the country's forest resources. Despite Malawi having relevant legislation to ensure the protection of natural resources from over-exploitation (e.g. the Environmental Management Act of 1996, the Forestry Policy of 1996, etc.), the degradation of natural resources continues to be a major threat to the social and economic development of Malawi. Malawi's high population density and the dependence of Malawians on agricultural production have led to alarming rates of environmental degradation leading to deforestation; decreasing soil fertility and increasing erosion; water depletion; loss of biodiversity; and increasing pollution (GoM, 2010a). These poor environmental conditions are also exacerbated by poverty (ibid). Subsequently, in order to subsist, a high proportion of the population relies on the exploitation of natural resources such as firewood, and the over-reliance on fuelwood for energy is another major cause of deforestation. There is therefore a strong likelihood that natural resources will continue to be a dominant energy source as well as a source of income for other households even with increasing electricity access rates hence various interventions need to be put in place to appropriately address this. Moreover, other energy experts have highlighted that households in some African countries do not switch completely from biomass to other energy sources such as Liquefied Petroleum Gas (LPG) and electricity but rather increase the number of fuels used in their households as their total expenditures and incomes rise, even in urban areas (figure 2.4) (Brew-Hammond and Kemausuor, 2009). This therefore implies that increasing electricity generation capacity might not be a complete solution to decreasing biomass use and deforestation.

The relationship between energy use, high population growth and the low incomes of a majority of African/Malawian households also provides an avenue that needs further analysis. Population growth and persistent poverty will mean that the use of biomass energy will continue to rise (both in user numbers and quantity consumed) for the foreseeable future (Owen et al., 2013). It is estimated that even with Africa's national targets to increase the contribution of electricity to national energy supply from 29% to 47% between 2008 and 2030, the number of people in SSA without electricity is expected to rise by 110 million during the same period (IEA, 2010). The rise in the number of people excluded from accessing electricity is arguably a

consequence of population growth and ineffective policies that do not promote investment in the energy sectors.

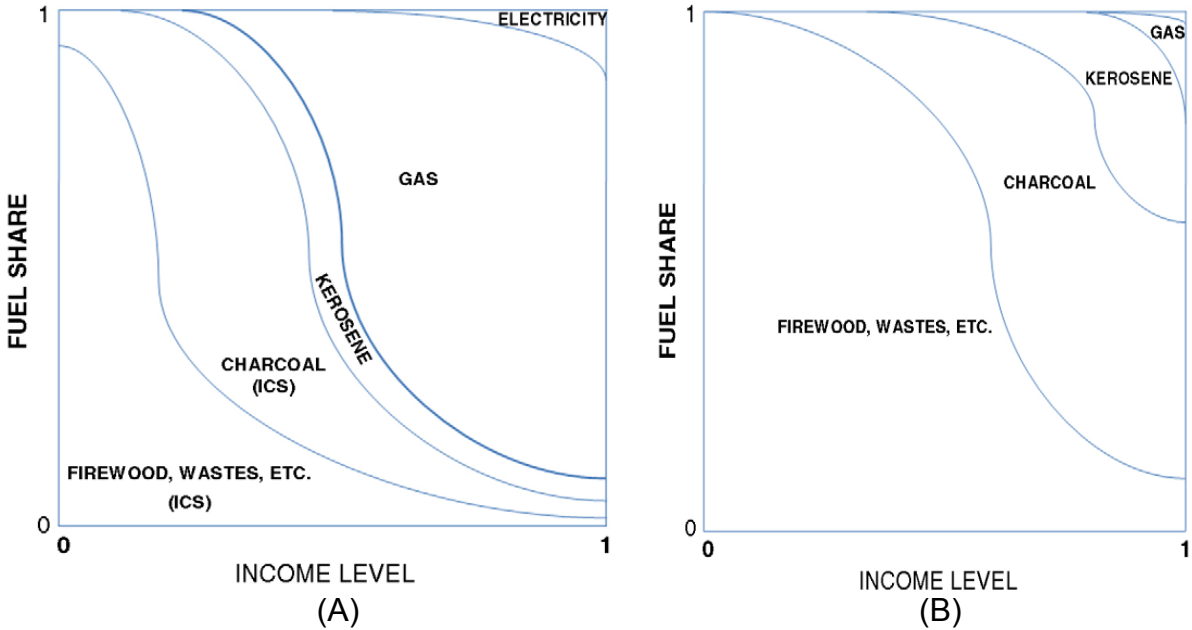


Figure 2.4 Likely evolution of cooking fuel use in SSA households (A is the likely scenario before a rise in household income levels and B is the likely scenario after a rise in household income levels.)

Source: Brew-Hammond and Kemausuor, 2009

Most energy policies in SSA (Malawi included) portray biomass as a retrogressive source of energy that degrades the environment and engenders poverty. Such a misconception leads to missed opportunities since biomass has a significant potential to support urban-rural revenue flow, strengthen domestic energy security and drive green economic development (Owen et al., 2013) and its production and trading could contribute to the economy by providing incomes for rural areas, tax revenue and employment (Cuvilas et al., 2012). Recent studies also point out that the predicted household transitions from traditional biomass fuels to modern fuels (e.g. electricity, kerosene, and LPG) as incomes and urbanisation increase will not be feasible in most African countries (figure 2.4). Apart from income other factors such as energy preferences, convenience and insurance against unreliable supply can prevent complete energy transitions and produce energy mixes instead as such the consumption of charcoal in Africa is projected to double and firewood to increase by 24% from 2000 to 2030 (Zulu, 2010). As it stands, whilst Malawi’s National Energy Policy (2003) envisages a fall in the contribution of biomass energy from 93% of total consumption in 2000 to 50% by 2020, more recent evaluations show that biomass

will still account for 82% of total energy consumption by that time if current trends continue, and demand for commercial wood fuels will have risen by 45% on 2008 levels (EUEI-PDF, 2009: pp. 12). This scenario therefore points out that Malawi needs to urgently review its energy policy and put in place frameworks to ensure that the energy policy is reviewed at least every five to ten year as a failure to do this delays the mobilisation of resources and technologies to rectify missed targets.

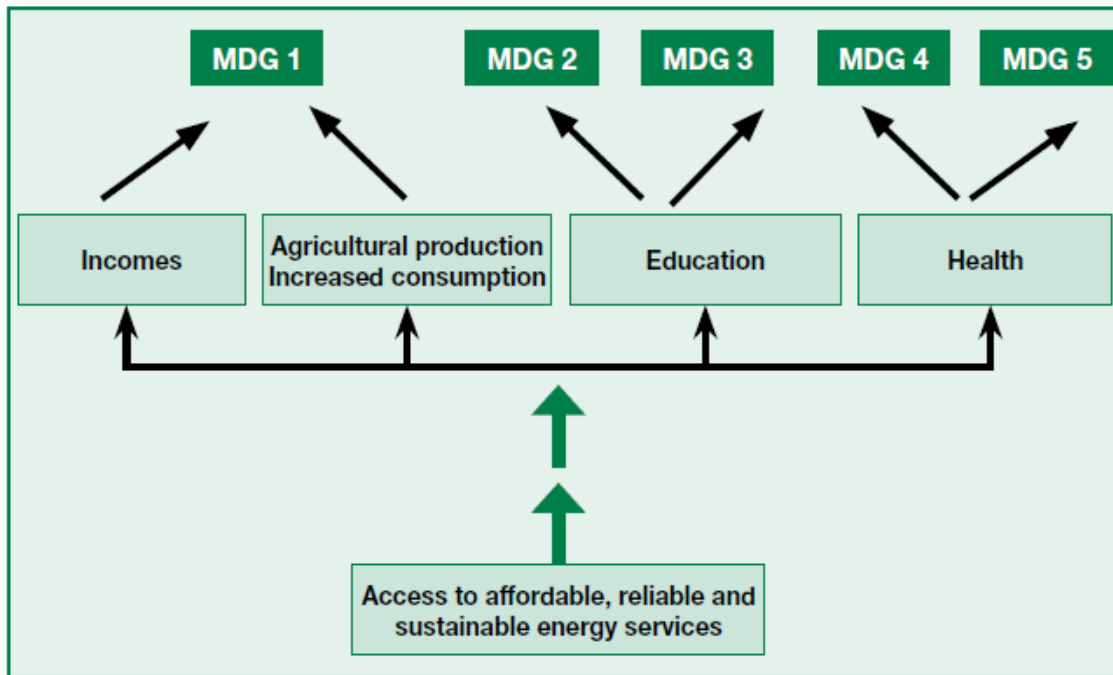
As stated earlier, even with increasing electrification rates in developing countries, charcoal and firewood will continue to be used for cooking and lighting at household level creating an energy mix of electricity, charcoal, firewood, gas and kerosene (Brew-Hammond and Kemausuor, 2009). In Malawi, it has been reported that even in cases where energy in the form of hydro or solar electricity is made available, its high cost is a deterrent to most households especially in rural areas and as such even though 21% of households have electricity within 100 meters from their dwellings, only 7% of those households use electricity (GoM, 2010b). This can therefore support the argument put forward by Zulu (2010) that more efforts and investments in Malawi should be put in making the biomass sector, especially charcoal production more efficient to reduce deforestation and also improve its supply chain to make it a viable source of income generating activity for rural households rather than maintaining the partial bans on the trade of charcoal which are unrealistic and untenable as there is an increasing demand and production of illegal charcoal.

### **2.2.5 Biomass, Renewable Energy and the Millennium Development Goals (MDGs)**

When biomass is converted into modern bioenergy (e.g. biofuels and biogas), it not only provides energy but it also develops a bioenergy sub-sector that has potential to reduce poverty by attracting Foreign Direct Investment (FDI), increasing income generating activities, and promoting technology flows from developed countries (Hofmann and Khatun, 2013). Bioenergy projects can therefore contribute to the eradication of extreme poverty and achievement of the Millennium Development Goals (MDGs). In order for the bioenergy sector to unlock its potential, current institutional/policy, technical, economic, financial, information, and capacity hurdles will need to be addressed (Amigun et al., 2008).

Bioenergy can be derived from various feed stocks (e.g. sugarcane, jatropha, organic matter, etc.) hence it is feasible to be an income generating opportunity for many rural populations as they can utilise feed stocks that are in keeping with their normal practices and livelihoods. Moreover, on a commercial scale, Malawi has an established ethanol industry which complements the petroleum sub-sector by providing ethanol for blending and hence this industry can be scaled up or can provide a basis for the development of other similar investments (e.g. development of jatropha biofuel). When all sustainability issues (land tenure and use, food security, water availability, etc.) are taken into consideration regarding expanding bioenergy production, Malawi can also focus on developing an export market for bioenergy as future projections indicate that there will be a growing global market for bioenergy because of fluctuations in crude oil prices, local and global environmental impacts of fossil fuels, and concerns about climate change. These factors are also driving bioenergy focused research and technological advances (Amigun et al., 2011) which could be of benefit to Malawi's research and education institutions.

The MDGs are particularly important to Malawi and the developing world at large as they help shape strategic outlines for eradicating poverty through setting specific, measurable targets to be strived for. Although energy is not explicitly part of the MDGs, analysts agree that none of the eight MDGs can be met without major improvement in the quality and quantity of energy services supplied to the rural poor in developing countries. Figure 2.5 illustrates the relationship between energy and the achievement of the MDGs. The bioenergy sector has therefore got two crucial roles with regards to the achievement of the MDGs. On one hand the bioenergy sector can provide employment and livelihood opportunities for various urban and rural communities which can help reduce poverty and improve their access/affordability to education and health. On the other hand the bioenergy sector can also provide sustainable energy (e.g. biofuel from jatropha) which can be utilised to generate energy for other industries that have potential to create employment.



Note: MDG 1- Eradicate extreme poverty & hunger, MDG 2- Achieve universal primary education, MDG 3- Promote gender equality and empower women, MDG 4- Reduce child mortality and MDG 5- Improve maternal health

Figure 2.5 Relationship between energy and the achievement of the MDGs

Source: UNECA, 2006

### 2.2.6 Rural Electrification in Malawi

85% of Malawi's population live in rural areas. However, it is only less than 6% of the households in rural areas that have electricity. Improving the country's rural electrification rates is therefore an important socio-economic and environmental aspect. Some of the issues identified as barriers to rural electrification and consequently can lead to low rates of rural electrification include the scattered low-income consumers, high upfront equipment costs, high cost of extending electricity grids, institutional weaknesses and the limited availability of financing for rural electrification programmes. Additionally, where rural electrification is undertaken using RETs in developing countries the impediments also include low electricity demand, low consumption and over dependence on donors for financing (Urmee et al., 2009). Other researchers also point out that grid connection in rural areas is sometimes subsidised (i.e. depends on the availability of funding for subsidies) and that electrification of rural areas is often the result of politics rather than practical considerations (Hancock, 2015; Haanyika, 2006; Urmee et al., 2009). However, the correct approach for projects aiming to assist with renewable energy diffusion in rural communities should be to focus on structural education and extension programmes that could lead to the adoption of innovative technologies in rural communities,



sustainable investigation of renewable energy options for meeting the rural energy demand in accordance with the availability of RESs, and establishing a concrete financing system as an integral prerequisite for successful project uptake (Mohammed et al., 2013a).

Through the Malawi Rural Electrification Programme (MAREP), the Government of Malawi and Electricity Supply Commission of Malawi Ltd (ESCOM)<sup>15</sup> have an objective to increase access to electricity to people in peri-urban and rural areas as part of the Government's effort to reduce poverty, transform rural economies, improve productivity, and improve the quality of social services. MAREP now in its Phase VII started in the 1980s. Due to Malawi's high rural population, increasing electricity access in rural areas can substantially facilitate the attainment of the MDGs and reduce rural-urban inequities by improving service delivery in education, health, etc. Various developments have occurred in the energy sector to ensure that rural electrification remains a Government priority regardless of the orientation of the government in power. Such developments include the enactment of the Rural Electrification Act.<sup>16,17</sup> This legislation therefore provides a good framework for supporting the programme and could arguably be seen as instrumental in sustaining the programme through locally generated funds.

Notwithstanding the fact that rural electrification can be an expensive exercise for both governments and utilities, consideration also has to be made as to how

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<sup>15</sup> The Electricity Supply Commission of Malawi Ltd (ESCOM) is Malawi's main (sole) electricity generation, transmission and distribution company. ESCOM was originally planned and envisaged to be privatised by the reforms of the 1990s (and National Energy Policy 2003) in order to de-monopolise the energy and electricity sector. However, that never took effect hence the Malawi Government still owns the institution, and the institution still monopolises the energy and electricity sector. This highlights the failures of past reforms in the energy sector, and the poor policy implementation capacity of the country.

<sup>16</sup> An Act to make provision for the promotion, funding, management and regulation of rural electrification; and for matters connected therewith and incidental thereto (The Rural Electrification Act: Act No. 21 of 2004. Passed in Parliament on 19.03.2004) (GoM, 2004c).

<sup>17</sup> The Rural Electrification Act also makes provisions for utilising renewable energy sources for Rural Electrification projects (i.e. Section 13: The proceeds of the Fund shall be used to finance ... (b) the capital cost of solar home system equipment to be acquired for public institutions; (d) provision of credit guarantees for the capital cost of solar home system equipment other than those to be acquired by Concessionaire). In some instances renewable energy technologies have therefore been utilised for rural electrification. However, the Rural Electrification Act does not cover vital renewable energy issues such as implementation, aspects of certain technologies, and policy and institutional issues as suggested by Schillebeeckx et al. (2012) and as such has not made a significant impact in improving the deployment of renewable energy technologies since extending the grid is the main rural electrification strategy for Malawi.

affordable the electricity and energy services can be to the beneficiaries. On one hand it has been suggested that increasing the affordability of energy (e.g. by providing electricity subsidies to keep energy prices low) can make energy affordable even to poorer households but can in-fact reduce its availability, as the provider may find it unprofitable to extend coverage to areas where the poor reside (Ranjit and O'Sullivan, 2002). Also it has been observed that households having their dwellings in close proximity to where electricity is accessible is not in itself an indicator or incentive to have electricity within the dwelling (GoM, 2012a). The purchasing power of most people in rural areas is low as such most households are unable to pay the up-front connection cost and energy usage costs even where modern energy and electricity is considered to be available or if the household is within the economic connection and supply range of the energy network or supplier. Other models of rural electrification that use decentralised generation technologies or distributed generation (e.g. internal combustion engine-generators, wind turbines, fuel cells, small and micro sized hydro schemes and photovoltaics) do not only have to face the problem of affordability and the beneficiaries' ability to pay the upfront costs, but the developers and service providers also have to deal with financial uncertainty due to macro-economic conditions out of their control and issues such as inflation and unstable exchange rates. Inflation and unstable exchange rates are common to many African countries and this proves to be quite damaging for businesses in the energy sector (Haanyika, 2006). This therefore has a negative impact on the viability, sustainability and investment costs for renewable energy projects.

### **2.2.7 Private Sector Participation in the Energy Sector**

Private sector participation in Malawi's electricity sub-sector is weak and lagging. Reforms and legislation (e.g. Energy Regulation Act (2004), Electricity Act (2004), etc.) were developed with the aim of providing an attractive environment for private sector investments in the electricity sub-sector and to promote the proliferation of Independent Power Producers (IPPs). The mere fact that the country has electricity supply deficits could be a sign that the energy sector is not yet conducive for active private sector participation.

According to Lee and Zhong (2014), some renewable energy policies and fiscal incentives do not necessarily align with the business interests of investors and developers, and this leads to a lack of motivation for investors to venture into the

renewable energy business or become IPPs. This consequently leaves governments to continue taking an active role in the development of the energy sector hence further increasing government expenditures and exacerbating under-investment in the energy sector. An understanding of a country's business environment is therefore arguably imperative in order to ascertain the level to which local and foreign businesses can become IPPs. The Ease of Doing Business Index (2014) (World Bank, 2014b) shows countries with a high ease of doing business ranking as an indicator that the regulatory environment in that country is more conducive to the starting and operation of a local business. The Ease of Doing Business Index (2014) which uses indicators such as starting a business, getting electricity, protecting investors, trading across borders and enforcing contracts points out that Malawi has a rank of 171 out of 189 economies. This translates into a rank of 34 out of 47 countries in SSA. The other pertinent ranks for the neighbouring countries are Zambia 83/189 (7/47), Tanzania 145/189 (19/47) and Mozambique 139/189 (15/47) (World Bank, 2014b; Doing Business, 2014a). When considering the ease of doing business in a country, access to electricity is an independent factor and significant determinant of how favourable a country is to various investments and FDI. Malawi's energy sector inadequacies therefore contribute to the country having a poor ranking as an opportune destination for investors and investments which can contribute to job creation and reducing poverty. As shown in table 2.5 and table 2.6 below, there is a weak correlation between the ease of doing business and getting electricity<sup>18,19</sup> in that the SADC countries that have easier processes to getting electricity have also got a good ranking on the ease of doing business (i.e. the two tables illustrate that of the five bottom ranked countries in relation to getting access to electricity, three countries (Malawi, Angola and Madagascar) are also bottom ranked in terms of ease of doing business).

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<sup>18</sup> Getting electricity considers procedures required for a business to obtain a permanent electricity connection and supply for a standardised warehouse. These procedures include applications and contracts with electricity utilities, all necessary inspections and clearances from the utility and other agencies and the external and final connection works.

<sup>19</sup> Malawi has a global rank of 183 out of 189 countries in terms of getting electricity (six procedures or processes over 222 days at a cost of US\$7,468.50). Mauritius, the highest ranked country in SSA has a global rank of 48 (four procedures or processes over 84 days at a cost of US\$281.10). Madagascar the lowest ranked country in SSA has a global rank of 187 (six procedures or processes over 450 days at a cost of US\$9,050.20). The average for SSA is five procedures or processes over 141 days at a cost of US\$4,819.90) (Doing Business, 2014b).

Table 2.5 Sub-Saharan Africa (SSA) ease of doing business and getting electricity ranking (2013) (SADC countries)

Country	SSA Ease of Doing Business Rank	Getting Electricity Rank	Starting a Business Rank	Electrification Rate (%)
Mauritius	1	1	2	100
South Africa	3	27	7	85
Botswana	4	13	12	66
Seychelles	6	25	16	97
Zambia	7	29	6	26
Namibia	8	4	23	30
Swaziland	10	34	39	27
Lesotho	14	20	10	28
Mozambique	15	37	11	39
Tanzania	19	12	17	24
Madagascar	21	46	4	15
Zimbabwe	33	31	31	40
Malawi	34	43	30	9
Angola	40	36	42	30
DR Congo	42	23	45	9

Source: Author's compilation with data from Hancock, 2015 and Doing Business, 2014a

Table 2.6 Sub-Saharan Africa (SSA) getting electricity and ease of doing business ranking (2013) (SADC countries)

Country	Getting Electricity (SSA Rank)	SSA Ease of Doing Business Rank	Starting a Business Rank	Electrification Rate (%)
Mauritius	1	1	2	100
Namibia	4	8	23	30
Tanzania	12	19	17	24
Botswana	13	4	12	66
Lesotho	20	14	10	28
DR Congo	23	42	45	9
Seychelles	25	6	16	97
South Africa	27	3	7	85
Zambia	29	7	6	26
Zimbabwe	31	33	31	40
Swaziland	34	10	39	27
Angola	36	40	42	30
Mozambique	37	15	11	39
Malawi	43	34	30	9
Madagascar	46	21	4	15

Source: Author's compilation with data from Hancock, 2015 and Doing Business, 2014a

Detailed analyses of aspects that need addressing to improve the attractiveness of the electricity sub-sector for private sector participation are beyond the scope of this chapter as they are more related to macro-economic and micro-economic policies and structures including proximity to large markets, the quality of infrastructure services (roads, telecommunications, etc.), the security of property from theft and

looting, the transparency of government procurement, macroeconomic conditions, the underlying strength of institutions (World Bank, 2013), inadequacy of policies, strength of institutional frameworks, and availability of financing (Haanyika, 2006).

However, other studies suggest that the right strategies to attract private sector participation in the energy sector should mainly concentrate on creating an environment where there is the availability of finance, adoption by the community, government support, environmental benefits (Barry et al., 2011) as well as good infrastructure, (skilled) labour, and access to services and goods (Schut et al. 2010). Notwithstanding all these issues, Chinese firms' growing interests in investing in Africa as well as Malawi are therefore timely and opportune. Chinese firms have been investing in various sectors in Africa including the construction and energy sectors. In Malawi, some notable developments that have been done by the Chinese Government include the construction of a five star hotel, construction of various roads, the construction of a stadium and the construction of the Parliament Building in Malawi's Capital City. Arguably, the activities of the Chinese Government in Malawi are contributing to the infrastructural development of the country which could make the country more favourable for investment from other stakeholders. There is also an assertion that with the growth in technology in China, prices of RETs will progressively decrease hence making RETs more affordable globally (Tan, 2013).<sup>20</sup> This follows that, there is a clear correlation between increasing markets and decreasing module prices (i.e. the generation costs for solar PV are projected to decreased by more than 50% between 2010 and 2020, and a doubling of the cumulative installed photovoltaic capacity has led to a 22% price reduction for modules hence further significant price reductions can be expected in the future (Jacobs and Sovacool, 2012) (figure 2.6)). Consequently, solar PV module prices have fallen more than 75% between 2009 and 2016, and residential solar PV systems are 65% cheaper in 2016 than in 2008 (IRENA, 2016: pp. 20). A fall in the cost of PV module prices is not only beneficial in terms of reducing the development costs for decentralised renewable energy systems and developing solar parks, but its

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<sup>20</sup> In Chirambo (2014), it was argued that even though historically Africa has failed to utilise its abundant energy potential to create viable energy sectors, China's current growing interests in Africa's resource and infrastructure industries offers strong possibilities that Africa's energy sectors, infrastructure, and human and institutional capacity building can grow and develop more rapidly than historical trends provided that African countries develop right institutions to attract Chinese investments and properly manage local energy resources and capital.

greatest impact could be in reducing the cost of portable or modular solar panels (i.e. solar lighting systems, solar LED lamps, solar chargers, solar irrigation systems, etc.) and off-grid pay as you go solar systems which are more affordable and practical for low income rural households (figure 2.7 and figure 2.8). For Malawi to fully benefit from both these opportunities (i.e. global reductions in costs for RETs and Chinese investment interests in Africa) in order to enhance the country’s renewable energy sector as well as growth in other sectors, the country needs to develop a clear and understandable regulatory and legal environment which can also improve relations with existing foreign investors and offer them incentives to assist in marketing domestic investment opportunities to other potential foreign investors hence attracting more investment flows to Malawi and improving the prospects for sustained growth and development (Dupasquier and Osakwe, 2006).

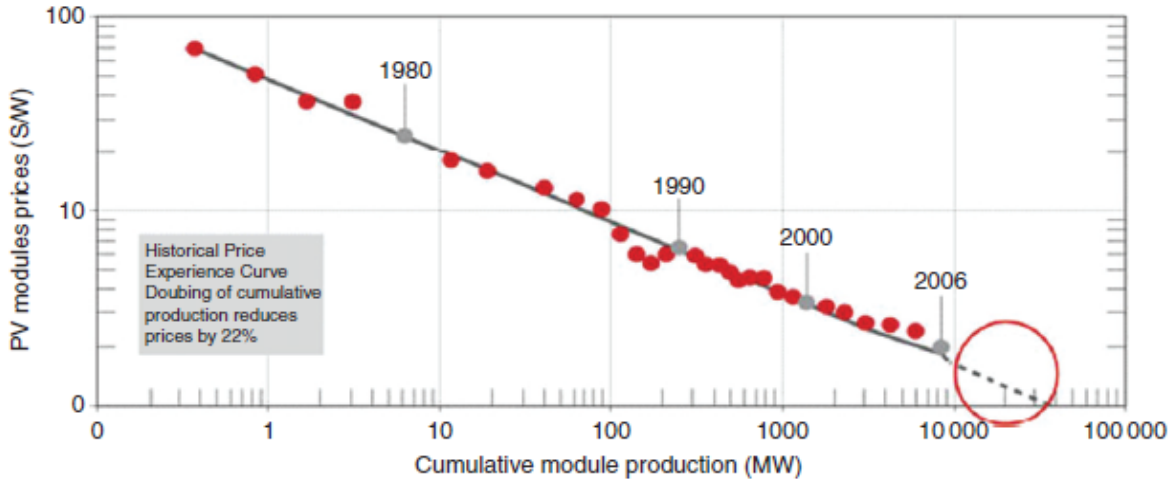


Figure 2.6 Decreasing photovoltaic module prices  
Source: Jacobs and Sovacool, 2012



Figure 2.7 Use of portable solar technologies for lighting and mobile phone charging  
Source: Author’s collection and Azuri Technologies, 2015



Figure 2.8 Solar Pay As You Go Systems in use in Africa  
Source: Azuri Technologies, 2015

### 2.3 Chapter Conclusion

Laws and policies can provide incentives to encourage investments into the renewable energy sector by simplifying regulatory requirements; and providing FITs, renewable energy targets, tax credits and grants. However, the presence energy laws and policies, natural energy sources and suitable (renewable energy) technologies are not sufficient to promote the development and use of those technologies if underlying economic forces prevent them from being adopted (Tietenberg and Lewis, 2010). Malawi has a very high poverty level. 61.6% of the population of Malawi lives below the US\$1.25 (PPP) per day benchmark in comparison to 48.4% for SSA, and 68.9% of the urban population live in slums in comparison to 61.7% for SSA (UNSD, 2015; Appendix 1). A close look at the socio-economic profile of Malawi shows that the country is highly vulnerable to external shocks, including unpredictable and unreliable aid flows; adverse weather conditions and terms of trade shocks; and weak implementation capacity or lack of capacity to steer reforms within and across sectors (IDA/IMF, 2012). Malawi's aid per capita at US\$68.6 is much higher than other countries in Africa (US\$42.1) or Southern Africa (US\$44.5), making the country vulnerable to fluctuations in donor inflows (AfDB, 2013). Maintaining good relations with its various donors is therefore an aspect that can enable Malawi to improve access of electricity to its people since most of the country's inhabitants live in rural areas which could be uneconomic to reach under normal business models or without subsidies, and foreign aid helps in cushioning the country from economic shocks.

The link between climate change, the energy sector and the energy profile of Malawi was elaborated in section 2.2.3. It was reported that Malawi was in the process of drafting a climate change policy to assist with the effective coordination, institutional harmonisation, and implementation of climate change management since currently climate change issues are fragmented in sectoral policies, and the policy statements in most of the sectoral policies are very general hence do not provide for specific strategies or measures on climate change management (CEPA, 2012). The climate change policy can therefore be expected to have provisions for enhancing the deployment of renewable energy in Malawi since the use of renewable energy mitigates the emission of GHGs. A problem that is endemic in Africa as well as the Malawi context is that there is need for more effort to be given to policy implementation rather than spending more time on policy formulation since the policies that are developed are eventually not enforced (Otieno and Awange, 2006). An evaluation of the factors that are undermining Malawi's energy sector regulatory reforms that have been proposed show that not all the pieces of legislation that were supposed to complement the national energy policy (including the proposed Renewable Energy Act) were not implemented. Within such a framework a great threat to Malawi's renewable energy development could be the country's failure to implement all the things that will be in the climate change policy.



## **Chapter 3 Climate Finance and Climate Risk Management in Malawi**

### **3.1 Introduction to Chapter Three**

This chapter provides an overview of the implementation of climate finance projects in Malawi, and how climate change issues are perceived and viewed in Malawi in order to provide a better understanding of how climate finance activities can enhance the promotion of RES and other climate change management related activities. It begins with an analysis of global issues that shape how climate finance modalities are structured and the roles and responsibilities of various countries in the global climate finance architecture. This is then followed by an assessment of how climate change issues are managed in Malawi by looking at the strengths and weaknesses of the institutions managing climate change and climate finance related activities, and the strategies and policies that have been implemented in Malawi for climate change mitigation and adaptation. The chapter ends by highlighting how a lack of a climate change policy in the country has impacted the implementation of various climate change programmes due to problems in coordinating programmes and activities that run across different sectors and ministries. This chapter also highlights how economic crises led to the non-prioritisation of environmental management strategies hence highlighting how policy implementation can be impeded by unforeseeable changes in circumstances.

### **3.2 The Role of Climate Finance in Promoting Climate Resilient Development**

Climate finance refers to financing channelled by national, regional and international entities for climate change mitigation and adaptation projects and programmes. They include climate specific support mechanisms and financial aid for mitigation and adaptation activities to spur and enable the transition towards low-carbon, climate-resilient growth and development through capacity building, Research & Development, and economic development (Buchner et al., 2011: pp. 1). Other commentators consider climate finance to be a catalyst to leverage private and public resources, open new economic opportunities, promote technology deployment and transform development pathways in order to improve resilience to the social, economic and political impacts of climate change which are directly affecting economic growth and development (AfDB, 2014). Climate finance therefore has a dual role to improve climate change resilience and promote socio-economic growth without causing significant harm to the environment.

According to the United Nations Development Programme (UNDP) various forms of climate finance mechanisms are available in order to facilitate climate change mitigation, adaptation, capacity building and technology transfer. Examples of climate finance mechanisms include carbon finance (emission reduction based payments), co-financing, debt, end user payments, equity, grants, interest rate subsidy, lease finance, loans, loan guarantees, Overseas Development Assistance, payment for eco-system services, risk management, structured finance, technical assistance, etc. (UNDP, 2015). In this study, climate finance is broadly used to describe carbon finance climate financing mechanisms. This follows that carbon finance based climate finance modalities are market, price and economic variables based tools that were specifically developed in response to climate change, and are promoted by the United Nations Framework Convention on Climate Change (UNFCCC) through the CDM.

Policies and laws have a significant influence on improving the potential of a country to attract investments and projects in its renewable energy sector through climate finance. Factors that influence CDM and climate finance investment flows in various countries include the existence of CDM/climate finance capacity building initiatives, existence of institutions for the development of special technologies/sectors (i.e. cooking stoves), presence of support activities in the financing sector, country emissions reduction potential, and country general investment climate (Amatayakul and Berndes, 2012; Burian et al., 2011). Figure 3.1 also shows that CDM institutions and economic performance/investment climate could be crucial in determining the investment risk and attractiveness of a country for CDM/climate finance project implementation. Arguably, the factors that can undermine the implementation of climate finance projects in Malawi could be a consequence of the country's policies and laws, or institutions or a combination of both. Consequently, it is imperative to identify the particular laws, policies and institutions that can potentially improve the deployment of climate financed renewable energy projects in the country.

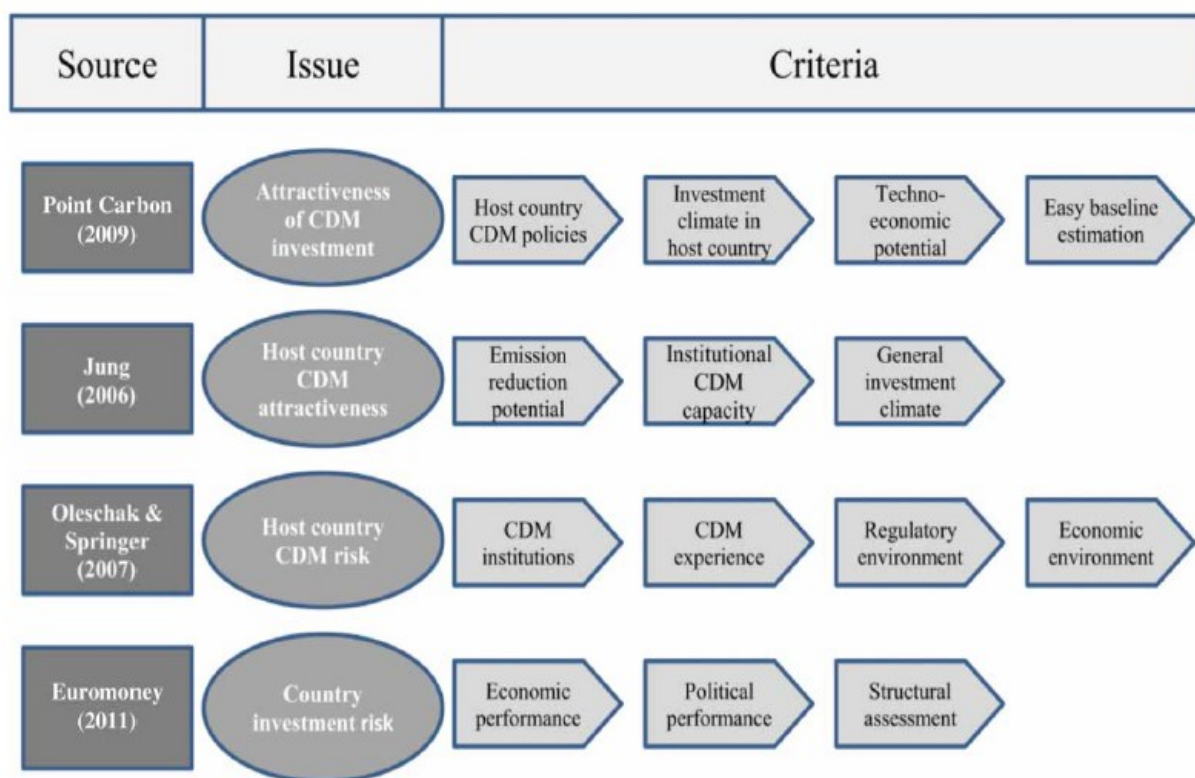


Figure 3.1 Criteria used in studies on the host country's attractiveness and investment risk

Source: Mohammadi et al., 2013

### 3.3 Malawi's Climate Change Regulatory and Institutional Framework

Malawi does not have an overarching climate change policy but various national and sector specific policies addressing climate change issues have been developed in Malawi. Some of these policies include the National Adaptation Programmes of Action (NAPA) (2006), Malawi Growth and Development Strategy II (2011-2016), and the National Environmental Policy (2004). Additionally, Malawi's National Climate Change Investment Plan (NCCIP) shows Malawi's climate change priority areas in relation to adaptation; mitigation; climate change research, technology development and transfer; and capacity building. In October 2015, Malawi submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC showing the activities that the country is committed to undertaking to develop a low-carbon, climate-resilient future in keeping with the other signatories of the UNFCCC.

### **3.3.1 National Adaptation Programmes of Action (NAPA)**

It can be argued that many of the LDC UNFCCC Parties do not have the capacity to prepare and submit national communications in the foreseeable future, or to convey their urgent and immediate needs in respect of their vulnerability and adaptation to the adverse effects of climate change (UNFCCC, 2002). Consequently, Decision 28/CP.7 (Decision 28 of the UNFCCC Conference of Parties 7 held in Marrakech in 2001) established a framework for LDCs to develop National Adaptation Programmes of Action (NAPAs) as a means of identifying and communicating programmes that LDCs could implement to address their urgent and immediate climate change adaptation needs and concerns (UNFCCC, 2002: pp. 7). NAPAs are therefore strategies principally developed by LDCs<sup>21</sup> to identify and prioritise critically important adaptation activities for which further delay might increase vulnerability or lead to higher adaptation costs over the long term (Stringer et al., 2009).

Just like Malawi, other SADC countries such as Angola, Lesotho, Mozambique, Tanzania and Zambia have also developed NAPAs to assist with identifying and implementing projects that can improve their resilience to climate change. As highlighted in Chapter 2.2.3, Malawi's NAPA (GOM, 2006), highlights that climate change could have detrimental impacts on agriculture, water, human health, energy, fisheries, wildlife, forestry and gender equality. It can therefore be seen that climate change has both direct and indirect bearings on issues to which the Malawi National Energy Policy (2003) is trying to address. However, the NAPA can be said to have helped Malawi to identify key areas that are vulnerable to climate change and the interventions<sup>22</sup> needed to reduce vulnerability and increase resilience but has not been successful in providing adequate mainstreaming of climate change issues in government policies and programmes (GoM, 2011b). Climate policies that are integrated into broader development policies have been shown to have fewer barriers

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<sup>21</sup> LDCs are countries that are generally characterised by low income, weaknesses in human resources, and economic vulnerability (UNDESA, 2014) hence are arguably more vulnerable to climate change because of their poverty levels and lack of relevant capacity to respond effectively to climate change impacts.

<sup>22</sup> The NAPA identified five urgent activities that need to be undertaken in Malawi namely improving community resilience to climate change through the development of sustainable rural livelihoods; restoring forest in Upper, Middle and Lower Shire Valleys catchments to reduce siltation and the associated water flow problems; improving agricultural production under erratic rains and changing climatic conditions; improving Malawi's preparedness to cope with droughts and floods; and improving climate monitoring to enhance Malawi's early warning capability and decision making and sustainable utilisation of Lake Malawi and lakeshore areas resources (CEPA, 2012; GoM, 2006).

and are easier to implement (Hyder, 2008) and as such the lack of success in the mainstreaming of climate change issues into other sectors can be a contributing factor to the poverty and environmental degradation that Malawi continues to experience. This is particularly critical since poverty remains one of the most important social challenges in Malawi with gender inequalities, environmental degradation, food insecurity, and climate change contributing to and exacerbating poverty in the country (ICEIDA, 2012).

### **3.3.2 Malawi Growth and Development Strategy (MGDS) II (2011-2016)**

The objective of the Malawi Growth and Development Strategy II (MGDS II) is to promote wealth creation and reduction of poverty through sustainable economic growth and infrastructure development. The MGDS II focuses on six thematic areas namely: (i) Sustainable Economic Growth; (ii) Social Development; (iii) Social Support and Disaster Risk Management; (iv) Infrastructure Development; (v) Governance; and (vi) Gender and Capacity Development. These themes are further categorised into nine key priority areas namely: (i) Agriculture and Food Security; (ii) Energy, Industrial Development, Mining and Tourism; (iii) Transport Infrastructure and Nsanje World Inland Port; (iv) Education Science and Technology; (v) Public Health, Sanitation, Malaria and HIV and AIDS Management; (vi) Integrated Rural Development; (vii) Green Belt Irrigation and Water Development; (viii) Child Development, Youth Development and Empowerment; and (ix) Climate Change, Natural Resources and Environmental Management (GoM, 2011b).

Climate Change, Natural Resources and Environmental Management are a priority area in the MGDS II and hence are a vital component to Malawi's aspirations to achieve sustainable development (figure 3.2). With reference to climate change, the goal is to enhance resilience to climate change risks and impacts by implementing strategies to assist with improved climate change mitigation and adaptation measures. Climate change impacts such as increased climate variations (prolonged dry spells, droughts, intense rainfall, floods and temperature variability), have negatively affected the performance of sectors such as agriculture, natural resources, forestry, water and irrigation, energy, and infrastructure, and as such the policy document duly recognises that climate change can hinder the development of the other priority areas consequently compromising the success of the MGDS II. It is

therefore crucial for the country to mainstream climate change mitigation and adaptation measures in all sectors for improved resilience and sustainable development.

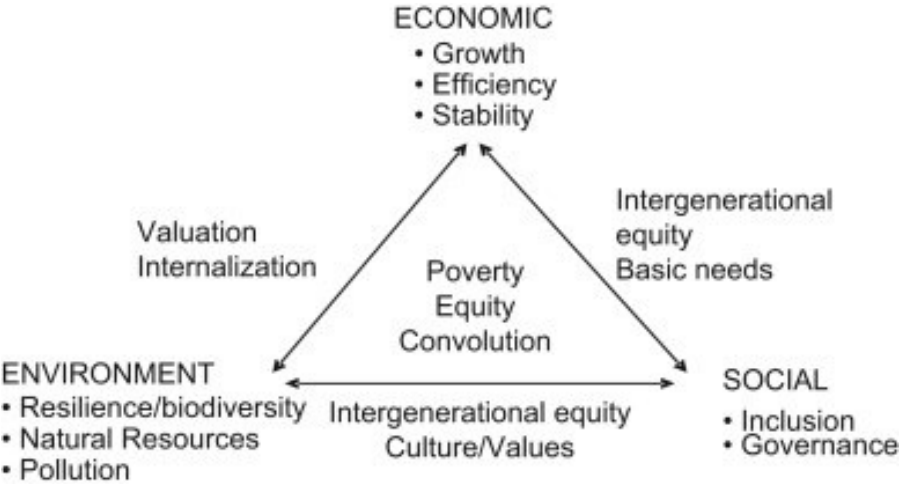


Figure 3.2 Sustainable development – key elements and interconnections  
 Source: Wee et al., 2012

Accelerated deforestation; poor land use and management practices; depletion and degradation of land and water based resources; and weak regulation enforcement mechanisms are cited as the main challenges within the remit of climate change, natural resources, and environmental management. Deforestation and land use change which are contributing to GHG emissions are much more driven by the urban demand for traditional energy (charcoal) and food production which may also explain the pressure on forest resources, hence achieving sustainable growth and wider energy access will imply a comprehensive strategy encompassing the energy system as a whole with a logic articulation between the various components (i.e. addressing the fuel supply chain through interventions on the supply and the demand side management in both urban and rural areas) (Khennas, 2012). It can be argued that improving the environment and/or managing climate change impacts in Malawi can only be successful when people are provided with alternative livelihoods to sustain themselves since deforestation and land clearing are issues associated with practicing subsistence farming and selling charcoal for income generation. In the absence of effective strategies to provided alternative livelihoods to communities, Demand-Side Management (DSM) strategies can be deployed. DSM is often a very cost effective option as the investment is relatively low which translates in a relatively

high return on capital at the household or enterprise levels. DSM in the context of Malawi could therefore be related to electricity consumption (e.g. dissemination and utilisation of energy efficient lightbulbs) and utilisation of energy efficient cookstoves for both rural and urban communities to reduce pressure on natural resources. Both these interventions are also eligible for climate finance hence there are funding opportunities to enhance DSM in Malawi.

### **3.3.3 The Malawi Economic Recovery Plan (ERP) (2012-2017)**

The Malawi Economic Recovery Plan (ERP) (2012-2017) (GoM, 2012b) was formulated in response to macroeconomic challenges that were faced by the country during the 2010-2012 period.<sup>23</sup> During the 2010-2012 period, Malawi's GDP grew by only 4.3% compared to the 6.9% projected in the MGDS II. Environmental aspects and climate change management are neither directly addressed nor prioritised in the ERP. However, energy is a priority area in the ERP due to its influence on boosting economic activities and productivity in areas such as mining and manufacturing. Energy related strategies in the ERP include exploring the establishment of coal generated electricity. From the above observations some meaningful deductions can be made. In the first instance the country is actively promoting the deployment of coal (fossil fuels) into the energy mix. From an environmental perspective, this can be viewed as a negative development as the country's current electricity generation is over 80% hydropower based hence the addition of coal based generators will reduce the cumulative contribution of renewable energy sources to the energy mix and reduce the good environmental credentials of Malawi's electricity sector. However, many countries exhibit the presence of energy generation from a variety of sources for energy security,<sup>24</sup> energy affordability and climate change mitigation (Mezher, 2012; Stambouli, 2011). Similarly, electricity generation in Malawi is heavily dependent on hydropower hence increasing the share of fossil fuels in the energy

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<sup>23</sup> Malawi's economic and monetary policies during the 2010-2012 period led to an overvalued official currency exchange rate and tight administrative regulations which led to severe shortage of foreign exchange and strategic commodities including fuel and industrial raw materials.

<sup>24</sup> For example, with regard to energy security, in Kenya the exploitation of geothermal resources has been fast-tracked to increase Kenya's energy security as the predicted intense and frequent droughts from climate change will affect hydropower electricity generation, which is currently Kenya's main source of electricity (GoK, 2010).

mix could be beneficial from an economic and energy security perspective but not from a climate change and environmental perspective.<sup>25</sup>

A climate change and environmental friendly approach to increasing energy generation and ensuring energy security could be used to develop the untapped renewable energy sources that are available in Malawi such as hydropower. Whilst climate change can adversely affect hydropower generation by increasing the frequency of floods, siltation, droughts and aquatic weeds infestation in water sources, in the case of Malawi, climate change impacts on hydropower generation are exacerbated by poverty and the concentration of hydropower plants and stations on one river (i.e. the Shire River basin). The Shire River basin is prone to environmental degradation<sup>26</sup> because communities along the river have been known to cut down trees (for charcoal and firewood) in the protected catchment areas, and practice unsustainable small scale irrigation in protected wetlands of the river banks hence accelerating the sedimentation of the river (Kaunda and Mtalo, 2013). Malawi can therefore still depend on hydropower for electricity generation by diversifying into other river systems other than relying solely on hydropower stations located in the Shire River. As shown on table 1.2, there are a variety of untapped hydropower sites in the country hence the dependence on the Shire River basin for hydropower electricity could be because of the comparatively higher generation costs from the other untapped hydropower sites. However, various hydropower projects have been developed through the CDM and PoA routes when they demonstrated “additionality”

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<sup>25</sup> In October 2015 the British Broadcasting Corporation Africa (BBC Africa) reported that Tanzania, Malawi’s neighbour to the north, would be (temporarily) shutting down its hydropower plants. According to the report, all hydropower plants in Tanzania were being switched off because a lack of rain has led to low water levels in the country’s dams. The lack of rain had therefore consequently led to hydro-electricity generation to fall to 20% of capacity hence making it difficult for the dams to operate. In addition to the low rainfall being experienced, farming activities upstream were also reducing the flow of water, hence compounding an already critical situation (BBC Africa, 2015). Malawi also generates a lot of its electricity from hydropower hence its power plants could equally be at risk of low capacity due to low rainfall and human impacts in the near future. Integrating coal energy into Malawi’s energy supply chain can therefore be a prudent energy security strategy but this might constrain the development of renewable energy projects as coal generation might be preferred to renewable energy should coal technologies prove to be cheaper and more reliable than renewable energy sources.

<sup>26</sup> Improving the Shire River basin is also a sub-component of the Power Sector Revitalisation Project because of growing problems of aquatic weed infestation and excessive sedimentation in the Shire River which cause costly disruptions to downstream power plant operations. The Power Sector Revitalisation Project will therefore instigate mechanical and biological measures to mitigate the impact of the weeds and sedimentation, and develop and implement an Environmental and Natural Resource Management Action Plan to enable an improved understanding of the environmental, social (including gender), and economic factors that cause or contribute to weed infestation and sedimentation in the Shire River (MCC, 2011).



(i.e. demonstrated that the projects could displace the use of fossil fuel power plants, but without the support of the CDM or PoA the projects would not be implemented as the projects were at a competitive disadvantage and/or were facing obstacles in such areas as technology, financing, risk and human resources) (Yunna and Quanzhi, 2010; PPGC, 2015: pp. 2). It is therefore conceivable that these sites in Malawi could become attractive for hydropower project development due to the additional funding from the sale of carbon credits that these sites can potentially generate. This would therefore reduce Malawi's requirements for developing fossil fuel based energy systems.

### **3.3.4 National Climate Change Investment Plan (NCCIP) (2013-2018)**

The primary objective of the National Climate Change Investment Plan (NCCIP) is to increase climate change investments in Malawi. The NCCIP aims to develop the capacity of the environment and climate change management sector, increase the protection and conservation of the environment and natural resources, and increase the productivity of the environment and natural resources. The NCCIP contains principles, goals, objectives and strategies for enhancing climate change investment in the country. The NCCIP can therefore provide a framework to mobilise the (technical and financial) resources necessary to reduce the stress on natural resources due to climate change and environmental degradation.

The NCCIP identifies the four key priority areas to promote climate change management in Malawi as: adaptation; mitigation; climate change research, technology development and transfer; and capacity building. Under the four themes, a total of eleven programmes will be pursued in the implementation of the NCCIP as follows:

#### **1 Adaptation Investments**

- a. Integrated Watershed Management Programme;
- b. Improving Climate Change Community Resilience through Agriculture Production;
- c. Climate Change Proofing of Infrastructure Development;
- d. Enhancing Disaster Risk Management;

## 2. Mitigation Investments

- a. Enhance Reduction of Emissions from Deforestation and Forest Degradation (REDD+);
- b. Waste Management and Pollution Control Programme;
- c. Enhancing Energy-Saving Technology Programme;

## 3. Research, Technology Development and Transfer Investments

- a. Climate Change Adaptation Technology Development (CCATD);
- b. Climate Change Mitigation Technology Development (CCMTD);
- c. Adaptation and Mitigation Technology Transfer (AMTT);

## 4. Capacity Development Investments

- a. Capacity Development in Climate Change.

The NCCIP considers climate change as a threat to Malawi's aspirations for growth and poverty reduction directly through the effects of changing water availability; loss of biodiversity; declining or volatile agricultural yields; climate-related disasters (including floods and droughts); increased incidence and prevalence of vector-borne diseases; weakened infrastructure; and political instability due to heightened conflict over resources and movement of people (GoM, 2013). However, the document further stipulates that climate change can also be seen to present various economic, social, environmental and political opportunities. Climate change economic opportunities for Malawi include the possibilities of the government and private sector stakeholders to access additional funding through climate finance mechanisms (i.e. financing mechanisms that have been put in place by international organisations to finance programmes targeted to minimise climate change impacts such as the international carbon market (mandatory and voluntary carbon markets), Payment for Ecosystem Services (PES), and the Reduced Emissions from Deforestation and Forest Degradation (REDD+)). Climate change social opportunities for Malawi include increased interest in developing checks on population growth (i.e. education and awareness on family health) which is deemed as one of the drivers of climate change, and the development of new and appropriate technologies (e.g. energy-efficient technologies; drought, pest and disease resistant varieties; transfer and use of technologies such as genetics; irrigation systems; land conservation; etc.). Climate change environment opportunities for Malawi include reduced environmental degradation by addressing climate change through strategies such as the promotion

of CDM projects; promotion of PES; and enhancing development of voluntary carbon markets (REDD+). Climate change political opportunities for Malawi include the possibility to link climate change ambitions with policies and actions to promote peace and security by exploring political synergies which can enhance regional programmes that link up with community level initiatives.

Even though the NCCIP acknowledges that carbon markets offer important opportunities for supporting new technologies and leveraging private investment, it is silent on the methods to which various local and international private sector stakeholders will be incentivised and encouraged to develop such carbon and emissions trading based project. As already noted, Malawi has not been very successful in attracting climate finance projects hence the outputs of this research can also feed into the objectives of the NCCIP by providing insights into what the country needs to do to increase climate change management related investments.

### **3.3.5 Malawi's Intended Nationally Determined Contributions (INDCs)**

Intended Nationally Determined Contributions (INDCs) are pledges made by governments as their climate change management commitments for the post 2020 period. INDCs therefore provide a means for governments to communicate internationally their ambition for reducing emissions, and the steps they will take to address climate change in their own countries with due regard to their domestic national priorities, capabilities, and responsibilities. Levin et al. (2015: pp. 4) consider INDCs as tools that can help countries to realise non-climate benefits associated with mitigating climate change (e.g. facilitating sustainable development and poverty reduction), and also strengthen institutional and technical capacity, enhance policy integration, and inform key stakeholders. INDCs can therefore provide a platform for engaging the private sector to contribute towards a country's climate change ambitions.

Malawi's INDC states that between 2015 and 2040, total annual GHG emissions are expected to increase from the current level of approximately 29,000 Gg CO<sub>2</sub> equivalent to in the range of 42,000 Gg CO<sub>2</sub> equivalent, an approximately 38% rise (GoM, 2015). Some of the factors that can change the trajectory of these emissions include endogenous economic and political factors, and the provision of international

capacity building, technology transfer and financial assistance. The Government of Malawi estimates that between 14,000 and 16,000 Gg of CO<sub>2</sub> equivalent will be saved per year by 2030 if a robust low emission development path is adopted.

The main sectors contributing to GHG emissions in Malawi are energy, industrial processes and product use (IPPU), agriculture, forestry and other land use (AFOLU), and waste. At sectoral level, the largest emitters of GHGs are forestry and land-use, agriculture and energy respectively (figures 3.3 and 3.4). The largest sectoral increase will likely take place in the energy sector as new coal-based generation capacity by IPPs comes on line. The country will also experience increases in deforestation and forest degradation due to unsustainable use of fuelwood and charcoal and poor agricultural practices.

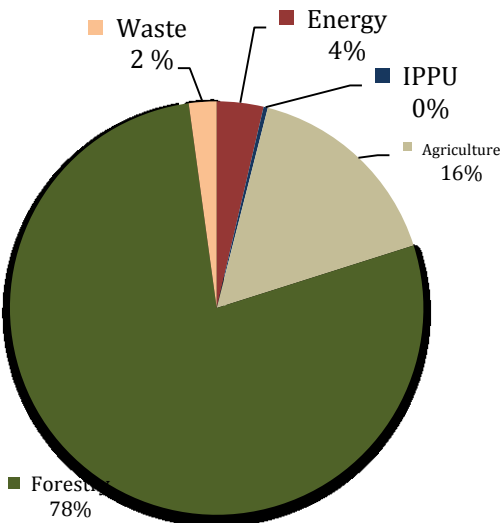


Figure 3.3 Sectoral emissions in 2015  
Source: GoM, 2015

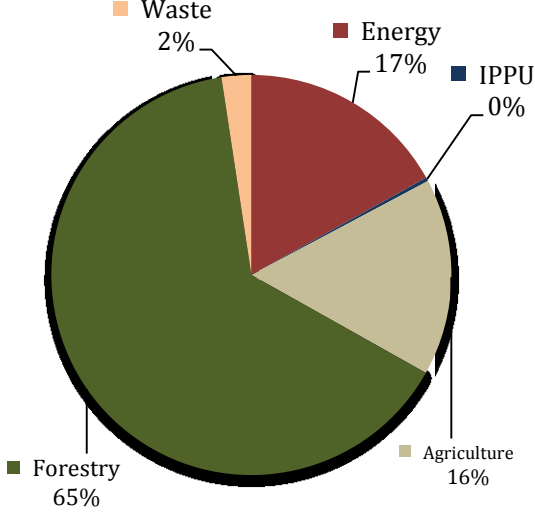


Figure 3.4 Sectoral emissions in 2040  
Source: GoM, 2015

Malawi has developed two alternative climate change mitigation scenarios. The first scenario assumes the implementation of policy mitigation actions in various sectors of the economy using local resources such as tax. This scenario, the unconditional scenario, therefore reflects the capacities and capabilities of Malawian institutions to manage climate change on their own. The second scenario, the conditional scenario, reflects the emission reductions and activities that can be undertaken in the country should there be external support in terms of capacity building, technology development and transfer, and financial resources from Malawi’s development partners, donors and other stakeholders. Implementing all unconditional and conditional mitigation activities can be expected to reduce the per capita emissions of

Malawi from 1.4 t CO<sub>2</sub>e per capita in 2010 to around 0.7 to 0.8 t CO<sub>2</sub>e per capita in 2030 compared to expected business as usual emissions of around 1.5 t CO<sub>2</sub>e per capita in 2030. Table 3.1 provides Malawi's policy mitigation actions and programmes that can facilitate the achievements of its climate change ambitions and goals.

Table 3.1 Malawi's policy-based mitigation actions

Sectors	Intended policy based action	Provision of implementation means			
		UC	CR	TR	FR
<b>Energy Supply</b>	Produce 2000 solar water heaters (SWH)	✓ <input type="checkbox"/>			
	Increase SWH from 2,000 to 20,000 by 2030		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Install 20,000 solar PV systems	✓ <input type="checkbox"/>			
	Increase Solar PV from 20,000 to 50,000 by 2030		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Produce 2 million litres of bio-diesel/year	✓ <input type="checkbox"/>			
	Increase biodiesel from 2 to 20 million/ year		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Produce 18 million litres of ethanol/ year	✓ <input type="checkbox"/>			
	Increase ethanol production from 18 to 40 million litres per year		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Increase number of passengers using mass transport by 1%	✓ <input type="checkbox"/>			
	Increase number of passengers using mass transport by 30%		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Producing 351 MW of hydro electricity	✓ <input type="checkbox"/>			
	Increase generation of HEP by 800MW by 2025		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
<b>Energy utilization</b>	Distribute energy saving cook stoves to 400 000 households	✓ <input type="checkbox"/>			
	Increase the number of households adopting energy saving stoves to 2,000,000 by 2030		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
<b>Industrial Processes</b>	Increase use of soil-cement stabilized block and rice husk ash blended cement to around 10% of current cement production		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Support research and use of alternative cement materials	✓ <input type="checkbox"/>			
	Develop national standards for alternative building materials and technologies		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Support industries engaged in carbon capture and storage		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
<b>Agriculture</b>	Support development of market based policies and legal instruments to shift decisions from financial to environmental decisions		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Develop appropriate extension and training materials for climate resilient agronomic practices	✓ <input type="checkbox"/>			
	Upscale the dissemination of climate resilient agronomic practices to above 10% of current cropland		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Build capacity to implement and monitor the agriculture NAMA		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
<b>Forestry and land-use</b>	Afforestation, reforestation and forest conservation and protection of catchments	✓ <input type="checkbox"/>			
	Upscale afforestation, reforestation and forest conservation and protection of catchments		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Implementation of payment for ecosystem service for hydroelectric dams		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Promotion of non-extractive livelihoods from forest	✓ <input type="checkbox"/>			
	Upscale the non-extractive livelihoods from forest		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Promote sustainable production of fuel wood by establishing woodlots plantations and forest management	✓ <input type="checkbox"/>			
	Upscale sustainable production of fuel wood by establishing woodlots plantations and forest management		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
<b>Wastes</b>	Construct controlled landfill for biogas recovery to generate up to 240 GWh of primary energy (95 GWh of electricity) per year		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Promote solid and water waste reduction practices at household, institutional and industry level to reduce waste generation	✓ <input type="checkbox"/>			
	Process municipal solid wastes into fertilisers		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>
	Install waste to energy incinerators to generate up to 250 GWh of electricity per year		✓ <input type="checkbox"/>	✓ <input type="checkbox"/>	✓ <input type="checkbox"/>

Key: Unconditional (UC); Capacity Requirements (CR); Technology Requirements (TR) and Finance Requirements (FR)

Source: GoM, 2015

### **3.4 The UNFCCC and Climate Finance Project Implementation in Malawi**

The United Nations Framework Convention on Climate Change (UNFCCC) was developed as an international treaty, to cooperatively consider what different countries could do to limit average global temperature increases and the resulting climate change, and to cope with whatever impacts were, by then, inevitable. Malawi signed the UNFCCC in June 1992 and ratified the Convention in April 1994.

The Kyoto Protocol, which operationalises the Convention, commits industrialised countries to stabilise GHG emissions based on the principles of the Convention. Malawi is classified as a Non-Annex I country under the Kyoto Protocol hence has no mandatory commitment to reduce its GHG emissions. More importantly, as a Non-Annex I country Malawi is eligible to host CDM projects. The CDM (figure 3.5; figure 3.6) was established as an instrument for signatories of the Kyoto Protocol to implement and/or host emission-reduction projects in developing countries which can earn saleable CER credits hence be an incentive to undertake applicable projects as well as be a source of climate finance (UNFCCC, 2014b). The CDM process and cycle for Malawi is depicted on figure 3.7.

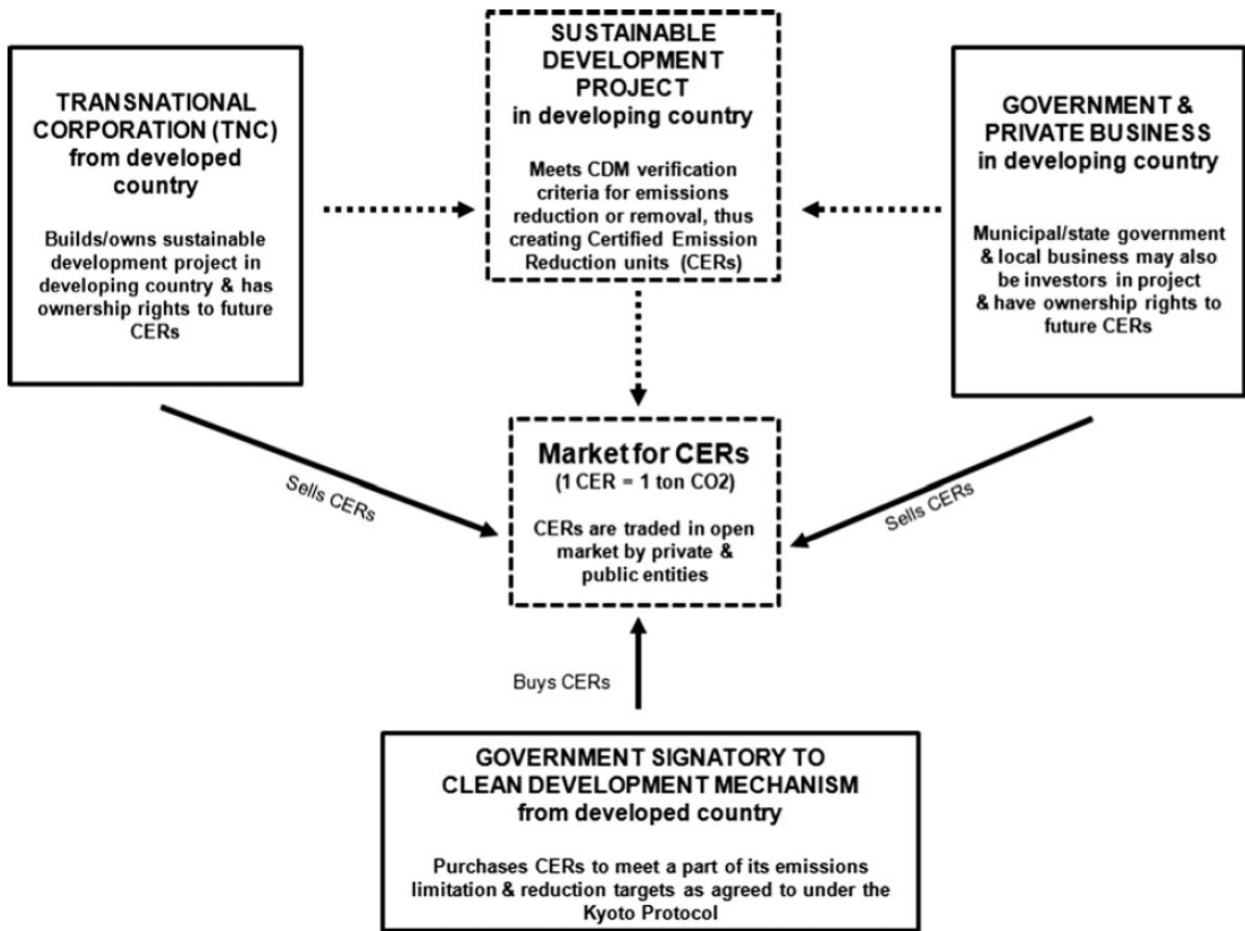


Figure 3.5 How the Clean Development Mechanism (CDM) works  
Source: Martinez and Bowen, 2013

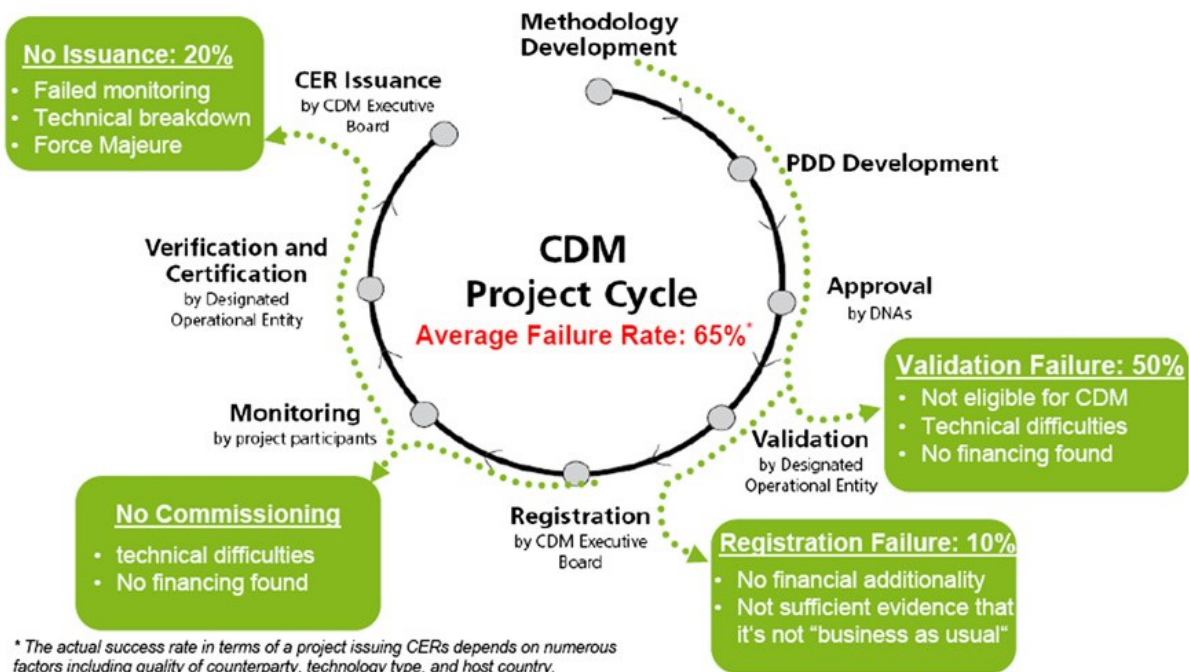
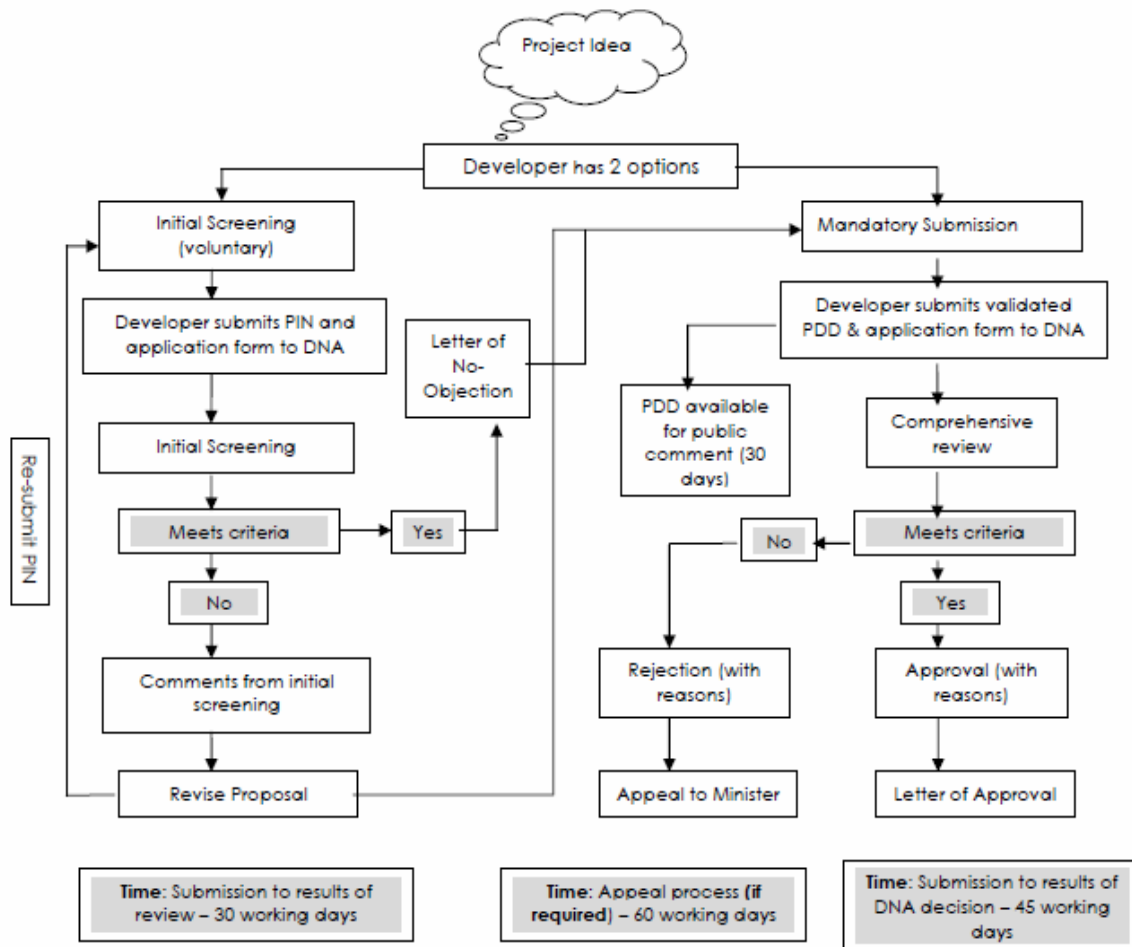


Figure 3.6 CDM processes and risks along the CDM project cycle  
Source: Hofmann and Khatun, 2013



Key: DNA- Designated National Authority; PIN- Project Idea Note and PDD- Project Design Document

Figure 3.7 CDM project approval procedures for Malawi

Source: GoM, 2011c

The CDM was developed as an instrument to assist signatories of the Kyoto Protocol to promote sustainable development (more especially in the developing world where the adverse impacts of climate change could be the most severe) by financing projects that help in the long-term transition of developing country energy sectors towards renewable technologies (Pearson, 2007). Arguably, the CDM has contributed to improving the deployment of renewable energy in different developing countries and contributed to mitigating the emissions of various gases through the use of various technologies (figure 3.8 and table 3.2). However, it has been suggested that the CDM only offers few opportunities for delivering additional sustainable development benefits to host countries; does not help catalyse fundamental shifts in energy production and use (Pearson, 2007); and that it has not been successful in equitably attracting projects across the different regions of the world (table 3.3). This has led to other commentators suggesting that in addition to



raising sufficient funds for implementing climate finance projects, another challenge for climate finance modalities is to achieve a more equal distribution of projects across countries, in particular LDCs (i.e. a significant challenge for the CDM is to remove barriers and improve development of projects in underrepresented countries) (van der Gaast et al., 2009).

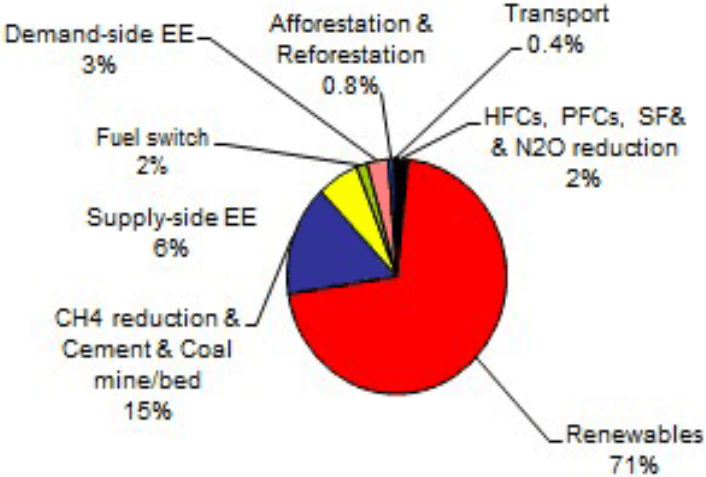


Figure 3.8 CDM project implementation by project type  
Source: CDM pipeline, 2015a

Table 3.2 CDM technologies and GHG emissions achieved

Number of projects and expected/issued CERs	CDM					
	Type		number	CERs/yr (000)	CERs Issued (000)	
Wind	2616	31%	238730	20%	170461	11%
Hydro	2234	26%	329101	27%	213039	13%
Biomass energy	756	9%	51684	4%	48631	3%
Methane avoidance	700	8%	29497	2%	27082	2%
Solar	424	5.0%	13715	1.1%	2586	0.16%
Landfill gas	403	5%	58222	5%	72892	5%
EE own generation	383	4%	50431	4%	72288	4%
Fossil fuel switch	133	1.6%	69499	6%	55645	3%
EE Industry	129	1.5%	4638	0%	3582	0.2%
Coal bed/mine methane	111	1.3%	72721	6%	43161	2.7%
EE Supply side (power plants)	107	1.3%	52230	4%	6080	0.4%
N2O	105	1.2%	57010	5%	289302	18%
EE Households	102	1.2%	3742	0.3%	745	0%
Afforestation & Reforestation	71	0.8%	4417	0.4%	11328	1%
Fugitive	58	0.7%	49855	4%	36556	2.3%
EE Service	35	0.4%	592	0.05%	68	0%
Geothermal	35	0.4%	12401	1.0%	9840	0.6%
Transport	32	0.4%	4400	0.4%	1372	0.1%
Cement	26	0.3%	4156	0%	6290	0.4%
HFCs	23	0.3%	81334	7%	539942	33%
Energy distrib.	22	0.3%	7260	1%	1576	0%
PFCs and SF6	17	0.2%	5393	0%	5409	0.3%
Mixed renewables	14	0.16%	611	0.1%	23	0%
CO2 usage	3	0.04%	80	0.0%	10	0.001%
Tidal	1	0.01%	315	0.0%	910	0%
Agriculture	1	0.01%	8	0.0%		
<b>Total</b>	<b>8541</b>	<b>100%</b>	<b>1202041</b>	<b>100%</b>	<b>1618817</b>	<b>100%</b>
HFCs, PFCs, SF6 & N2O reduction	145	1.7%	143736	12%	834653	52%
Renewables	6080	71%	646558	54%	445491	28%
CH4 reduction & Cement & Coal mine/bed	1302	15%	214539	18%	185990	11.5%
Supply-side EE	512	6%	109921	9%	79944	4.9%
Fuel switch	133	1.6%	69499	5.8%	55645	3.4%
Demand-side EE	266	3.1%	8972	0.7%	4395	0.3%
Afforestation & Reforestation	71	0.8%	4417	0.4%	11328	1%
Transport	32	0.4%	4400	0.4%	1372	0.08%

Source: CDM pipeline, 2015b

Table 3.3 Unequal regional distribution of CDM projects

Region	Number of small-scale projects		Number of full scale projects		Number of all projects	
	Number	Percentage	Number	Percentage	Number	Percentage
Latin America	402	11.6%	710	14.0%	1112	13.0%
Asia and Pacific	2912	84.0%	4084	80.5%	6996	81.9%
Europe and Central Asia	26	0.8%	60	1.2%	86	1.0%
Africa	84	2.4%	154	3.0%	238	2.8%
Middle East	41	1.2%	68	1.3%	109	1.3%
<b>Total</b>	<b>3,465</b>	<b>100.0%</b>	<b>5,076</b>	<b>100.0%</b>	<b>8,541</b>	<b>100.0%</b>

Source: CDM pipeline, 2015c

Malawi has undertaken numerous activities (e.g. workshops, production of CDM investors guides and brochures (see Appendix 2), etc.) to attract various types of GHG emission reduction projects. However, Malawi does not host any regular CDM renewable energy projects let alone any regular CDM project in any other sector.<sup>27</sup> It is generally conceived that CDM project implementers choose to implement their projects in countries that have political and macroeconomic stability, sound regulatory frameworks (and efficient supporting institutions enforcing the relevant laws and regulations), and good physical and social infrastructure (including roads, communication systems and skilled labour) but not necessarily in countries where the CDM projects could have the most social benefit or be needed the most such as in LDCs (Winkelman and Moore, 2011; Burian et al., 2011; Arens et al., 2011). Other studies also point out that factors influencing CDM investment flows include (i) country emissions reduction potential; (ii) general investment climate; and (iii) track record (i.e. number of projects approved by the DNA)<sup>28</sup> (Amatayakul and Berndes, 2012; Burian et al, 2011; Arens et al., 2011). This therefore signifies that more efforts are required from various stakeholders in the CDM and climate finance arena in Malawi in order to address the shortfalls that are still persistent in the country more especially since the country has no track record of CDM projects hence might continue to be shunned by CDM investors.

Table 3.4 shows the status of implementation of CDM projects in the different SADC countries. Various factors have contributed to making some countries to be more successful than others in hosting such projects but arguably as there is some CDM

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<sup>27</sup> Recent amendments to CDM modalities have included a new category namely CDM Programme of Activities (PoA). The rationale for PoAs is that under a PoA it is possible to register the coordinated implementation of a policy, measure or goal that leads to emission reduction. Once a PoA is registered, an unlimited number of component project activities (CPAs) can be added without undergoing the complete CDM project cycle. Compared to regular CDM project activities, this programmatic approach has many benefits, particularly for less developed countries or regions (UNFCCC, 2014a). The creation of PoAs to the climate finance framework can be seen to have assisted Malawi as the country now has three registered PoAs.

<sup>28</sup> Many studies focus on the uneven distribution of CDM projects across countries and regions. Within countries there is also evidence that CDM projects can be unevenly distributed because of internal factors. For example, it was noted that there was an uneven distribution of CDM projects and revenue within India, where states such as Tamil Nadu, Maharashtra, Karnataka and Rajasthan each had over 200 projects at validation stage, while several other states were not hosts to any CDM projects at all. While economically prosperous states had generally seen greater CDM investment than poorer ones, 'good governance' also appeared as an important factor for attracting CDM projects in the different states since these same states are those that generate confidence among investors based on perceived respect for the rule of law and property rights and having an attractive investment climate (Phillips and Newell, 2013).

activity within the region there is potential for Malawi to equally host such projects once current inadequacies are identified and addressed.

The introduction of PoAs into the CDM framework can be seen to have assisted Malawi to have a foothold on producing saleable carbon credits (i.e. CERs) on the compliance carbon market. Malawi has still not attracted CDM investors on the regular CDM route but has three registered PoAs. Some of the benefits of PoAs include that transaction costs, investment risks and uncertainties for individual component project activities (CPA) participants are reduced; PoAs are managed on a regional level which speeds up the approval process; access to the CDM is extended to smaller projects which would not be viable as stand-alone projects; specific regional policy goals can be effectively supported by accessing carbon finance through PoA; and monitoring and verification can be undertaken on a collective basis by utilising a sampling approach (UNFCCC, 2014a). Table 3.5 shows the various emission reductions potential from various sectors in Malawi, hence once the underlying technical and institutional challenges that undermine the implementation of climate finance projects in the country are addressed, climate finance can potentially achieve the objective of facilitating sustainable development in the country.

Table 3.4 Registered CDM projects and Programmes of Activities (as of 12 April 2014)

Country	CDM Project (registration date)	Reductions*	CDM Programme of Activity- excluding multi-country/ international programmes (date registered)	Reductions*
Angola		0		0
Botswana		0		0
DR Congo	Ibi Batéké degraded savannah afforestation project for fuelwood production (Democratic Republic of Congo) (18 Feb 11)	54,511		
	Kinshasa Landfill gas recovery and flaring project (16 Mar 11)	124,819		
Lesotho	Efficient Wood Fuel Stove-Cooking-Sets, Lesotho (29 Aug 12)	34,433		
Madagascar	Small-Scale Hydropower Project Sahanivotry in Madagascar (28 Aug 10)	44,196	0	
	Tsiazompaniry Hydropower Project in Madagascar (17 Dec 11)	14,675		
	Tough Stuff Solar Panel and Lamp Sales Madagascar Project (09 Aug 12)	25,704		
Malawi		0	Improved Cookstoves Programme for Malawi and cross-border regions of Mozambique (13 Mar 14)	38,857
			Efficient Cook Stove Programme: Malawi (01 Aug 13)	52,877
			CarbonSoft Open Source PoA, LED Lighting Distribution: Pan Africa (01 Oct 13)	41,850
Mauritius	Plaine Des Roches Wind Farm (14 Sep 11)	32,039	0	
	Mare Chicose Landfill Gas Project (30 Mar 12)	81,601		
Mozambique	Cleanstar Mozambique - Maputo Ethanol Cookstove and Cooking Fuel Project 1 (22 Apr 13)	192,482	0	
	Niassa Reforestation Project (14 Jan 14)	23,585		
Namibia	Methane Recovery and Power generation at	9,341	0	

	the Kupferberg Landfill in Namibia (05 Dec 12)			
	Power generation from biogas in Windhoek, Namibia (30 Dec 12)	7,869		
Seychelles		0		0
South Africa		58		26
Swaziland		0		0
	Landfill gas recovery and electricity generation at "Mtoni Dumpsite", Dar Es Salaam, Tanzania (02 Jun 07)	202,271	Solarwave water purification (12 Jun 12)	5,184
	Nyanza Bottling Company Clean Drinks CDM Project (27 Nov 12)	9,818		
Tanzania	Mwenga Hydro Power Project (30 Jan 13)	11,354		
	CDM Lusaka Sustainable Energy Project 1 (09 Jan 10)	130,032	Improved Cookstoves Program for Zambia (07 Nov 12)	41,046
Zambia	Rural Electrification by Mujila Falls Lower Zambia Mini-hydropower station (25 Jan 13)	11,037	Fuel Efficient Stoves in Zambia (28 Jan 13)	40,684
Zimbabwe	Sable Chemicals Tertiary N2O Abatement Project in Zimbabwe (27 Jun 12)	473,759		0

\* Estimated emission reductions in metric tonnes of CO<sub>2</sub> equivalent per annum

Source: Author's compilation from UNFCCC, 2014c

Table 3.5 Malawi's Emission Reduction Potential per year

Technology type	Emission Reduction Potential per year (tCO <sub>2</sub> e)	Technology type	Emission Reduction Potential per year (tCO <sub>2</sub> e)
REDD+/Avoided deforestation	8,624,500	Agricultural residues	300,000
Afforestation/Reforestation	2,846,085	Domestic biogas	162,000
Charcoal production	380,600	Industrial biogas	2,900
Biodiesel	12,000	Wastewater	15,000
Ethanol	47,000	Hydro	22,005
Landfill gas	130,000	Solar PV	522,000
Sugar bagasse	86,100	Efficient stoves	1,500,000
Biomass briquettes	37,700	Industrial production	690,500

Source: UNEP RISØ, 2013

Some studies indicate that SSA has 3,227 potential CDM projects, including 361 PoAs, with a GHG mitigation potential of 740.7 million tons of CO<sub>2</sub>eq annually. These projects could attract US\$158 billion of total investment to the region and could generate US\$7.5 billion of carbon revenue annually if the carbon price were to stabilise at US\$10/tCO<sub>2</sub> (Timilsina et al., 2010). Moreover, these projects could add 149 Gigawatts of clean electricity generation capacity, which is more than twice the region's current total electricity generation capacity of 69 Gigawatts (ibid). The emission reduction potential per year for Malawi using different technologies is presented in table 3.5. There is therefore a significant untapped potential for climate finance projects to contribute towards the improvement of the environment and energy sectors within Malawi and the SSA region particularly the SADC region since other SADC countries such as Seychelles, Botswana and Angola have also not been able to attract climate finance projects through the CDM.

Whether the growth in the implementation of PoAs in Malawi and the SADC region marks the beginning of a process which will consolidate and build enough capacity for Malawi and other countries in the SSA region to attract regular CDM investments or whether investors will focus on implementing PoAs is an issue for further investigation. What is clear at the moment is that global policy makers have been receptive to the concerns of various stakeholders and managed to form a climate change architecture that is now also benefiting under-represented nations by allowing them to generate CERs and integrating them into the climate finance arena.

### 3.5 Climate Finance Challenges

In less affluent geographic areas environmental issues are given a lower priority or not provided with adequate financial resources (Marara et al., 2011) because immediate economic priorities override environmental concerns. Climate change alone is therefore often not a sufficient policy goal to be able to mobilise enough political will or adequate action in these regions (Ürge-Vorsatz and Herrero, 2012). It can then be seen that in the wake of an economic crisis, policy action in Malawi has shown to be in line with this notion. Whilst Climate Change, Natural Resources and Environmental Management are a priority area in the MGDS II, they have been omitted as a priority area in the ERP. The desire to put the country back on a positive GDP growth trajectory can be seen to overshadow equally important environmental considerations. It can therefore be assumed that climate finance projects related to renewable energy can probably be given less priority in the midst of economic crises (more especially as such projects also require capacity building which do not provide easily discernible short term benefits) even though such projects have various economic benefits.<sup>29</sup> This situation is detrimental as success in attracting and implementing climate finance projects is linked to institutional factors such as governance, existence of promotional centres, the administrative performance of the DNA and enabling policy environments (at international, national and sub-national levels) (Phillips and Newell, 2013) all of which are only permissible when climate change issues are consistently afforded priority status.

From the above observations it can be seen that one of the greatest challenges to achieving any climate change related strategy in Malawi (and other similar countries) is ensuring that climate change and environmental issues will still have a priority in the midst of economic crises. Investors for renewable energy projects and carbon finance (energy) projects require not only the existence of a conducive business environment and the existence of relevant government policies, but assurances of

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<sup>29</sup> Managing climate change and renewable energy deployment are shown to create various economic benefits through job creation since as compared to fossil-fuel power plants, renewable energy generates more jobs per unit of installed capacity, per unit of power generated and per dollar invested. More importantly, the renewable energy markets can be expected to grow rapidly in the future due to climate change mitigation and energy security imperatives hence it is plausible to assume that jobs created in this sector have a sustainable long-term perspective (Müller et al., 2011). This therefore means that there was scope for the ERP to also include climate change, natural resources and environmental management as priority areas for both economic growth and environmental preservation through the promotion of renewable energy sources.



the stability and predictability of the policies because such investments have a long duration and long-term and stable policy environments are acknowledged to be vital criterion for the success of developing renewable electricity markets (Bürer and Wüstenhagen, 2009; Zerriffi, 2011). In addition to this, power purchase guarantee rather than guarantee of access to sell carbon credits (carbon credit purchase guarantee) is more decisive to attract carbon projects and influence the decision for project implementers (Amatayakul and Berndes, 2012). This implies that the perception of stable policies and regulations that guarantee access for renewable energy project developers to sell electricity to the grid at a guaranteed attractive price (e.g. a stable FIT policy) could lead to the development of many renewable energy projects in developing countries rather than the existence and demand of carbon credits. Policies therefore need to show a degree of predictability in order to capture the degree of certainty associated with a policy instrument and its future development (instrument's overall direction, detailed rules, and timing) (Rogge et al., 2011) and more importantly policies need to show that they will not be abandoned at the onset of any socio-economic stress.

### **3.6 Chapter Conclusion**

Various positive developments (such as modifications to climate change architectures) are occurring globally regardless of the gaps in knowledge and uncertainties over the precise extent, time-scale, and consequences of climate change (Morton et al., 2011). However, developing effective climate policies in the developing world<sup>30</sup> is a complicated process because unlike in the developed countries, climate policy development and analyses in developing countries need to take into account existing market failures in the economic system (e.g. high unemployment levels, imperfect tax system structures, presence of a large informal economy, the barriers to capital flows and trade imbalances, biased saving behaviours, and presence or absence of social safety nets (e.g. unemployment insurance and health insurance)) (Kriegler et al., 2012). It is therefore commendable that policy makers in Malawi are trying to make climate change issues to move up on

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<sup>30</sup> In developing countries, existing economic distortions cannot be disregarded in the design of climate policies. The high level of unemployment (often over 25%), the large share of informal economy, and the difficulty to enforce regulation (e.g. in terms of land-use planning) and to raise taxes create specific difficulties that need to be accounted for, even over the long term. A consequence of these imperfections is that the most effective policies to reach a given objective can be very different from those suggested by a first-best world analysis (Kriegler et al., 2012).

the priority lists of government agendas through the inclusion of climate change, environment and natural resources management as key priority areas in the MGDS II. A dedicated climate change policy is also under consideration/consultation. Whilst the identification of issues, and development and formulation of policies is common practice, it is actually the implementation of policies (as well as the understanding and analysis of the solutions) that requires urgent attention. A lack of innovative ideas, lack of feedback from stakeholders as progress on the implementation process is undertaken, and poor monitoring and evaluation systems (GoZW, 2010; Hailu, 2012; Bhanot and Jha, 2012; Chaurey et al., 2012) all contribute to policy implementation failures hence new climate change management interventions should be developed with due consideration to these issues.

Among some of the criticisms of the MGDS II is that too many priorities were included with insufficient resources allocated (GoM, 2012b; IDA/IMF, 2012) hence casting doubt as to whether the interventions related to climate change, environment and natural resources management contained in the MGDS II are implementable. Moreover, it also highlights potential flaws in Malawi's policy making mechanisms in that some policies that can be developed are arguably un-implementable as they are assigned insufficient resources. Additionally, Malawi's National Environmental Policy (2004) proposed the drafting of a Clean Air Act; the Energy Policy (2003) proposed the drafting of a Renewable Energy Act; and Wambua (2011) proposed the drafting a policy and regulatory framework for biofuels development, but these have not led to fruition. Already highlighted is how the economic priorities will override environmental priorities as such there is a great risk that the climate change policy might never materialise, might materialise at a very late date or might not contain sufficient measures to make it effective and implementable.

China is reputed to have improved its energy access through renewable energy investments in part due to access to climate finance and in part effective renewable energy laws (Lewis, 2010; Schuman and Lin, 2012). Theoretically, Malawi can therefore also improve its energy access through renewable energy investments by utilising climate finance and effective renewable energy laws. Therefore, there needs to be a better understanding of how renewable energy policies and activities are influencing access to climate finance on energy related projects or incentives that can

be deployed in Malawi to enable the implementation of renewable energy climate finance projects through the CDM and other climate finance instruments. Developing climate finance projects more especially CDM projects in developing countries is very challenging as evidenced from the uneven distribution of CDM projects across countries and failure of most project to promote sustainable development (Schroeder, 2009; Pearson, 2007; Simon et al., 2012; Nautiyal and Varun, 2012; Boyd et al., 2009). Some of these challenges emanate from the climate finance instrument's procedures (e.g. registration formalities and conditions which are necessary in order to bring credibility and accountability to climate finance instruments) (Kaygusuz, 2012) and the others from in-country institutional weaknesses (Byigero et al., 2010). Each country therefore has its own unique set of challenges that need to be identified and addressed as this research is trying to do.

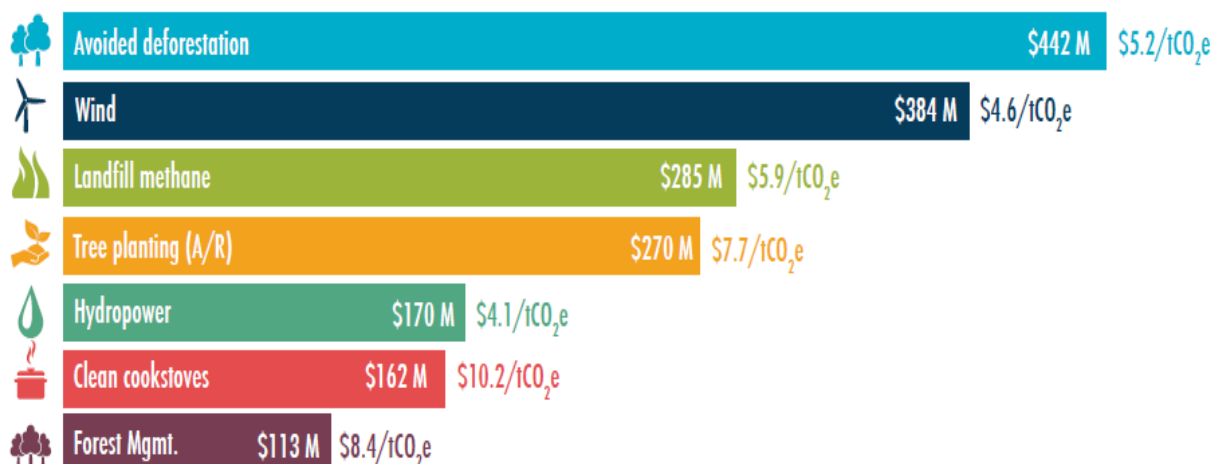
In addition to regular CDM projects and PoAs, there are also Voluntary Carbon Markets (VCMs)<sup>31</sup> as alternatives to the more stringent compliance carbon markets (Perdan and Azapagic, 2011; Climate Corporation, 2013). VCMs do not necessarily have unique sets of rules and regulations, hence VCMs provide room for micro-projects to enter the wider carbon market as they have reduced transaction costs, enable innovation and create space for testing new methodologies that may be included subsequently in compliance carbon markets (Benessaiah, 2012). VCMs therefore have an advantage over the CDM in that unlike the CDM, they do not have high transaction costs and long project validation times which often prove prohibitive for smaller-sized projects. This therefore means that the CDM is not the only route that Malawi can pursue in order to attract investment related to reducing GHG emissions. Some examples of VCM schemes include Gold Standard and Verified Carbon Standard. Malawi therefore has good prospects to attract various carbon finance projects through the VCM route providing that there is due consideration to the specific requirements for each option or scheme taken.

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<sup>31</sup> Compliance Carbon Markets are created and regulated by mandatory national, regional or international carbon reduction regimes. Subsequently, the CDM falls under the compliance market category as it is regulated under the Kyoto Protocol and EU-ETS. On the other hand, Voluntary Carbon Markets (VCMs) are administered under voluntary programmes and schemes hence do not need national approval from the project participants, do not need registration and verification from the UNFCCC, and the calculation and the certification of the emission reduction in VCMs are implemented in accordance with the programme's methodologies or industry-created standards.

Additionally, the United States of America (US) did not ratify the Kyoto Protocol hence does not participate in the CDM. However, organisations and companies from the US can participate in VCMs and invest in voluntary emissions reduction projects in order to reduce their carbon footprint. VCMs therefore tap into the significant technological and financial resources that are excluded from the CDM due to the non-ratification of the Kyoto Protocol by the US. Figure 3.9 shows the cumulative value and average price of the top seven VCM project types. Table 3.6 shows the average carbon price in VCMs in Africa and the leading top five countries in terms of VCM project implementation in Africa. Figure 3.9 and Table 3.6 therefore provide an indication of the amounts of funds and investments that Africa has benefited from due to VCMs. Arguably, there is scope to increase the deployment of VCM projects in Africa to further increase climate finance investments in Africa.

Lastly, even though climate change issues have been addressed in a number of sectoral policies, programmes, and strategies, the absence of a climate change policy in Malawi has led to a lack of a broad overview of the impacts of climate change across all the sectors and a lack of a co-ordinated policy response to climate change issues. Consequently, various sector policy instruments have not been incorporated into national legislation and as such climate change adaptation has not found its way into national budgetary framework and therefore relies heavily on external assistance (CEPA, 2012). Consequently, many stakeholders have proposed that Malawi should develop a climate change policy to assist with creating an environment that has a harmonised and well-coordinated approach to the various aspects of society which are affected and influenced by climate change. This research can therefore significantly enhance and contribute towards Malawi's efforts and strategies to combat climate change as it will investigate climate finance policy and knowledge gaps, and identify crucial issues that need to be addressed in order to enhance the country's potential to attract climate finance and/or determine the appropriate framework for climate change policies and strategies that can promote sustainable development through improved access to climate finance and wide-scale deployment of renewable energy.



Note: M = million; \$ = United States of America Dollars

Figure 3.9 Cumulative values and average prices of the top seven VCM project types  
Source: Hamrick and Goldstein, 2015

Table 3.6 Average carbon prices in VCMs in Africa and the leading top five VCM countries

Africa by the Numbers, Overall and Project-Level						
	VALUE		AVERAGE PRICE		VOLUME	
	Overall	Primary market	Overall	Primary market	Overall	Project-level
ALL TIME	\$253 M	\$93 M	\$6.6	\$4.9	38 MtCO <sub>2</sub> e	19 MtCO <sub>2</sub> e
2014	\$93 M	\$16 M	\$5.8	\$4.6	7 MtCO <sub>2</sub> e	3 MtCO <sub>2</sub> e

Top African Countries by Carbon Finance Value, 2007-2014		
	VALUE	VOLUME
Kenya	\$154 M	18.7 MtCO <sub>2</sub> e
DRC	\$21 M	4.6 MtCO <sub>2</sub> e
Uganda	\$17 M	2.5 MtCO <sub>2</sub> e
Ghana	\$11 M	1.6 MtCO <sub>2</sub> e
Mozambique	\$7.2 M	1.0 MtCO <sub>2</sub> e

Note: M = million; \$ = United States of America Dollars

Source: Hamrick and Goldstein, 2015

## **Chapter 4 Research Framework and Methodology**

### **4.1 Introduction to Chapter Four**

This chapter presents a detailed methodology for this research. The chapter begins with background information on energy laws and policies in order to highlight their importance and issues dealing with how energy laws and policies are developed. This is then followed by an explanation of the challenges in evaluating and determining the effectiveness and success of a policy or law because of the dynamic nature of the indices and socio-economic parameters related to renewable energy development and climate change management. An assessment of different approaches for determining the effectiveness and success of a policy and/or law is also provided. The chapter also provides the rationale for using data from primary and secondary sources for this research as qualitative research approaches were used for the research. The research was broadly divided into two phases. The first phase consisted of a literature review and two pre-tests. Phase Two developed on the data from Phase One, and consisted of face to face interviews with respondents in Malawi.

### **4.2 Regulatory Framework for Renewable Energy Development**

Poor people in developing countries are often the first to suffer from the results of poor policy, planning or investment decisions which undermine development and lead to resource degradation (OECD, 2012). Furthermore, the quality of development policy and planning processes affect the long-term success of development and play a significant part in progress towards the MDGs (ibid). Energy planning and policy therefore encompasses plans, goals and strategies; and regulatory frameworks that can help achieve the necessary economic, social and institutional conditions in the energy sector to improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services for sustainable development and poverty reduction (Ottinger et al., 2005). The field of energy planning and policy is not just a government function, but other stakeholders such as Non-Governmental Organisations (NGOs) or private organisations also have vital roles to plan energy resource use, develop policy instruments that shape energy production and consumption, and regulate oversight over energy resources (Carley et al., 2011).

Policies whose specific goal is to promote renewable energy fall into three main categories: (1) price setting and quantity-forcing policies, which mandate prices or quantities; (2) investment cost reduction policies, which provide incentives in the form of lower investment costs; and (3) public investments and market facilitation activities, which offer a wide range of public policies that reduce market barriers and facilitate or accelerate renewable energy markets (Beck and Martinot, 2004). Other commentators categorise the policy measures into four main categories namely (1) regulations governing market access, (2) financial assistance and incentives, (3) addressing subsidies for conventional energy, and (4) public-private partnership and stakeholder involvement (van Alphen et al., 2008). The crucial aspect to remember is that policy measures are aimed at addressing specific barriers to the utilisation of renewable energy and as such the policy measures can target one or a combination of barriers or a combination of policy measures can be used to address a specific barrier or a combination of barriers. This could all be dependent on current institutional factors and the socio-economic context in a country or region

### **4.3 Research Approach**

In order to achieve the objectives of this research as described in the introduction, it can be argued that a logical methodology would be to compare the effectiveness and generating capacity of the energy sector in Malawi before and after the implementation of some policies and legislation aimed at enhancing the energy sector or more especially assess the increase in the adoption of renewable energy technologies before and after the implementation of renewable energy policies, strategies and projects. However, such an assessment would possibly give out misleading conclusions as the (renewable) energy sector is influenced by a myriad of exogenous variables and shocks which have direct and indirect bearing on pertinent laws and policies and subsequently indirectly the development and growth of the conventional energy sector and the renewable energy sector. A closer look at the socio-economic profile of Malawi shows that the country is highly vulnerable to external shocks, including unpredictable and unreliable aid flows; adverse weather conditions and terms of trade shocks; and weak implementation capacity or lack of capacity to steer reforms within and across sectors. Furthermore, inadequate policy responses to exogenous shocks, such as reduced aid flows and deterioration in terms of trade exacerbates the impact of these shocks on the economy (IDA/IMF,

2012). These aspects can therefore positively or negatively influence the impact of a policy.

Dependence on donor aid could be detrimental to the development of Malawi because generally individual donors have their own priorities depending on the type of aid packages and programmes, overall budget and spread of investments which vary from time to time due to political considerations, historical patterns of influence, and commercial interest (OECD, 2012). Furthermore, the provision of donor aid is subject to many constraints as finance may be diverted to other programmes, budgets may be cut, planned interventions may be inappropriate to local circumstances and timescales for delivering effective change may be much longer than the programmes themselves (ibid). Therefore, it is plausible that even good energy policies can become ineffective due to the influence of changes in donor priorities overtime.

Another potential problem with using generating capacity as the only index to highlight whether policies are succeeding or not in improving the energy sector is that it masks some socio-economic issues that are particular to Malawi and other developing African countries. As highlighted in the preceding chapters (see table 2.3 on pp. 21), Malawi (as well as many countries in SSA) has inequitable distribution of access to electricity with the urban electrification rates being significantly higher than in rural areas.<sup>32</sup> For example in Chad, regardless of a high rural population (i.e. 80% of Chadians live in rural areas), more than 80% of the electricity produced in the country is consumed in N'Djaména (the capital city) and it is only one-third of the city that has electricity (GoC, 2008; IRENA, 2011: pp. 21).<sup>33</sup> In such a setup it is plausible for the national generating capacity to be increased but only in urban areas hence perpetuating inequality between the rural and urban communities.

According to Abdullah and Jeanty (2011), in some communities, particularly in rural areas, it is the accessibility and costs of connecting to electricity that is the main

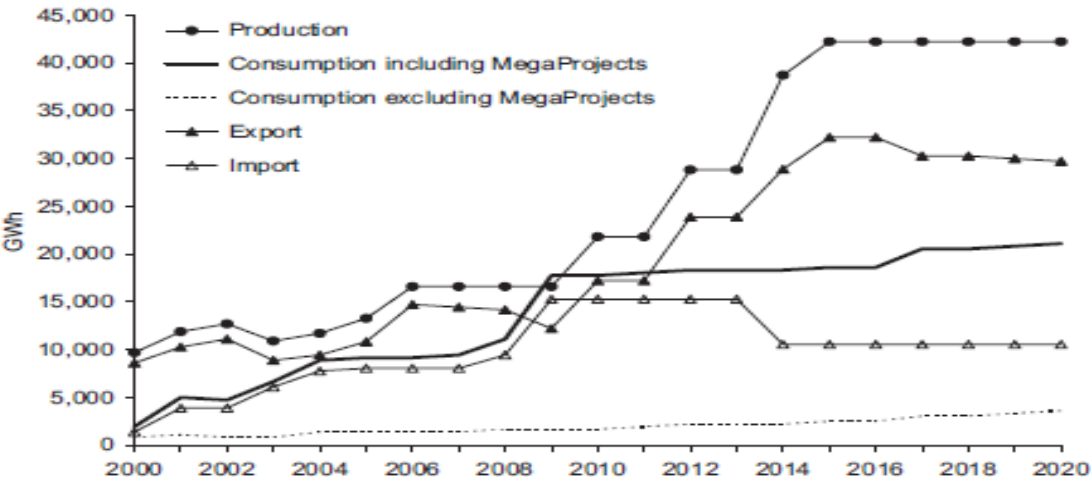
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<sup>32</sup> The electrification rate of Malawi is 9% (in urban areas 33% of households have electricity in their households, whilst in rural areas only 2 % of households have electricity) (GoM, 2012a).

<sup>33</sup> Nearly eight Chadians in ten live in the rural areas. N'Djaména, the capital, is by far the largest city. However, less than 11% of the population lives in N'Djaména and the country's three other main cities. Other urban centres account for less than 10% of the population (GoC, 2008). Additionally, IRENA (2011: pp. 21) recorded the generation capacity of Chad to be 32 MW, and the country's electricity use per capita as 9 kWh in contrast to an electricity use per capita of 579 kWh for Africa.



challenge not the availability of generation capacity. Consequently, what is not easily apparent is that circumstances also exist where improvements and increases in generating capacity can be attained but still not improve the affordability and accessibility of modern energy services (electricity) to some segments of society. For example, 21% of households in Malawi have electricity within 100 meters from their dwellings but only 7% of those households use electricity due to the cost implications (GoM, 2010b). A similar situation also existed in Botswana whereby connection to the grid by households had been low in circumstances where a connection subsidy was not provided (GoB, 2009). Similarly, in Mozambique despite a generation capacity of more than 2,075MW (in 2008) (Mulder and Tembe, 2008), only 8% of the population had access to electricity as most of the electricity produced was for export and commercial consumption (i.e. for use in industry and mining sectors) (ibid) (figure 4.1). Arguably, Mozambique’s energy sector was therefore not benefiting all segments of society particularly rural households. Arguably, that scenario highlighted that the use of generation capacity was not an ideal index for describing issues in the energy sector (i.e. a generation capacity cannot show if an energy policy has been successful within a Malawian/African setting because on its own it cannot show if improvements in the generating capacity are leading to equitable improvements in access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services for sustainable development and poverty reduction).



Note: Mega projects refers to industry and mining sector projects such as the Mozal aluminium smelter, Moma mineral sand mining project, and large-scale coal explorations.

Figure 4.1 Electricity sector in Mozambique (2000-2020)

Source: Mulder and Tembe, 2008

Energy distribution is also an important aspect in energy policies. Consequently, consideration also has to be made to ensure that the levels of energy access can be determined from the indices used since in some circumstances a country can produce sufficient amounts of energy for its internal consumption but could be unsuccessful in delivering that energy to the whole population. For example, in Zambia, although for many years the installed capacity was significantly higher than the demand, the excess generating capacity could not be exploited to supply rural areas (Haanyika, 2008) hence highlighting issues to do with distribution, transmission and affordability of electricity. Figure 4.1 and table 2.3 (pp. 21) also illustrate that Mozambique has an electrification rate of 39% even though the country's energy production significantly exceeds local consumption. A contributing factor to this could be a national orientation to exporting energy to neighbouring countries and limited infrastructure in rural areas to adequately distribute energy to all households.

Politics also have an influence on the development, implementation and outcome of laws and policies. For example, changes in government administrations can lead to a slowdown of reform processes initiated by a previous administration<sup>34</sup> (World Bank, 2011: pp. 4). Long-term and stable policy environments are acknowledged to be vital criterion for the success of developing renewable electricity markets (Bürer and Wüstenhagen, 2009; Zerriffi, 2011). Policies therefore need to show a degree of predictability in order to capture the degree of certainty associated with a policy instrument and its future development (instrument's overall direction, detailed rules, and timing) (Rogge et al., 2011). However, various reasons make it hard to bring about predictability more especially at policy implementation stage where political considerations become imperative. It has therefore been suggested that understanding the political economy of the situation (in addition to social realities as well as the market function) is essential when addressing issues pertaining to energy, because the various stakeholders such as politicians, firms, consumers and other interest groups can all influence the decision-making process, and the key elements

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<sup>34</sup> For example, despite the implementation of the Nigerian Biofuel Policy and Incentives (2007) to create a favourable investment climate for the entrance of Nigeria into the biofuel sector, Nigeria's bioenergy sector has still not been transformed because among other reasons a government administration change. The administration of President Obasanjo (1999–2007) focused on revitalisation of the agricultural/bioenergy sector, but the following administration of President Jonathan paid less attention to agriculture/bioenergy, and focused instead on conventional hydroelectricity and thermal power plants to quickly deliver Nigeria from an impending energy crisis (Ohimain, 2013).

of energy inequality and sustainability must be central to any policy development, and both of these fall largely into the realm of political orientation (Abdullah and Markandya, 2012). For example, some energy sector interventions such as Power Sector Reforms in Malawi, Zimbabwe, Tanzania, Ghana, etc. (UNECA, 2007) were not effective in boosting the investment potential of the Africa's energy sectors because all the elements of the policies/reforms and proposed interventions were not undertaken by various governments. This highlighted a problem to do with policy implementation and acceptability rather than the philosophy of the policies themselves. In this instance, the policies and reforms did not achieve their objectives because some governments were not willing to adjust tariffs for full cost recovery as stipulated in the reforms (OFID, 2010) hence the energy sectors could still not manage to attract the necessary investments from the private sector.

In addition to the factors mentioned above, also crucially important is the sequencing of policy measures or policy pathways in order to achieve the stated objectives (Scrieciu et al., 2013) and ultimately, what may be most significant is not so much the type of policy instrument deployed but the precise design and interactions of the policy measures with other measures from other policies since positive interaction between policy instruments is required to avert policy conflicts (TCCCR, 2013). Other researchers also highlight that as (climate) policy implementation progresses, new policy instruments may emerge following political changes and as such the introduction of other instruments may complement and reinforce or undermine the effectiveness of existing policies (i.e. cause policy congestion where new solutions produce new issues in the shape of policy overlaps, jurisdictional conflicts and unplanned results; or the misguidance of environmental regulations based on single policy instruments) (Yeoh, 2008). This analysis therefore shows that the effectiveness of laws and policies is not only a matter of identifying the main socio-economic and technical obstacles but that the timing of actions when implementing policies could therefore positively or negatively influence the development of the renewable energy sector regardless of what is prescribed in the country's (renewable) energy laws and policies.

The aforementioned factors highlight some aspects that were considered in this research in order to comprehensively understand if Malawi's policies and laws were

having a positive impact on the development of the energy sector, renewable energy utilisation, equitable development, and climate risk management.

The issues outlined above generally highlight major factors to consider when developing an energy policy/renewable energy policy/climate change policy and/or when evaluating the effectiveness of an energy policy/renewable energy policy/climate change policy. The indices used, main objectives of the policy, how a policy is implemented, how the policy interacts with other policies and the influence of external issues on the policy all have a significant bearing on the outcome of a policy. It can therefore be deduced that in order to attain the goal of this research all these considerations have to be borne in mind and incorporated when evaluating Malawi's energy regulatory framework, renewable energy policies and climate risk management strategies; when collecting primary data; and also when putting forward suggestions and recommendations for stakeholders.

#### **4.4 Research Methodologies from Comparable Studies**

Different research methods can be undertaken in order to determine the impact of law and policy on the development of renewable energy sources and access to climate finance in Malawi. In measuring the effectiveness of renewable energy policies, most of the literature uses installed capacity (energy generation capacity) as the dependent variable rather than explicitly addressing investment and details of policy implementation (Wüstenhagen and Menichetti, 2012). The threats, shortfalls and inadequacies of basing/evaluating a policy's effectiveness on the installed capacity have already been highlighted in the previous section. Since most literature still uses installed capacity as the dependent variable regardless of the aforementioned limitations of installed capacity as an indicator for showing the effectiveness of energy sector policies, it can be argued that installed capacity is still a useful and commonly used indicator for easy comparisons and communication to various stakeholders as opposed to investment and details of policy implementation which are more technical and valuable for determining project risks. Additionally, this assertion by Wüstenhagen and Menichetti (2012) also highlights the importance of understanding the business and investment environment at various times in a country as they have a significant bearing on the development of the energy sector and outcomes of policies.

Various research methods can be utilised in order to determine the impact to which some laws and policies have had on the development of the energy sector/renewable energy sector. Below are some examples of research methods that have been used in various studies. The examples below are important in this research (i.e. important for the selection of research methods for this research) as they illustrate different approaches that are available to renewable energy policy analysts and researchers, the data required in order to use some methods and the limitations of some approaches. The research methods include:

1. analysing the differences in energy generation capacities in relation to the timing of the enactment of various renewable energy laws and policies (Schuman and Lin, 2012);
2. categorising and comparing different policy measures (price systems and incentive systems) for a specific renewable energy technology (i.e. wind energy) (Liu and Tan, 2011);
3. analysing how a policy framework influenced the development of various aspects relating to the development and generation capacities of different renewable energy sources, listing the laws, regulations and policies related to renewable energy development and showing the context and applications of renewable energy developments (Zhao et al., 2011);
4. providing case studies highlighting how various instruments and incentives were deployed to encourage the development of renewable energy sources (Porter, 2012);
5. using a panel data over 50 US states for the years 1991-2007 with a state fixed-effects model with state-specific time-trends to estimate the effects of state policies on the penetration of various emerging renewable electricity sources (Shrimali and Kniefel, 2011);
6. summarising and categorising renewable energy policies and barriers (Beck and Martinot, 2004);
7. reviewing the trends, policies, plans and programmes for increasing energy access (Kemausuor et al., 2011);
8. discussing the (inter)national policies, agreements and legislation related to renewable energy (biofuel production, processing and trade in Mozambique) and subsequently looking at how incentives and restrictions established in

these policies could influence the development of the biofuel sector (in Mozambique) (Schut et al., 2010);

9. employing panel data (1992-2008) to conduct an econometric analysis of the effectiveness of FIT policies in promoting solar photovoltaic (PV) and onshore wind power development in 26 European Union countries (Jenner et al., 2013);
10. analysing progress achieved in meeting the objectives and target set in the Nigerian Biofuel Policy and Incentives (2007) four years after implementation (Ohimain, 2013); and
11. reviewing case studies and biofuels policy related frameworks in selected Sub-Saharan countries (Jumbe and Mkondiwa, 2013).

The above eleven methods which were identified through a literature review of contemporary issues in renewable energy deployment show that researchers can equally use qualitative assessments (e.g. case studies) or quantitative assessments (e.g. models) to determine the impact of various policies over time. Quantification often makes observations more explicit as it makes it easier to aggregate, compare, and summarise data as well as open up the possibility of statistical analyses, ranging from simple averages to complex formulas and mathematical models. Quantitative data, then, offers the advantages that numbers have over words as measures of some quality. On the other hand, they also carry the disadvantages that numbers have, including a potential loss in richness of meaning (Babbie, 2010; Research Methods Knowledge Base, 2013). Consequently, this research used qualitative assessments to be inductive and to provide the flexibility to allow the exploration of issues as diverse as people's perceptions of using renewable energy to how international climate change agreements impact socio-economic development in Malawi.

#### **4.5 Data and Institutional Considerations**

Some perspectives on policy evaluation calls for ex ante monitoring then ex post monitoring to assess the impact of the policy (i.e. predict likely impacts prior to implementation and then evaluate post implementation and understand difference between predicted and actual outcomes) (Stern et al., 2005). Such a strategy might

not be ideal for a LDC like Malawi<sup>35</sup> since such a strategy is effective where the availability, collection and storage of data over a long period of time would not be a problem and there are effective institutions in place to manage this data. Another important consideration is that the barriers that are in the energy sector to which different policies and laws are introduced to overcome can be technical, economic, institutional, organisational, political, social or environmental. These barriers tend to be interrelated and therefore difficult to isolate the impact of one single barrier (Ahlborg and Hammar, 2014). In this regard, some policies and laws are introduced within a framework to complement each other hence making the task of assessing the effectiveness of a single law and policy problematic. In these cases each of these policy mechanisms works together with and complements the others; conversely, many of the challenges require examining each of the mechanisms to see how they can be improved to bolster each other and function together to provide a stronger policy framework for renewable energy development (Zhao et al., 2011).

Some commentators have pointed out that regulatory mechanisms can be the least-cost way to transform markets, particularly for new products and systems (such as renewable energy technologies). However, for regulatory mechanisms to be effective they need to be supported by strong and effective local institutions and good governance, which can take many years to cultivate (Sarkar and Singh, 2010). According to Eberhard and Shkaratan (2012) a contributing factor to the failure of some regulatory reforms and policies is that some governments in developing countries often underestimate the difficulty of establishing new public institutions, and do not appreciate that building enduring systems of governance, management, and organising and creating new professional capacity are lengthy processes. Arguably, power sector reforms in many African countries (i.e. Kenya, Zimbabwe, Senegal, Tanzania, Ghana, Malawi, Burkina Faso, Zambia, Eritrea, Namibia, Cameroon, etc.) started in the late 1990s (UNECA, 2007), hence the consequent new regulatory institutions are no more than a few years old and few are older than ten, and many are still fragile and lack capacity (Eberhard and Shkaratan, 2012). For example, in Malawi, the Malawi Energy Regulatory Authority (MERA) was established after 2004.

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<sup>35</sup> Malawi and all its neighbouring countries namely Mozambique, Zambia and Tanzania are amongst the world's 48 LDCs due to their low levels of socioeconomic development, low Human Development Index ratings, low gross national income (GNI), and their high degree of economic vulnerability.

It also has to be borne in mind that transplanting successful regulatory interventions from one country to another is neither easy nor a recipe for automatic success as the institutional arrangements and socio-economic conditions differ greatly, and the dynamics between society and technology can be very different (Bhattacharyya, 2012a). These aforementioned factors have two major implications on policy development and implementation. The first is that a policy that has been successful in one country or area might not necessarily work in another area, setting or context. The other implication is that these factors highlight the importance to which time has on realising the objectives of certain policies. Time is needed for the policy objectives to consolidate and make changes to the existing status quo and time is also needed for institutions (new and old) tasked with implementing policies to successfully undertake their functions. How much time is therefore enough time to allow for the processes and objectives contained in a policy to materialise? The answers to this question can be varied possibly due to differences in energy endowments, economic development, social realities and existing market functions within and between countries.

#### **4.6 Research Questions**

To understand and tackle sustainable energy and sustainable development issues affecting different countries in Africa (such as Malawi) one has to have an understanding of the complex, difficult and controversial nature of the interaction between politics, economics, law, environment and engineering (OFID, 2010). This is particularly relevant to Malawi as most energy sector/renewable energy sector investments are promoted by the government and donors as such can be least influenced by laws and policies that are vital in a true market based economy and energy sector. In addition to this, other researchers such as Currie (2012) consider the current policy framework in Malawi (including policies from sectors outside energy such as forestry and Local Government) to be both complex and incomplete. This is the case because the country does not have a single policy encompassing off-grid renewable energy at the community and household level to assist with developing an effective and enabling regulatory environment which can enable effective off-grid energy services to contribute to the development of a range of 'basic services' which are essential to enable Malawi to meet the MDGs, Vision 2020 and the aspirations in MGDS II (Currie, 2012).



Therefore, with regard to the objectives of this research, an optimum methodology for this research would have to answer various renewable energy sector and non-renewable energy sector questions within the context of Malawi. The questions that can help in achieving the objectives of the research include:

- Do laws and policies have an impact on the development of renewable energy sources in Malawi?
- What have the existing energy related laws and policies achieved in improving the energy sector (renewable energy and non-renewable energy sub-sectors)?
- Do the existing energy related laws and policies need to be amended or be given more time for their impacts to be noticed?
- Are there any inadequacies with the implementation of renewable energy laws and policies in Malawi?
- Is there a need for other supporting frameworks and institutions to improve the effectiveness of energy related laws and policies?
- Which laws and policies have an impact on the development of renewable energy sources in Malawi?
- What are the necessary conditions that are needed in order to make laws and policies to have an impact on the development of renewable energy sources in Malawi?
- What aspects can make laws and policies not to have an impact on the development of renewable energy sources in Malawi?
- Do laws and policies have an impact on improving access to climate finance in Malawi?
- What are the necessary conditions that are needed in order to make laws and policies to have an impact on improving access to climate finance in Malawi?
- Is there a need for other supporting frameworks and institutions to improve access to climate finance in Malawi?
- Is there a need for other supporting frameworks and institutions to improve the implementation of energy related climate finance projects?

#### **4.7 Research Plan and Data Sources**

In order to address the issues highlighted in the previous sections and achieve the objectives of this research, an analysis of Malawi's energy sector was undertaken. Furthermore, analyses of the socio-economic status of the country were also undertaken in order to determine the impacts that laws and policies have on the development of renewable energy in Malawi and have an appreciation of the (socio-economic) context in which the laws and policies operate in.

The research methods selected for this study were chosen to facilitate the analysis of structures, best practices, challenges and barriers to the development of renewable energy in Malawi and other developing nations, and assess the influence that laws and policies could have to facilitate the development of renewable energy and access to climate finance in Malawi. The research therefore utilised literature reviews (policy reviews and academic literature reviews), questionnaires, key informant interviews, case studies and field surveys/observations. The process followed from the development of the research problem to the writing of the thesis is shown in figure 4.2.

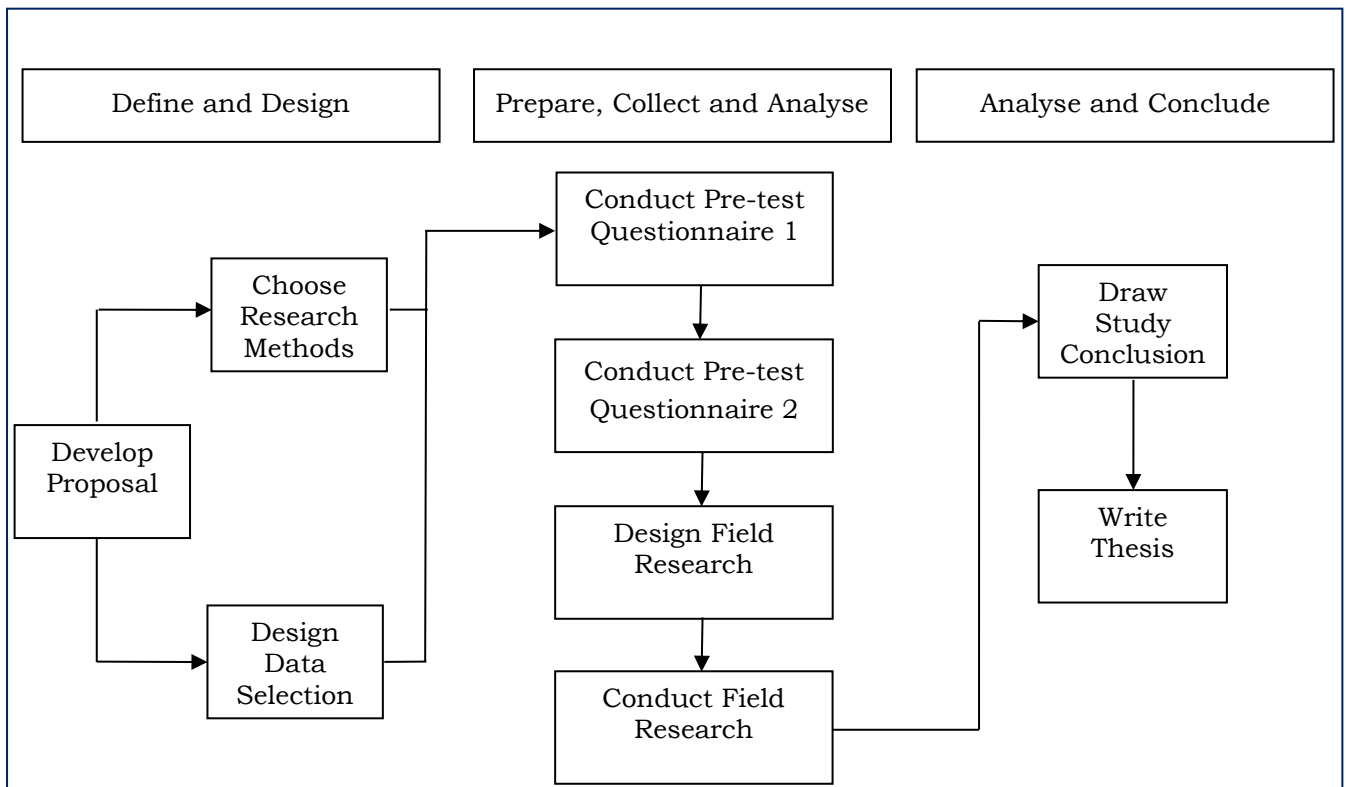


Figure 4.2 Research method process  
 Source: Adapted from Kavaratzis (2008) and Yin (2003)

**Literature Review-** Secondary data (e.g. Poverty Reduction Strategy Papers (PRSP), energy policies for different countries) were used in order to determine a baseline and establish the maturity of renewable energy with regard to the renewable energy sectors in various developing countries. The literature review also provided insights into existing laws and policies in Malawi as well as climate change and renewable energy sector projects/initiatives and reports.

**Questionnaires-** Questionnaires were developed and sent out during the course of the research in order to elicit information and generate primary data. The questionnaires were developed to elicit information such as what were the current and proposed energy laws and policy in the different countries, current and proposed energy projects in the different countries, factors influencing the development and enforcement of energy laws in the different countries, drivers for energy laws and projects in the different countries, existing climate finance projects in the different countries, etc.

**Case Study Analyses-** Case studies help to provide an understanding of how and why things happen in certain policy context (de Oliveira, 2009). Different case studies were analysed in order to provide in depth insights into the economic and socio-

political aspects as well as dynamics that have contributed to the success or failure of different power reforms, projects, and energy laws and policies.

**Key Informant Semi-Structured Interviews-** These were undertaken with stakeholders in Malawi in order to provide primary data on the complexities, gaps and challenges associated with balancing energy laws and policies and other economic and socio-political issues (e.g. climate change, environmental protection, food security, economic development, etc.).

#### **4.8 Sampling**

The research sought to solicit information from individuals and stakeholders that had technical expertise in various aspects related to energy policies, climate change issues and development. Consequently, purposive (judgmental) sampling was used. In such a situation, the respondents were selected based on their own or their institution's influence and importance in (renewable) energy processes (supply and demand) and/or public policy formation and implementation (i.e. climate change and environmental management). Arguably where purposive (judgmental) sampling is used, the sampling size of the informants is not a crucial element in assuring the accuracy of information (Al-Ghorbany, 2014). Al-Ghorbany (2014, pp. 5-6) further elaborates that a small number of specially selected informants is often better than a larger, extensive random sampling of informants since the accuracy of information provided by the informants is related to the extent to which they interacted with other experts in their professional network. Moreover, since the research was exploratory in nature and relied on the perspectives of experts, the research was based on the construction of analytical generalisations rather than statistical generalisations.<sup>36</sup> Such an approach enabled the researcher to capture the concerns of the decision-makers, managers and experts, and their probable solutions.

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<sup>36</sup> In analytic generalisation, the researchers strive to generalise from particulars to broader constructs or theory. In the course of their analysis, qualitative researchers distinguish between information that is relevant to all (or many) study participants, in contrast to aspects of the experience that are unique to particular participants. Through rigorous inductive analysis, together with the use of confirmatory strategies that address the credibility of the conclusions, qualitative researchers can arrive at insightful, inductive generalisations regarding the phenomenon under study. On the other hand, in statistical generalisation quantitative researchers begin by identifying the population to which they wish to generalise their results hence researchers proceed to select participants from that population, with the goal of selecting a sample that is representative of the population (Polit and Beck, 2010).

## **4.9 Stakeholder Groups**

A diverse set of respondents and stakeholders was sought since the research sought to assimilate technical and social-economic considerations that can improve renewable energy deployment and access to finance in Malawi. This follows that controlling for the factor of natural resource availability/renewable energy resource availability, low carbon transition, renewable energy deployment, and climate change mitigation and adaptation are driven by an appropriate conglomeration of innovation and diffusion of efficient technology, accurate policy mix and social readiness (Roy et al., 2013). This implies that the energy systems in a country are determined by a complex interplay of several factors such as the availability and types of natural resources, existing infrastructure, stage of development, political priorities of the actors, financial resources, returns to investment, and behavioural response of the users (ibid). Various people and institutions have therefore different roles and responsibilities within the renewable energy and climate finance supply chain.

Secondary data (e.g. Biagini and Sagar, 2004; EUEI-PDF, 2009; GoM, 2003a; GoM, 2010; van Alphen et al., 2008) and literature reviews undertaken during this research highlighted the various roles to which various institutions have on the (renewable) energy sector as well as highlighted the groups, institutions and stakeholders that undertake renewable energy projects and stakeholders that have been consulted in the drafting of various policies, laws and projects. Major energy sector stakeholders can be sub-divided into organisations involved in energy supply; agencies responsible for areas that create energy demand; agencies who facilitate financing for the energy sector; organisation mandated for developing energy policy; and intermediaries (e.g. NGOs). Other studies consider the sustainable market development for renewable energy to involve four main groups of stakeholders: users of the technology, the supply chain (e.g. local manufacturers, assemblers, shops and maintenance technicians), policy makers and financiers (Glemarec, 2012). In addition to this, other commentators point out that practical developments in the energy sector concern about 75% institutional factors and only about 25% of science and engineering as such the influence of planners, politicians, financiers and the media could be substantial (Twidell and Weir, 2006) in ensuring that policies are both developed to consider the needs of all stakeholders and ensuring that the public accept and adopt policy actions.

With the aforementioned factors in mind, this research broadly categorised the stakeholders into eight groups namely:

1. Policy and Law Making, and Regulation (including Government Departments, Statutory Corporations, and Parastatal Organisations);
2. Media (Radio, Television, Newspapers, etc.);
3. Financiers (Commercial Banks, Microfinance Institutions, Multilateral Lending Institutions, Bilateral Lending Institutions, Donor Agencies);
4. International Development Organisations;
5. Academic, and Research and Development Institutions;
6. Private Sector (including Consultants, Project Developers and Independent Power Producers);
7. High Energy Demand Organisations (Industries related to Mining, Agriculture, Construction and Tourism); and
8. Civil Society and NGOs.

Energy services consumers are stakeholders in the energy sector as they are users of renewable energy technologies and/or services provided through renewable energy sources. Energy services consumers were not included as stakeholders in this research due to sampling and resource constraints.<sup>37</sup> Consumers for energy services fall into different categories such as high income households and low income households; high household energy consumers and low household energy consumers; rural households and urban households; formal businesses and informal businesses; employed persons and self-employed persons; commercial institutions and non-commercial institutions, grid connected energy services consumer and off-grid energy services consumer; etc. All of these categories of consumers have varying needs and expectations of energy services hence would have needed to be adequately sampled to get a good representation<sup>38</sup> of their perceptions on the subject matter.

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<sup>37</sup> Consideration has to be made to the fact that this research was policy and legislation based as such not many consumers or potential consumers are expected to have empirical knowledge and expertise on the laws and policies that govern and influence the energy sector let alone renewable energy generation and affordability. Moreover, since the country has a low electrification rate and high rural population, it can be deduced that a majority of the people in the country do not have practical knowledge of electricity and other forms of modern energy.

<sup>38</sup> Software to calculate appropriate sample sizes for statistical analyses such as Raosoft (2015) recommended 385 respondents as the sample size for Malawi using an estimated population of 15.8 million people (at 5% margin of error, 95% confidence level and 50% response distribution). As stated earlier in order for the results not to be skewed, the users/respondents would have to be appropriately

#### **4.10 Primary Data Collection – Phase One Pre-tests**

Phase One of the research comprised of two pre-tests which provided primary data for analysis. As part of the first phase of the research, surveys using e-mail questionnaires were undertaken with the respondents selected from various stakeholder groups in the energy and climate change management sector in various developing countries, followed by a second group of respondents from Malawi, Ghana and Uganda.

#### **4.11 Questionnaires**

##### **4.11.1 Questionnaire Format and Design – Pre-test One**

Energy choices at household, and national and international level are influenced by factors such as income, energy preferences, convenience, insurance against unreliable supply affecting domestic energy use, climate change, environmental sustainability, economic development, and energy security (Zulu, 2010; Kaygusuz, 2012). This therefore implies that the relationship between renewable energy and non-renewable energy sectors in a country could be complimentary to each other (e.g. the two sub-sectors work together to reduce costs for fuel supply and enhancing energy security) and/or adversarial (e.g. the two sub-sectors oppose each other on technical aspects and impacts to the environment hence are promoted by different stakeholders). The renewable energy and non-renewable energy sectors therefore had to be analysed together to truly assess how they influenced household and industry energy choice, and government policy, as well as how the priorities of households, industry and government also dictated the development of the renewable energy and non-renewable energy sectors. The other issue that was also important was to assess the interplay between energy sector laws and policies and non-energy sector laws and policies (i.e. if energy sector laws and policies could be effective in a setting characterised by weak non-energy sector laws and policies relating to environmental management and investment).

A questionnaire composed of two parts was subsequently developed. The first part of the questionnaire was composed of 32 statements using Likert items in order to

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categorised. For example, only 1,422,000 people (9% of the population) have access to electricity hence sampling would also have to consider this (i.e. whether people with no access to electricity should also be included in the sample and under what criteria, in addition to the considerations above on how different and varied the perceptions of the different categories of energy users would be).

determine the level to which the stakeholders agreed and/or disagreed with issues in their respective energy sectors and society. The format consisted of presenting a statement, and the respondents were required to choose among the following options: strongly agree, agree, not sure, disagree and strongly disagree.

The second part of the questionnaire had 20 open ended questions requiring the respondents to provide brief answers. In addition to providing justification for the answers in Part A, the open ended questions in Part B were aimed at discovering aspects that might not have been apparent in the literature reviews as well as to discover new and emerging threats and challenges to the renewable energy sector and climate finance sector.

The questions were drawn from analysing contemporary and emerging issues contained in the Malawi National Energy Policy (2003), Malawi Electricity Act (2004), Malawi Rural Electrification Act (2004), Malawi Energy Regulation Act (2004) and various Five Year Poverty Reduction Strategy Papers and energy policies from Malawi and other countries in Africa such as Kenya and Ghana (GoG, 2010a; GoG, 2010b; GoK, 2008; GoK, 2013; GoM, 2006). For each group of questionnaires to a specific country, the questionnaires were amended in conformance to the issues, institutions and legislation for the specific country. Phase One was therefore aimed at providing directions and new insights as to how the rest of the research (Phase Two) could progress by agreeing to or dispelling some of the information gathered from the literature reviews in the light of current circumstances since some of the laws, policies and literature were developed over eight years ago.

The questions for the questionnaire were divided into ten groups focussing of different themes.

Q1 through Q8 were in a similar group in assessing how the different legislations in the energy policy framework in the pertinent country were collectively working.

Q9 through Q12 were in a similar group in assessing the contribution of energy sector laws to the development of renewable energy and non-energy sector laws to the investments in renewable energy.

Q13 through Q20 were in a similar group in assessing the roles and contribution various actors in influencing the development of the renewable energy sector.



Q21 through Q32 were in a similar group in that they tackled energy policy related issues such as rural electrification and climate change but with a focus on how the future policies should be structured.

Q33 through Q38 aimed to assess which aspects of the renewable energy sectors required interventions to improve operations and the attainment of the energy policy objectives.

Q39, Q40, Q45, Q50 and Q51 aimed to assess the contributions of various stakeholders to the energy sectors.

Q41 through Q44 aimed to assess which aspects had been omitted in various policies hence adversely affected the deployment of renewable energy resources in the pertinent country.

Q46 and Q47 aimed to assess the link between the energy sector and other environmental concerns such as sustainable development and climate change.

Q48 and Q49 aimed to determine the appropriate responses that can be undertaken to ensure that constraints in the renewable energy sector were eliminated.

Q52 provided the respondents with the opportunity to make pertinent comments regarding the questionnaire and study.

After the design of the questionnaire, the next stages consisted of selecting respondents and e-mailing the questionnaires. In the first instance, ten questionnaires were sent to ten respondents so that any potential problems and misinterpretations from the questionnaires could be identified and amended prior to sending to another batch of questionnaires to the second group of respondents. The first batch of questionnaires was therefore developed as a pilot and control. In addition to being a pilot and control, the first batch of questionnaires would also generate primary data for comparisons and case studies on the development and implementation of various laws and policies in different developing countries. The responses could potentially also be compared to that of the main respondents for further analysis later on.

The ten control respondents were stakeholders that had a background or worked in institutions dealing with academics, industry, and business relating to renewable energy generation, transmission, distribution, application (i.e. consultancy, project development, planning, industrial research and development, and related fields) in

developing countries. The stakeholders were identified through their attendance to the International German Academic Exchange Service (DAAD) and Brandenburg University of Technology Cottbus-Senftenberg Summer School 2013 that was titled "The Integration of Renewable Energy Technologies into the Decentralised Energy Supply Systems in Developing Countries". The respondents were from a cross section of developing countries in various regions namely: Nigeria, Azerbaijan, China, Nepal, Jordan, India, Egypt, Turkey, Cameroon and Chad.

#### **4.11.2 Questionnaire Format and Design – Pre-test Two**

A questionnaire with 60 questions was developed. Part A of the questionnaire had 37 statements/questions and Part B of the questionnaire had 23 questions. The questionnaire was modified following comments and remarks from Pre-test One. The questionnaire therefore included eight more questions than the one used for the first pre-test. The questions covered in the questionnaire are provided in Appendix 3.

Part A of the questionnaire had 37 statements to assess the extent to which the respondent agreed with a statement. The respondents were required to choose among the following options: strongly agree, agree, not sure, disagree and strongly disagree. Part B of the questionnaire had 23 questions which required the respondents to provide brief answers (a maximum of four brief answers). Even though the questions in this part were phrased differently, they were correlated to the questions in the first part. The questions were designed to enable the respondents to provide justification for the answers they provided in Part A and also provide new insights and ideas on aspects that the researcher had not considered.

The questions were categorised as below:

Q1 through Q8 assessed how the energy policy and supporting energy sector legislation in Malawi (and the other pertinent countries) was collectively working. The key policies and legislations relating to the development and regulation of the energy sector in Malawi include the Malawi National Energy Policy 2003; The Energy Regulation Act 2004; The Electricity Act 2004; The Rural Electrification Act 2004; and The Liquid Fuels and Gas (Production and Supply) Act 2004.

Q9 through Q12 assessed the contribution of energy sector laws to the development of renewable energy and non-energy sector laws to the investments in renewable energy.

Q13 through Q20 and Q30 assessed the roles and contribution various stakeholders in influencing the development of the renewable energy sector.

Q21 through Q29 assessed cross-sectoral energy policy related issues such as bioenergy/biomass, rural electrification and climate change with a focus on how the future policies could be structured.

Q31 through Q34 and Q37 assessed how institutional arrangements and provisions can influence the development of the renewable energy sector.

Q35 and Q36 assessed the awareness and utilisation of the Clean Development Mechanism (CDM) as a climate finance instrument.

Q38 and Q39 assessed the challenges to energy sector regulatory frameworks.

Q40 and Q43 assessed the impacts of various policies on renewable energy deployment and the development of the energy sector.

Q44 and Q45 assessed the needs of various stakeholders.

Q46 and Q47 assessed the issues that could assist with enhancing energy policies and rural electrification.

Q48 and Q49 assessed the energy and non-energy policies that can improve the utilisation of renewable energy sources.

Q50 assessed the issues that could encourage the private sector to invest in renewable energy projects.

Q51 and Q57 assessed the management of climate change and climate finance aspects in Malawi (and the other pertinent countries).

Q52 assessed the influence of energy on poverty and sustainable development.

Q53 and Q54 assessed the role of policies in reducing energy sector growth constraints.

Q55 and Q56 assessed the influence of consumers on energy sector developments.

Q58 and Q59 assessed previous energy sector interventions that had been successful.

Q60 gave the respondents an opportunity to give out their comments and suggestions on issues pertaining to the study.

#### **4.12 Primary Data Collection – Phase Two: Main Study**

Phase Two of the research comprised of key informant semi-structured interviews with respondents/stakeholders from Malawi undertaken in Malawi. After analysing the questionnaire responses from the pre-tests, eleven guide questions were developed

as a way to guide the interviews and discussions on key-points and themes related to the research. Consideration was made to the fact that different respondents had different expertise and familiarity with the issues and as such the discussion and interviews could not touch on all eleven questions but rather on the questions that were more relevant to the roles and experiences of the respondent.

Purposive (judgmental) sampling and snowballing techniques were used in order to identify stakeholders and respondents. During interviews the respondents were asked to specify or nominate another individual who was knowledgeable on issues that were being pointed out as the interviews were progressing. This approach was chosen as the stakeholders through their work activities (workshops, field trips, etc.) and business networks had a better knowledge and understanding on who had expertise and current knowledge on the latest developments related to the research themes. A total of 26 respondents were interviewed. The interview guide and question framework is provided in Appendix 4.

#### **4.13 Ethics, Health and Safety**

This research was principally about gaining insights into the renewable energy sector and climate finance activities in Malawi (and other similar countries). To avoid any bias from the respondents such as “warm glow” whereby respondents answer in a manner to please the researcher (Hogarth, 2012), the questionnaires were framed as a means to solicit information on energy sector (renewable and non-renewable energy sectors), environment, and climate change management issues within the different countries. Questions about the development of the renewable energy sector and access to climate finance, and the influence of law and policy on these issues were therefore not being prominently highlighted as the main focus of the research.

The confidentiality of the respondents was preserved with the data being restricted for use only in relation to this research.

No health and safety risks were identified as Phase One was primarily a desk based exercise. The discussions and interviews for Phase Two were undertaken at the respondent’s place of business or mutual public area as these were deemed quite safe.

## **Chapter 5 Results and Discussion Phase One (Pre-test One)**

### **5.1 Introduction to Chapter Five**

A questionnaire with 52 questions divided into two parts was developed (i.e. 32 statements in Part A and 20 questions in Part B). Part A of the questionnaire had 32 statements to assess the extent to which the respondents agreed or disagreed with the various statements. The respondents were required to choose among the following options: strongly agree, agree, not sure, disagree and strongly disagree. Part B of the questionnaire had 20 questions which required brief answers (a maximum of four brief answers). The questions in Part B were correlated to the questions in Part A and had a similar theme to the ones in Part A in order to enable the respondents to provide justification on their answers to the first part and also provide new insights and ideas on aspects that the researcher had not considered.

The questionnaire was sent out as a pre-test to enable any potential problems with the questionnaire to be identified prior to advancing to the next stage of the research. The results from the questionnaires could also be used for comparisons later on in the thesis as the questionnaire was sent to stakeholders in developing countries that had valuable experiences and perspectives of their respective energy sectors.

Out of the ten questionnaires that were sent out, two questionnaires were returned. The questionnaires that were returned were from respondents from Cameroon and Nepal. This represented a 20% response rate. The results and discussion is based on the responses from a private sector stakeholder in Cameroon and Regulator/policy maker in Nepal, being the two respondents that replied. The implications of the results and concluding remarks are provided at the end of the chapter.

### **5.2 Results and Discussion – Pre-test One**

#### **5.2.1 Perceptions on the Effectiveness of Energy Sector Regulatory Frameworks**

Q1 through Q8 were aimed at assessing how the energy policies together with their accompanying and supporting legislation were contributing to the energy sectors in general and also the renewable energy sectors specifically in different countries. It

was discovered that all the legislation contained in the frameworks was significant and appropriate to the development of the energy sectors and more particular the renewable energy sector. The challenge was therefore in determining the extent to which the different aspects in the energy sector frameworks had actually promoted renewable energy deployment.

Q9 through Q12 were aimed at assessing the contribution of energy sector laws to the development of renewable energy and non-energy sector laws to the investments in renewable energy. Unlike in the previous group of questions where both respondents either strongly agreed or agreed with the statements, diverging views were noted in this group of questions and some of the respondents answered “not sure” about some of the questions contained in the statements. However, both respondents strongly agreed that renewable energy policies were vital for the development of the renewable energy sector. Both respondents were not sure of the role of non-energy sector laws and policies in developing the energy sector and renewable energy sectors highlighting that this was an area that needed to be explored more to make meaningful deductions for policy considerations.

Q13 through Q20 were aimed at assessing the roles and contributions of various stakeholders and actors in influencing the development of the renewable energy sector. Whilst the respondents agreed that most of the stakeholders were effective in promoting renewable energy developments, financial sector stakeholders and the media were highlighted as stakeholders that were lagging in comparison to the other stakeholders. The International Development Organisations were seen as the most effective stakeholder in promoting renewable energy. This scenario arguably pointed out that before renewable energy strategies are developed, consideration should be made to consulting local International Development Organisations that have a focus on energy and climate change issues in order to determine the roles that they can play in supporting the implementation of the renewable energy strategies more particularly on renewable energy financing and awareness matters. Additionally, there is arguably a need to assess the challenges and priorities of the media and financial institutions in supporting the implementation of renewable energy strategies in order to determine how they can be enhanced or can learn from other effective stakeholders (such as International Development Organisations).

Q21 through Q31 were aimed at assessing the interaction between energy policies and wider social and environmental issues such as poverty, rural electrification and climate change to assist with the future structuring of energy policies. The provision of modern energy was considered by both stakeholders as important to tackle poverty. It was also highlighted that even when policies were relevant in addressing particular energy sector issues, they still needed updating because technology, science and societal aspirations are continuously evolving as peoples' understanding of things change. This can be also more particular to climate change and bioenergy issues which are often topics of immense global public debate.

## **5.2.2 Perceptions on Aspects to Improve the Effectiveness of Energy Sector**

### **Regulatory Frameworks**

Q33 through Q38 aimed to assess which aspects of the renewable energy sectors required interventions to improve their operation or objectives. The policy setting/structure was identified as a weakness in itself hence suggesting problems with either policy development or implementation or both. Issues such as addressing the diffusion of technology and increasing awareness for the renewable energy resources were seen to be lacking. In addition to this, both respondents pointed out that the affordability of renewable energy needs to be improved be it by removing some taxes or providing better incentives for renewable energy development.

Q39, Q40, Q45, Q50 and Q51 aimed to assess the contributions of various stakeholders to the energy sectors. Local authorities were identified as another stakeholder that could play a part in the deployment of renewable energy resources. However, this would depend on existing institutional arrangements as countries differ widely in the mandates and funding given to local authorities for socio-economic development activities.

Q41 through Q44 aimed to assess which aspects had adversely affected the deployment of renewable energy resources in the different countries through their omission in policies. Project management, political instability, and governance were highlighted as aspects that required more consideration in future policies. Understanding how these issues derail renewable energy development in specific

contexts was therefore the key to ensuring the sustainability and success of renewable energy projects and policies.

Q46 and Q47 aimed to assess the link between the energy sector and other environmental concerns such as sustainable development and climate change. Q48 and Q49 aimed to determine the appropriate responses that can be undertaken to ensure that constraints in the renewable energy sector were eliminated. The introduction of subsidies and introduction of annual targets for renewable energy deployment were suggested as solutions to improving renewable energy deployment. The cost of RETs was therefore still a major impediment to renewable energy deployment as renewable energy costs are relatively higher than conventional sources in some instances.

Q52 provided the respondents with the opportunity to make pertinent comments. Apart from an admission that the respondents had problems answering all the questions, no other fundamental issues were raised by the respondents.

The results from the above analysis showed that there was a need to identify the role to which non-energy sector related policies have on the development of renewable energy and identify how political and socio-economic considerations could be barriers to renewable energy deployment as addressing these two aspects could lead to a better implementation of renewable energy policies and projects. This follows that, the stakeholders suggested that the coverage of renewable sector aspects in the energy policies was fair and that there was an assortment of various institutions and stakeholders undertaking various initiatives to promote the deployment of renewable energy, but still some inadequacies were found out in improving electrification rates and deploying renewable energy to meet the aspirations of people.

### **5.3 Chapter Conclusion**

With reference to the content and structure of the questionnaire, the returned questionnaires highlighted that the proposed respondents from the main study might have problems with answering all the questions. The two respondents for the pre-test were from two different stakeholder categories (i.e. private sector and government regulator) but both did not attempt to answer all the questions. This in itself was not a



problem as it was already envisaged that not all the respondents could be conversant with regulatory issues dealing with renewable energy, climate change and environmental management.

With reference to the responses to the questions, the returned questionnaires had captured various issues related to the renewable energy sector in Cameroon and Nepal. The valuable insights provided by the respondents could also be cross referenced with the results from the main study to assess any similarity and differences in the issues and determine if these factors could also be of significance to Malawi.

## Chapter 6 Results and Discussion Phase One (Pre-test Two)

### 6.1 Introduction to Chapter Six

This chapter contains an analysis of results from the second batch of questionnaires that constituted a second pre-test. The questionnaires were sent out in order to capture some emerging climate change and renewable energy issues, and to enhance the structure and themes for the forthcoming face to face interviews at a later stage in the research.

Some researchers consider that the renewable energy sector is a sector whereby if one country is facing difficulties it is often the case that several other countries have trialled potential solutions to that difficulty, and as such it is often the case that the shared experiences of other countries can help it identify potential solutions and where mutual interests are present different countries and organisations can work together to improve their own renewable energy generation strategies (ICER, 2012). With this consideration in mind, the researcher sought to generate knowledge and perspectives on how various renewable energy and climate change challenges are being addressed in other countries. Consequently, perspectives from renewable energy and climate change experts in Uganda and Ghana were sought. Experts from Malawi were also queried so that the perspectives from the three countries could be analysed together before proceeded to the next stage of the research.

Using purposive sampling techniques 16 stakeholders from Malawi, 16 stakeholders from Ghana and one stakeholder from Uganda were identified for the purposes of this exercise. 16 stakeholders were chosen for Ghana and Malawi in order to have two respondents from each of the eight stakeholder groups. Responses and perspectives from Ghana were sought as Ghana is a developing country in Africa that has achieved commendable progress in the field of electrification.<sup>39</sup> Uganda was chosen as a case country as it has 16 CDM projects hence is within the top five CDM host nations in Africa. The stakeholder in Uganda was chosen due to their vast experience in the renewable energy and carbon finance market, and because their

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<sup>39</sup> Ghana has made significant strides to improve its electrification rates. The country had an electrification rate of 28% in 1988. This rose to 43% in 2000, 55% in 2008, 60% in 2009 (Bhattacharyya, 2012b) and 64% in 2012. In Malawi, the electrification rate was 5% in 2000 and rose to 9% in 2012.

institution had undertaken projects in Uganda and the whole of East Africa. Moreover, as shown in table 3.6, both Uganda and Ghana are leading nations in terms of attracting and implementing climate finance through VCMs. This makes the stakeholders in these countries ideal practitioners to provide insights on how the deployment of renewable energy through climate finance could be enhanced in other African countries such as Malawi.

Two responses from Malawi were received giving a 12.5% response rate. Three responses were received from Ghana giving a response rate of 18.75%. The research had a target response rate of 20%-30% as suggested by similar researches such as Alam et al. (2014). Regardless of the lower than anticipated response rate, the surveys were still meaningful in providing relevant data for consideration into the next phase of the research and in keeping with the exploratory nature of the research. Moreover, as explained in Chapter 4.8 the size of the sample and responses was not detrimental to the study objectives since the research was based on analytical generalisation rather than statistical generalisation because the study was based on specific regulatory and policy issues that are inherently specialist areas of which many renewable energy and climate change stakeholders were not anticipated to have thorough knowledge on.

## **6.2 Perceptions on Renewable Energy and Climate Change**

A common theme that was identified from the questionnaires was that the respondents identified the level of awareness on renewable energy and climate change to be low among the different communities and institutions in Malawi, Ghana and Uganda. A low awareness of renewable energy and climate finance activities could be seen to be detrimental to efforts aimed at improving the renewable energy sector because the true value to which renewable energy could bring towards socio-economic development were not valued and understood.

As shown in figure 6.1 (renewable energy sector stakeholders and their roles in renewable energy supply chain processes) and figure 6.2 (renewable energy sector stakeholders and their roles in a typical renewable energy business model), the media was not always considered as a major stakeholder within the renewable

energy sector. Landi et al. (2013) and Taelle et al. (2012)<sup>40</sup> however suggested that the media and other agents that could publicise renewable energy information to be vital towards ensuring the success of renewable energy projects. This was further collaborated by the question on perceptions on shortfalls in renewable energy sectors where the respondents highlighted that education and awareness were noted as aspects that were not well addressed in the renewable energy sector. Furthermore, the question dealing with the perceptions on awareness and information about financing opportunities through climate financing instruments showed that all the respondents from the three countries agreed or strongly agreed that there was a lack of awareness and information about climate finance opportunities. The question on perceptions on issues omitted in the survey also showed that the renewable energy stakeholders highlighted that their countries had ineffective marketing strategies for promoting renewable energy technologies. All these issues pointed out the need to prioritise the media or other stakeholders that can diffuse information about renewable energy technologies within the renewable energy supply chain.

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<sup>40</sup> Promotional and training activities are needed to ensure that PVs take up a reasonable share of the energy supply mix of the country. The Lesotho Renewable Energy-Based Rural Electrification Project (LREBRE) (2007-2012) had a target to install 5,000 lighting systems in rural homes and public institutions. Awareness raising programmes were developed, including a series of field visits, awareness campaigns and product demonstrations which were held in the first year in the three target districts. Using information leaflets, promotional materials, radio programmes, workshops, exhibitions and meetings, the project sensitised the general public, rural communities and decision makers on the potential role of renewable energies in meeting basic energy needs in rural areas (Taele et al., 2012).

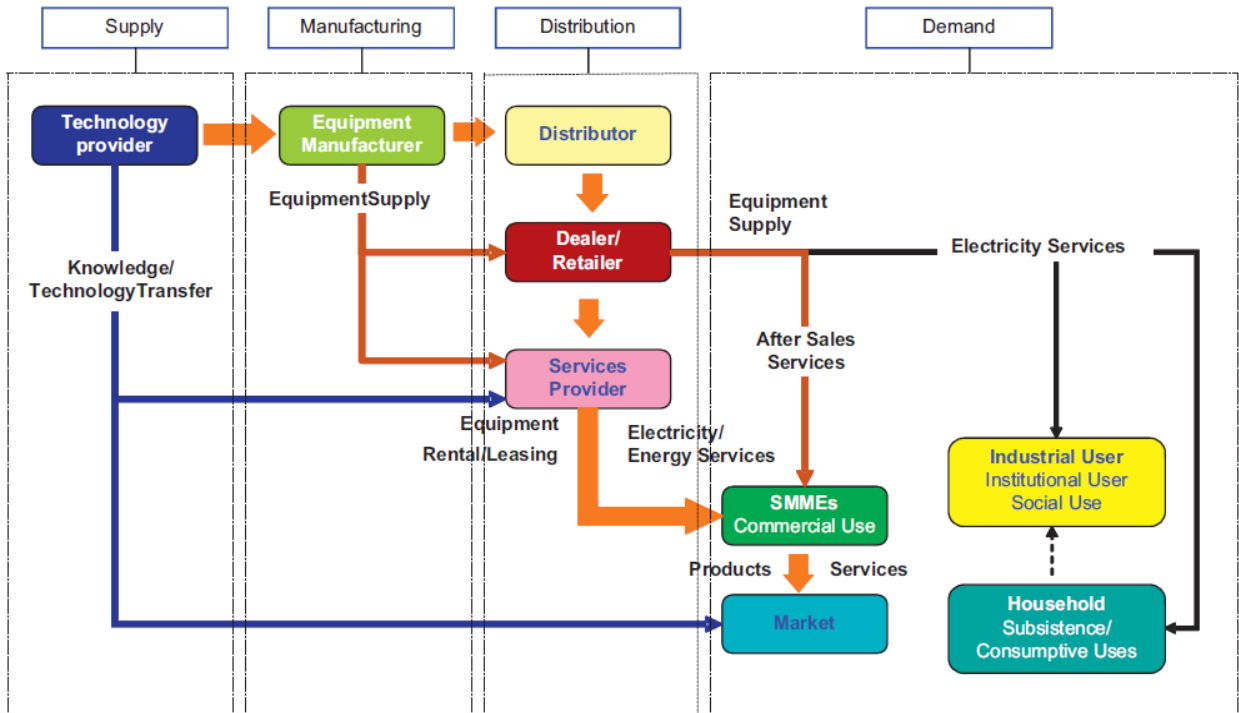


Figure 6.1 Renewable energy sector stakeholders and their roles in renewable energy supply chain processes  
 Source: Wee et al., 2012

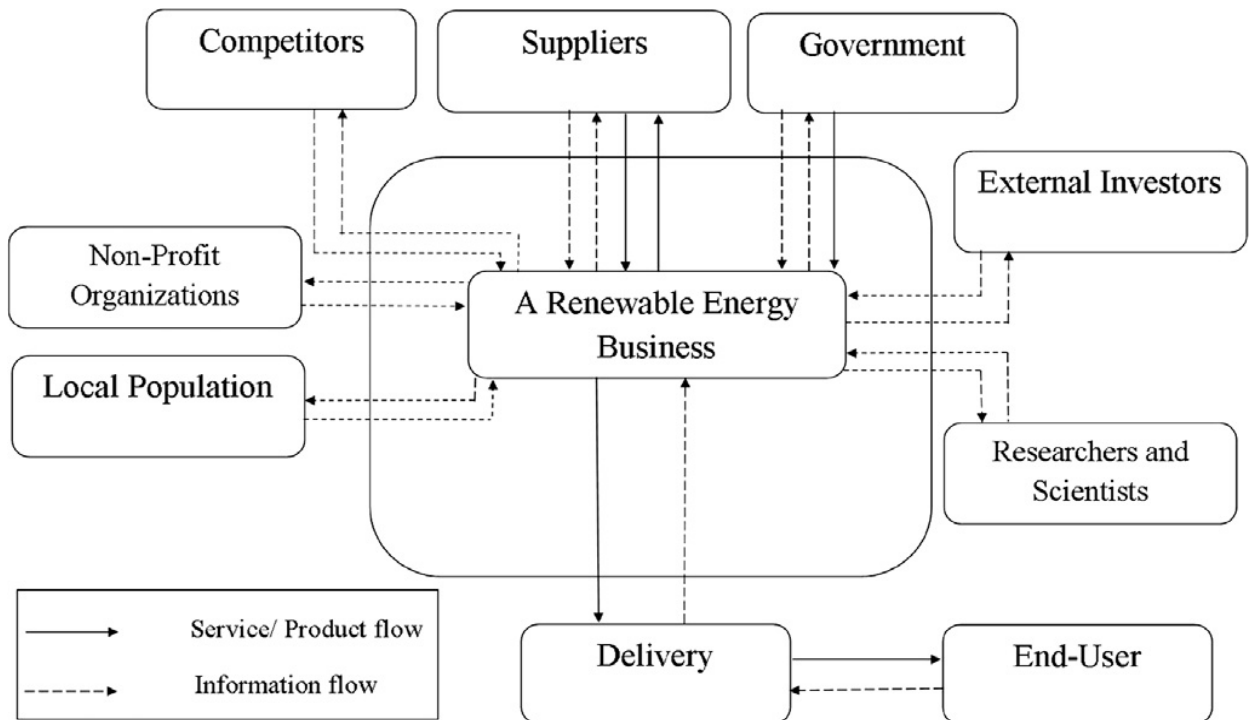


Figure 6.2 Renewable energy sector stakeholders and their roles in a typical energy business model  
 Source: Aslani and Mohaghar, 2013

According to Engels et al. (2013), public perceptions of climate change builds the foundation for decisions on carbon-reduction policies hence in the absence of knowledge and understanding of the causes and impacts of climate change, energy preferences, support for renewable energy policies and transitioning to renewable energy sources could be problematic. With this assertion in mind, it is plausible that policy makers and other stakeholder do not differentiate the technicalities and attributes of renewable energy and conventional energy supply systems within their countries since the end services are similar in most cases. Answers to Q57 (perceptions on aspects that can assist in promoting the accessibility and utilisation of climate finance instruments), Q51 (perceptions on energy and climate change related issues that require more consideration), Q45 (perceptions on the support that needs to be provided to stakeholders), and Q50 (perceptions on important issues and aspects that can encourage the active participation of the private sector and investors to promote the utilisation and development of RESs) all identified that there was a lack of knowledge (data and information) on climate change, climate finance and renewable energy to enable various stakeholders to undertake activities that could lead to a better deployment of RETs and utilisation of climate finance instruments. It was therefore not surprising to note that renewable energy development and utilisation was not to be a priority amongst the different countries as shown on Q28 (perceptions on government prioritisation of energy access issues), Q53 (perceptions on major constraints to wide-scale utilisation and development of RESs), and Q54 (perceptions on how regulatory frameworks can reduce the constraints to wide-scale utilisation and development of RESs). Renewable energy policies had therefore failed in enhancing renewable energy development due to their omission of awareness and sensitisation activities as a key element in their projects rather than only focusing on aspects to increase generation capacity from selected RETs. Revisions and amendments to energy policies and renewable energy policies should therefore have a component on collecting and disseminating relevant information that can enable targeted communities to find a need and value in the renewable energy technologies.

Just as other renewable energy studies and projects that have been done before in Malawi and other developing countries, this research reiterates that while the challenges to energy access are not unknown, the possible solutions to address

these challenges have not been adequately analysed, understood and deployed (Chaurey et al., 2012). The survey showed that in some circumstances, there were adequate resources for policy formulation and deployment (Q33- perceptions on the availability of sufficient resources for policy formulation, implementation and monitoring) and some stakeholders to be effective at promoting the deployment of RESs (Q13- perceptions on the contribution of various stakeholders to the deployment of renewable energy). However, the policies had not achieved their objectives hence highlighting that the policies had various shortfalls that were limiting the deployment of RETs and more especially utilising climate finance modalities to promote renewable energy deployment (Q50- perceptions on important issues and aspects that can encourage the active participation of the private sector and investors to promote the utilisation and development of RESs; Q57- perceptions on aspects that can assist in promoting the accessibility and utilisation of climate finance instruments).

The design of policy implementation can determine the degree of simplicity of the implementation mechanisms, and the complexity in those mechanisms generally leads to difficulties in achieving effective implementation. However, the complexity is not only a choice of policymakers in the design of the policy since many environmental problems are complex and need complex solutions (de Oliveira, 2009). The three countries sampled highlighted different problems associated with the successful implementation of renewable energy policies. In Q46 (perceptions on important issues and aspects not included in the energy policies) it was highlighted that whilst the regulatory frameworks and coverage of issues were satisfactory, more effort needed to be put towards policy implementation. In the Malawi case, even the development of the implementing instrument for renewable energy development as stipulated in Malawi's National Energy Policy (2003) was not enacted. In Ghana, the lack of clarity on the level of the FIT and the determination of renewable energy procurement targets would appear to somewhat undermine the effectiveness of the Renewable Energy Act in the short term (Norton Roseful Bright, 2013) due to a lapse of over 18 months between the assenting of the Renewable Energy Act (2011) and actual publication of the FIT rates.

### **6.3 Chapter Conclusion**

The aim of this survey which was undertaken through email questionnaires as described at the start of the chapter was to ascertain some of the aspects that have led to the success of implementing climate finance projects in Ghana and Uganda, and to determine the level of understanding of climate finance and renewable energy deployment amongst various practitioners in Malawi. This was done in order to assist with providing insights into which focus areas and themes the following phase of the study would concentrate on; and to provide insights into the most appropriate stakeholders to contact during the following phase of the research.

The survey showed that it would be wrong to assume that most of the practitioners in Malawi have read some of the main policy regulations relating to renewable energy deployment and climate change such as the Malawi Energy Policy (2003). The respondents did not answer all the questions on the questionnaire hence this could also indicate that the questionnaire covered a broad range of interrelated subjects of which the respondents were not fully conversant with. However, since the next phase of the research consisted of interviews and face to face contact, it would be feasible to direct the line of questioning and hence solicit more information from the interviewees. The surveys also highlighted how various policies are in place (in Malawi and Ghana) but arguably have problems achieving their objectives due to implementation problems. The following phase of the research would therefore be valuable if it could not only identify what policies could help with improving renewable energy deployment through climate finance instruments, but more importantly how these policies could be structured to ensure that they can be implemented readily since policy implementation and delays in the drafting accompanying legislation were highlighted as aspects that had undermined the effectiveness of some policies.



## **Chapter 7 Results and Discussion – Phase Two**

### **7.1 Introduction to Chapter Seven**

Chapter seven contains the results from face to face interviews/discussions that were undertaken in Malawi in order to address the research questions. This chapter therefore provides some insights into the various renewable energy and climate finance challenges being experienced by some institutions and communities as well as the solutions and strategies that have been put in place in order to address these shortfalls.

### **7.2 Data Collection Process**

26 interviews were undertaken with various individuals in Malawi (table 7.1). The respondents were selected based on their own or their institution's influence and importance in (renewable) energy processes (supply and demand) and/or public policy formation and implementation (i.e. climate change and environmental management).

The interviews were undertaken between 12 December 2013 and 3 February 2014. The interviews and discussions had durations of between 20 minutes to 90 minutes depending on the breadth of knowledge of the stakeholders on various renewable energy, climate finance, environment and sustainable development aspects. Phase One of the research showed that due to the differences in the competencies and expertise of the stakeholders on the various aspects of the research, not all stakeholders would be knowledgeable enough to shed light on all the themes encompassed in the research. Consequently, an interview guide (Appendix 4) with eleven questions was developed in order to ensure that the same general areas of information were collected from each interview, to provide adequate focus on relevant issues, and to allow a degree of freedom and adaptability in getting information from the interviewees. The guide was also helpful in reminding the researcher of the relevant topic areas to cover to assist in the later phase of data analysis.

Semi-structured interviews with open-ended questions were chosen for this phase of the study in order to gather information, experiences, attitudes and ideas related to the objectives of the research. Semi-structured interviews were appropriate for this stage of the research as they enabled respondents to identify significant issues and ideas themselves, and assign the importance of the various issues that were being uncovered; enabled various themes or sub-topics from the originally planned themes to emerge from the respondents themselves for further exploring; and they provided the flexibility necessary to allow participants from different organisations who act within different operational environments and have differing goals according to the specific operation fields to be appropriately evaluated (Kavaratzis, 2008).

Prior to each interview, the researcher printed out the interview guide that would subsequently be completed with the relevant responses as the interviews and discussions were progressing. The analysis below is based on the responses provided which were subsequently analysed and grouped into themes to correspond to the research questions as elaborated in Chapter 4.6 (Research Questions).

Table 7.1 List of interviews

<b>Ref. Code</b>	<b>Stakeholder Category</b>	<b>Perspective</b>	<b>Ref. Code</b>	<b>Stakeholder Category</b>	<b>Perspective</b>
M1	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-renewable energy IPPs, Project Developer, Consultants	Malawi Investment and Trade Centre	M14	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	RET Retailer
M2	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	Management Consultant	M15	Civil Society and Non-Governmental Organisations	Project Developer
M3	Policy and Law Making, and Regulation- Government Departments, Statutory Corporations, and Parastatal Organisations	Designated National Authority (DNA)	M16	Civil Society and Non-Governmental Organisations	Centre for Environmental Policy and Action
M4	Policy Making and Regulation- Government Departments, Statutory Corporations, and Parastatal Organisations	Department of Forestry	M17	Media-Radio, TV, Newspapers	Radio Station Manager
M5	Policy and Law Making, and Regulation- Government Departments, Statutory Corporations, and Parastatal Organisations	Department of Energy	M18	Media-Radio, TV, Newspapers	Radio Presenter/ Association of Environmental Journalists
M6	International Development Organisations	Millennium Challenge Corporation	M19	Academic and Research and Development Institutions	Senior Lecturer
M7	International Development Organisations	Climate Change	M20	Private Sector- Renewable Energy Independent Power	Consultant

		Analyst		Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	
M8	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-renewable energy IPPs, Project Developer, Consultants	Training Expert	M21	Civil Society and Non-Governmental Organisations	Project Developer
M9	Policy and Law Making, and Regulation- Government Departments, Statutory Corporations, and Parastatal Organisations	Energy Regulator	M22	Financiers- Commercial Banks, Microfinance Institutions, Multilateral Lending Institutions, Bilateral Lending Institutions, Donor Agencies	Global Environmental Fund
M10	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	Bioenergy Producer	M23	International Development Organisations	Department for International Development (DFID)
M11	Policy and Law Making, and Regulation- Government Departments, Statutory Corporations, and Parastatal Organisations	Dept. of Meteorological Services and Climate Change	M24	Financiers- Commercial Banks, Microfinance Institutions, Multilateral Lending Institutions, Bilateral Lending Institutions, Donor Agencies	African Development Bank (AfDB)
M12	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	Energy Efficient Cookstove Manufacturer	M25	Private Sector- Renewable Energy Independent Power Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	Project Developer
M13	Policy and Law Making, and Regulation- Government	Blantyre City Council	M26	Private Sector- Renewable Energy Independent Power	Project Developer

	Departments, Statutory Corporations, and Parastatal Organisations			Producers (IPPs), Non-Renewable Energy IPPs, Project Developer, Consultants	
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## **7.3 Key Factors Influencing Renewable Energy Deployment and Climate Finance Project Implementation in Malawi**

### **7.3.1 Do Laws and Policies Have an Impact on the Development of Renewable Energy Sources in Malawi?**

Laws and policies were determined to have a significant impact on the development of RESs. M5 highlighted that the government did not have plans to develop a dedicated Renewable Energy Act as originally proposed in the National Energy Policy (2003). However, M5 highlighted that two important documents were being developed in order to promote the deployment of renewable energy. A renewable energy strategy was being developed and also a FIT policy was almost ready for publication (i.e. awaiting further consultations and gazetting).

Whilst the new proposed approach to improve renewable energy development in Malawi entailing the introduction of a FIT policy might seem like a solution to the problems in Malawi's renewable energy sector, it has to be pointed out that in developing countries FITs are experiencing slow market growth because of a range of technical, regulatory, and financial barriers (Rickerson et al., 2013) which cause cumbersome and lengthy administrative processes that increase costs and delay project implementation hence discouraging renewable energy investments (HBS, 2013). To this effect the FIT policy in Uganda can be seen to be supported by the country's Renewable Energy Policy (2007) and a Renewable Energy Investment Guide (GOU, 2012) outlining the financing options, conditions for market entry for private entities and provisions for the fiscal and other incentives available. Rwanda has a National Energy Policy (2008) and National Energy Strategy: 2008-2020; as well as "Energy: The Opportunity in Rwanda" (RDB, 2012) as a publication to assist investors in determining the opportunities and investments in the energy sector. Kenya has an Energy Act (2006) and FIT Policy; as well as a Renewable Energy Portal to reduce the time and costs of developing renewable energy projects and help encourage private investment in the sector. Such examples show how FITs need additional support to be effective in an African setting. In the Malawi case, there might therefore be a need to develop another policy or document that can show the investment

potential for the sector or simplify access into the sector (if these issues will not be covered in the proposed renewable energy strategy).<sup>41</sup>

The impact of non-renewable energy sector policies on the development of the renewable energy sector was also noticed through M10 and M25. In the case of M10 tax exemptions for vehicles and other machinery for their biofuel project were obtained through the Ministry of Trade and Industry as an incentive to support the development of the project. In the case of M25, his organisation had been unable to receive tax exemptions for importing improved cookstoves thereby increasing the cost of their improved cookstoves hence arguably a disincentive for the organisation and other individuals to promote improved cookstoves. Import taxes on improved cookstoves were in place despite Malawi being a national partner to the Global Alliance for Clean Cookstoves and having a target of ensuring 2 million households would be using improved cookstoves by 2020 (Concern Universal, 2014). Improved cookstoves could play a significant role in improving the health of people and improving the natural environment. However, arguably the beneficiaries of the improved cookstoves were low income earners hence the high cost of the improved cookstoves because of the import taxes could be a deterrent to them. M25 highlighted how the application process for tax exemptions was cumbersome. Sometimes the Ministry of Finance referred applicants to make tax exemption claims through the Ministry of Trade and Industry, but the Ministry of Trade and Industry would then refer them back to the Ministry of Finance hence forming a frustrating vicious cycle where the government departments did not want to take responsibility or a leading role in removing taxes on the importation of efficient cookstoves possibly because the efficient cookstoves were not well defined in tax regulations or not considered to offer significant investment benefits as those that were realised from the biofuel project. It might therefore be prudent for the renewable energy sector stakeholders to develop an official list of what should be deemed as RETs (e.g. efficient cookstoves, solar panels, etc.) in Malawi to enable them to lobby the

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<sup>41</sup> Reference can be made to (Chapter 2.2.7 Private Sector Participation in the Energy Sector) where it was pointed out that Malawi has a global rank of 183 out of 189 countries in terms of getting electricity (6 procedures over 222 days at a cost of US\$7,468.50) hence whilst the FIT policy might address the tariff and pricing of electricity, some underlying issues that deter investment in the renewable energy sector will still need to be addressed.

government for tax exemptions on those products and also to simplify the process of obtaining tax exemptions.<sup>42</sup>

### **7.3.2 What Have the Existing Energy Related Laws and Policies Achieved in Improving the Energy Sector?**

The energy sector regulatory framework in Malawi consisted of the Malawi Energy Policy (2003), Energy Regulation Act (2004), Electricity Act (2004), Rural Electrification Act (2004), and Liquid Fuels and Gas Supply Act (2004). M9 and M19 considered the Malawi Energy Regulatory Authority (MERA) (which was established after the enactment of the Energy Regulation Act (2004) following the recommendations of the National Energy Policy (2003)) to have assisted in improving the standards of RETs that were in use in Malawi and improving the workmanship related to renewable energy installations. Through the Energy Regulation Act (2004) new requirements for people and organisations undertaking certain types of work in the renewable energy sector (e.g. installations to Institutional buildings) were required to have a licence from MERA.

Rural electrification had also arguably improved as a consequence of the introduction of the Rural Electrification Act (2004) which introduced modalities for the establishment and administration of a Rural Electrification Fund to support the Malawi Rural Electrification Programme (MAREP). The Government of Malawi could also be commended for building a US\$51 million 64MW hydropower plant using funds from the Rural Electrification Fund.

As shown in table 1.1 (Energy mix projections, targets and actual; pp. 3) the actual use of biomass in Malawi was higher than what was projected and envisaged in the country's energy strategies. Arguably, this indicated a shortfall and inadequacies in the energy sector regulatory framework's plan to reduce biomass use. M11 considered the MAREP as a programme that had uplifted the lives of rural people. M11 observed that in some instances when the grid was extended to various trading centres, other people would then take the initiative to pay for additional extensions of the grid to their

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<sup>42</sup> The biofuel project had a US\$15 million investment plan hence might have been more fortunate in obtaining tax exemptions for its associated imported materials due to the scale of the investment.



surrounding communities which were not part of the government programme as they valued the services and opportunities that electricity could bring to their communities. M1 and M19<sup>43</sup> had a different perspective on MAREP. In their views, the extension of the grid to some rural growth centres cost more than the benefits accrued since most of the households did not adequately utilise electricity and/or did not connect to the grid.<sup>44</sup> The respondents further added that since a significant amount of energy requirements for households were for cooking, and electricity was not used for cooking but mostly lighting (table 7.2), a better alternative would be to use money from the Rural Electrification Fund to develop initiatives that could assist people to modernise and improve their cooking technologies and methods (e.g. use efficient cookstoves) rather than focusing on extending the grid to rural areas for electricity which would later on turn out to be unaffordable to many communities.

Table 7.2 Population distribution by source of energy for cooking and lighting (2009)

Source	Cooking (% of the population)			Lighting (% of population)		
	National	Rural	Urban	National	Rural	Urban
Charcoal	8	1.7	43.4	0	0	0
Electricity	2	0.4	13.6	7.2	1.9	37.7
Firewood	88	95.7	41.8	2.6	2.9	0.4
Gas	0	0	0.1	0	0	0
Paraffin	1	1.2	0.7	85.7	92.5	46.5
Candles	0	0	0	3.2	1.1	15.3
Others	1	1	0.5	1.3	1.6	0.3

Source: Gamula et al., 2013

<sup>43</sup> The academic who was a respondent from Malawi during the second pre-test of the study also considered the rural electrification strategy for Malawi not to be effective. The respondent considered Malawi's Rural Electrification Act (2004) not to be successfully addressing the needs of the consumers and general public hence the need for the Act to be reviewed. There were therefore some stakeholders that strongly believed that the MAREP (which was enshrined in the Malawi Rural Electrification Act 2004) had financial costs that were not proportional to the benefits achieved hence a need for an alternative approach to rural electrification or rural energy use.

<sup>44</sup> This observation was supported by other studies that had shown that in Malawi and Botswana connection costs and electricity tariffs were considered prohibitive by potential electricity users particularly in rural areas (GoM, 2010b; GoB, 2009).

### **7.3.3 Do the Existing Energy Related Laws and Policies Need to be Amended or be Given More Time For Their Impacts to be Noticed?**

M25 highlighted that in some instances and communities low income households spent more money on energy than on food. More worrying were the assertions that biomass demand and supply projections showed that biomass supply would reduce over the years while demand would increase due to increases in population hence bringing about significant consequences on poverty and the ecosystem since the population and cost of biomass energy would both be increasing and the higher costs of the biomass energy would likely disadvantage the rural poor (Kambewa and Chiwaula, 2010). It was therefore conceivable that in the absence of affordable energy alternatives, energy costs would continue to rise and households would continue spending more on energy than food in the foreseeable future.

Additionally, even where electricity was provided, it was characterised by load shedding and frequent black outs as generation capacity was not able to match with demand. The existing energy regulatory framework was therefore not addressing the needs of the majority of people and country 9-10 years after implementation.

M5 highlighted that the government had instituted some measures and strategies in order to address these problems. Some of the measures that were in the process of being undertaken included reforming power purchase agreement conditions (i.e. allowing independent power producers to sell their energy to a customer of their choice (at tariffs agreed between the two parties) rather than being obliged to sell to the grid/ESCOM at government mandated tariffs) as the case was, introducing a FIT policy, and coming to an agreement with a Chinese investor to construct Malawi's first coal-fired power plant that will cost US\$667.2 million and have an output of 1,000 MW (FoM, 2013). These developments and reforms highlighted the problems that might have contributed to the underinvestment in the energy sector and partly imply that the current energy sector policies and laws were not responsive to the needs of the stakeholders more particularly IPPs and investors.

It was stated that historically as a result of energy subsidies, the interconnected SAPP member countries have enjoyed low average electricity prices by world standards and this has discouraged new investments in the region as the tariffs were too low to attract private investments hence (government) utilities surviving on direct and indirect subsidies from the taxpayer (ECAL, 2009).<sup>45</sup> Figure 7.1 and figure 7.2 show the electricity tariffs for the SAPP during the 2005-2007 period and 2013 period respectively. The figures highlight the trend of low tariffs in Malawi from 2005 to 2013 that arguably might have deterred IPP investment in the country's energy sector. Subsequently, the proposed new approach where IPPs and large energy consumers would be able to negotiate tariffs privately may be viewed as a solution to overcome the challenges as presented by the country's low tariff structure.

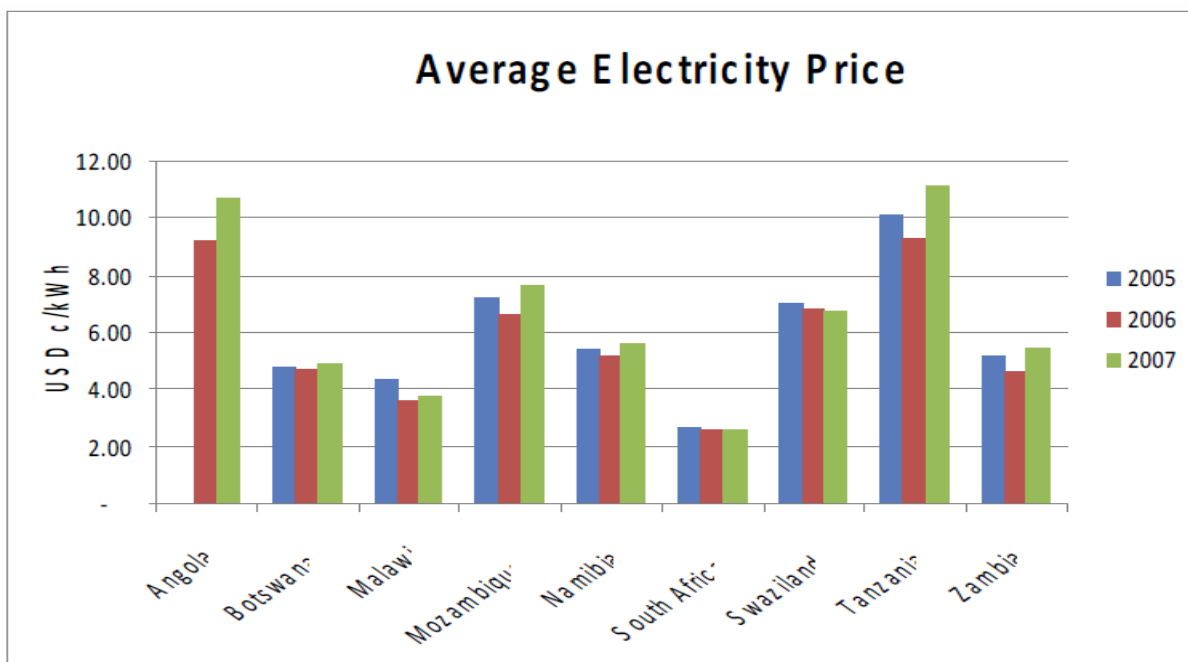
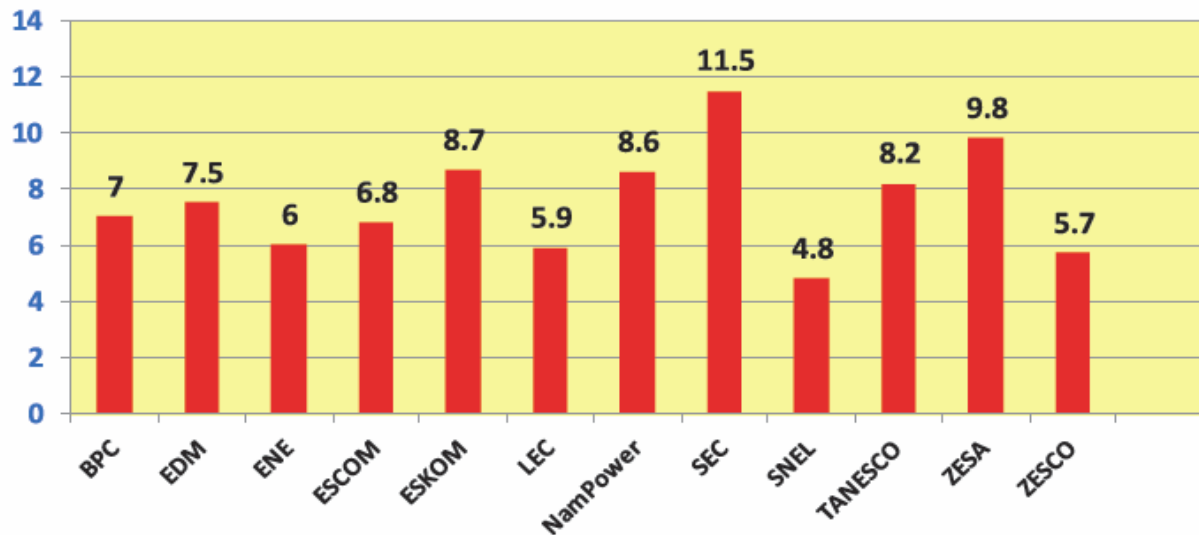


Figure 7.1 SAPP electricity prices USc/kWh (2005-2007)  
Source: ECAL, 2009

<sup>45</sup> OFID (2010) considers that the unwillingness of African governments to remove energy subsidies and implement full-cost-recovery tariffs as a contributing factor to the underinvestment in Africa's energy sector.

## Average Electricity Tariff, USc /kWh



Note: Botswana (BPC); Mozambique (EDM); Angola (ENE); Malawi (ESCOM); South Africa (ESKOM); Lesotho (LEC); Namibia (NamPower); Swaziland (SEC); DRC (SNEL); Tanzania (TANESCO); Zimbabwe (ZESA); and Zambia (ZESCO)

Figure 7.2 SAPP utilities average electricity tariff, USc/kWh (2013)

Source: SAPP, 2013

### 7.3.4 Are There Any Inadequacies with the Implementation of Renewable Energy Laws and Policies in Malawi?

Renewable energy policies arguably have a crucial role in developing the renewable energy sector hence the lack of a Renewable Energy Act in the Malawi energy sector regulatory framework could have been detrimental for the implementation of renewable energy initiatives. M1 noted that RETs were characterised by high up-front investment costs and often cost more than conventional energy. Renewable energy technologies were therefore at a disadvantage in the Malawi context when consideration was made that the country was a LDC where a majority of the people were poor and lived in rural areas hence could not easily afford RETs. Since Malawi had no comprehensive supporting framework to reduce the costs for renewable energy technologies or offer investors sufficient incentives for them to develop renewable energy projects (M1; M2; M13), there had been a slow growth in the development of renewable energy projects.

### **7.3.5 Is There a Need for Other Supporting Frameworks and Institutions to Improve the Effectiveness of Energy Related Laws and Policies?**

Three of the respondents (M13; M20; M21) considered that there was a slow rate of technology adoption in Malawi which led to a low access and penetration of modern energy and technologies. The rates of adoption to technologies also differed between regions and communities because of household differences in income levels and literacy levels/levels of understanding (M21 was making references to the acceptance of communities to the solar kiosk projects they implemented in various rural areas of Malawi). Initiatives and institutions that would focus on increasing the earning potential of people, lowering the cost of RETs, and increasing awareness of RETs would therefore address the gaps that had made the energy regulatory framework to be inadequate to address Malawi's energy needs.

Alternatively, renewable energy subsidies could be introduced in Malawi to support the development of renewable energy. In Nepal, despite the existence of the Rural Energy Policy (2006) it was noted that people living in the remote areas and poor households were still being deprived of energy services due to the high initial cost of the RETs and low capacity of the institutions involved in the development of renewable energy services at local level. Consequently, the Subsidy Policy for Renewable Energy (2013) was introduced to complement the Rural Energy Policy (2006). The Subsidy Policy for Renewable Energy (2013) provided a framework for subsidies targeted at various renewable energy technologies and beneficiaries so as to increase the accessibility of renewable energy technologies to low income households. Through the Subsidy Policy for Renewable Energy (2013), project implementers in Nepal were able to reduce the initial upfront costs of RETs, and promote the use of RETs for productive purpose thereby creating rural employment and enhancing the livelihoods of rural people particularly women, socially excluded groups and vulnerable communities (GoNe, 2013).

M19 and M25 considered that the introduction of energy officers at district level could improve the data collection and implementation of renewable energy related projects. As it stood, the pertinent ministries dealing with energy related aspects included the Ministry of Environment and Climate Change which had three departments (Department of

Environmental Affairs, Department of Forestry, and Department of Climate and Meteorological Services) and the Ministry of Energy (Department of Energy). At District Level, the Departments of Environmental Affairs, Forestry, and Climate and Meteorological Services had District Officers who facilitated the collection of data, dissemination of data and coordination of activities relating to their departments. There was therefore no government presence at district level to manage the affairs relating to energy utilisation and planning. It was therefore not surprising that there were problems with engaging various communities in improving their energy utilisation and environmental conservation more especially as it was in the rural districts that most of the people use biomass and subsequently Malawi was reported to have one of the highest deforestation rates in Africa at 2.8% (UNEP RISØ, 2013).

### **7.3.6 Which Laws and Policies Have an Impact on the Development of Renewable Energy Sources in Malawi?**

In the absence of a dedicated renewable energy policy or act, M9 highlighted that the Energy Regulatory Act (2004) and Rural Electrification Act (2004) were being utilised to regulate renewable energy installations. For example, section 24 of the Rural Electrification Act (2004) stipulated the conditions for which rural electrification activities were to be licensed and section 26 of the Rural Electrification Act (2004) stipulated the provisions for creating various Safety By-laws.<sup>46</sup>

M1 and M2 highlighted that Malawi did not have sufficient incentives to attract renewable energy developers as they considered the renewable energy technologies themselves to be expensive and not cost effective for wide-scale deployment in the Malawi context. As shown in Appendix 5 (Investors' Tax Incentives), some energy sector incentives provided in Malawi included import duty free status for goods such as energy saver bulbs, solar batteries, solar battery chargers, generators and invertors. However, the

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<sup>46</sup> According to section 26 of the Rural Electrification Act (2004), (1) The supply, wiring, design and safety by-laws under the Electricity Act shall apply to the grid and off-grid extension rural electrification system provided that in-order to ensure that rural electrification schemes are appropriately engineered and costs are minimised, the Authority, on the recommendation of the Committee, may develop and publish in the Gazette by-laws regulating the supply, wiring, design and safety standards for rural electrification grid extension or off-grid schemes; and (2) The Authority may, on the recommendation of the Committee, by notice published in the Gazette prescribe minimum codes of practice and design specification standards for solar home system equipment for rural electrification (GoM, 2004c: pp. 17).

goods were subject to a Value Added Tax (VAT) of 16.5% and the incentives had a limited breadth when consideration was made to technical issues related to various kinds of RETs such as wind power, solar thermal technologies, solar PV systems, and bio-energy. M5 was however more optimistic by stating that the Ministry of Energy was receiving many inquiries and proposal from potential IPPs due to the reforms that were happening not only in the energy sector but the general investment climate for the country.

The Rural Electrification Act (i.e. the introduction of a Rural Electrification Levy on petroleum products) had assisted in providing a framework to finance the 64MW Kapichira II Hydropower Project (2011-2013) for ESCOM and the Government at a cost of US\$55,000,000 (€40,315,275). The Government of Malawi also secured a US\$3,040,000 (€2,228,335) grant from the African Development Bank (AfDB) to finance the cost of conducting a feasibility study for Kholombidzo Hydro Electric Power Plant. The Government had therefore instituted some positive renewable energy developments based on socio-political considerations. During the study, there were no private renewable energy projects of over 1MW identified as being at an advanced stage or nearing completion. A renewable energy project of over 1MW would have signalled that the energy regulatory framework was giving confidence to private sector stakeholders to implement renewable energy projects.

Despite the presence of a good market for biofuels, the biofuels project (M10) had significant challenges in raising the US\$15 million for the investment from both local and international sources. Some of the issues cited as hurdles for a venture of this nature (and similar renewable energy ventures) included convincing investors of the profitability and attractiveness of the investment because of the prevailing complexities of doing business in a SSA LDC like Malawi and the risks associated with the bioenergy business. To add to this, accessing capital from international capital markets<sup>47</sup> was also constrained due to Malawi's general unattractiveness to private sector investors since

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<sup>47</sup> The Lake Turkana Wind Project in Kenya also had similar problems in accessing funds from international capital markets due to Kenya's high investment risk perception and a lack of similar wind projects in the country to demonstrate the viability of the technology (LTWPL, 2011). A further analysis of this project is provided in Chapter 8.3.2.

the country ranked 134 in the World Bank's Easiness of Doing Business ranking, which was in the lower 25% of the list and the rating of the Malawi Government by Fitch was B-/Stable, six grades below investment grade (the country is not rated by Standard & Poor's Ratings Services, which also showed that the country was not on the radar for private sector investors) (BERL, 2012). The project managed to secure its funding through a partnership with TNT Express<sup>48</sup> as the project's socio-economic and environmental benefits were in keeping with TNT's corporate social responsibility agenda. This therefore highlighted funding and financing challenges that were being faced by renewable energy project developers as well as the need for renewable energy policies to have sufficient incentives and financing mechanisms that were suitable for the needs of renewable energy developers and also that can address the concerns of financial institutions to make them less apprehensive towards funding renewable energy projects.

The renewable energy sector in Malawi could be said to have benefited from the growth in trade between Malawi and China, and also from the technological developments that were decreasing the costs of renewable energy technologies. In Chirambo (2014) it was argued that greater cooperation and trade between Malawi and China could be beneficial to the renewable energy sector in Malawi as it would enable cheaper RETs to be available locally. As seen in figure 7.3 and figure 7.4, solar technologies for various uses (e.g. cell phone charging) in addition to lighting were becoming more affordable and popular even with low income earners. M14 considered that that interest and sales for solar powered home systems were boosted by the unreliability of power supply from the main grid (in urban areas), the affordability/decreasing costs of the systems, and the availability of different types of solar systems. Due to the growth in the use of cell

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<sup>48</sup> TNT Express is an international mail and express company that has its headquarters in the Netherlands. TNT Express is a socially responsible company as evidenced from its works with international organisations to make a difference in combating poverty and improving the environment through its Moving the World initiative and its ambition to become climate neutral. Since the BERL Jatropha Biofuel Project was registered on the Voluntary Carbon Market under the Verified Carbon Standard Scheme, TNT was able to make an equity investment in BERL hence providing the necessary funds for the development of the project so that the expected carbon credits from the project could provide an opportunity to offset its transport emissions within its own network since carbon dioxide emissions were TNT's most significant environmental impact (BERL, 2012).



phones even in low income households, portable solar lighting systems and energy kiosks had become popular due to their capacity to charge cell phones. Taxation on RETs had been highlighted as a barrier and deterrent to the deployment of renewable energy systems<sup>49</sup> hence policy and regulatory reforms could significantly boost renewable energy deployment and change the energy use patterns of consumers by eliminating various taxes that are applied to RETs.

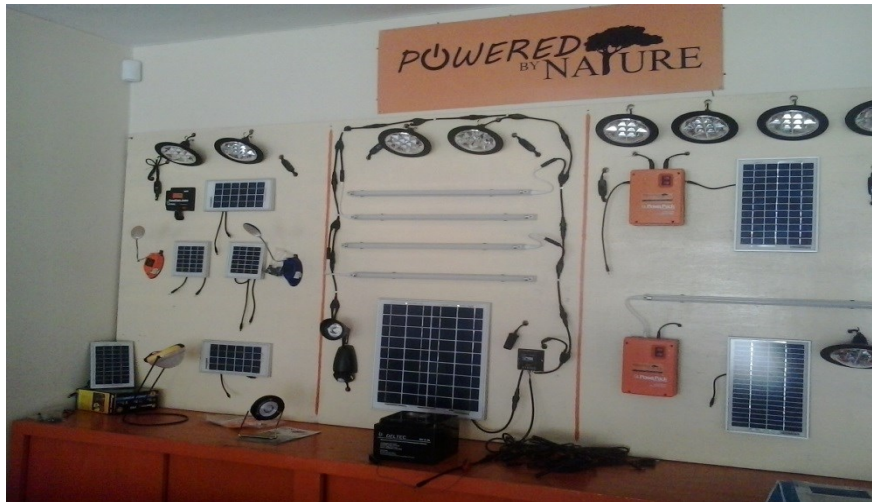


Figure 7.3 Renewable energy technologies for sale  
Source: Own collection



Figure 7.4 Rural uses for solar technologies  
Source: Own collection

<sup>49</sup> Issues on the taxation of renewable energy appliances and technologies were also highlighted by respondents for the pre-tests. Taxation issues were brought up on questions relating to perceptions on the impact of non-energy sector policies on the development of the energy sector; perceptions on the support required for various renewable energy stakeholders; perceptions on how energy sector related policies and laws influence the energy sector; perceptions on how non-energy sector related policies and laws influence the energy sector; and perceptions on how renewable energy sector related policies and laws influence the renewable energy sector. Issues on the taxation of renewable energy appliances and technologies were highlighted by M10; M19; M21; and M25 during the interviews.

### **7.3.7 What are the Necessary Conditions that are Needed In Order to Make Laws and Policies to Have an Impact on the Development of Renewable Energy Sources in Malawi?**

The deployment of renewable energy in Malawi has been lagging because the Ministry of Energy has not been vocal in advocating and lobbying for greater use of renewable energy (M2; M20; M25). For starters energy planning and implementation was done in a top-down approach due to a lack of energy officers at District Level hence energy planning data was collected in a fragmented way leading to many inaccuracies (M7; M8; M19). The energy needs of the base of the pyramid population that lack access to basic goods, services, and economic opportunities were therefore not well captured and understood. This has also led to the wrong assumption that biomass consumption will go down which is not the case on the ground (M19; M25).<sup>50</sup> So whilst the institutions in Malawi might have had adequate resources for energy sector policy formulation, implementation and monitoring, the institutional arrangement in which there were no energy officers at local level might have been flawed in that it did not allow for a continuous collection and analysis of accurate energy demand and supply data at district level to enable appropriate interventions to be undertaken at local scale.

The availability of information that is relevant and of value to a community's needs is a critical element in ensuring that knowledge, attitudes and practices of people towards new ideas and technologies are adopted. The radio, NGOs, extension staff, and local leaders were noted as the key sources of information in local communities in Malawi (Hara, 2012: pp.5). M11 highlighted that the Department of Climate Change and Meteorological Services had District Officers in almost all the 28 districts of Malawi. This was attributed to the close link between climate/weather data and agricultural production, and climate/weather data and disaster risk management. With over 80% of the population being rural based and dependent on subsistence farming, accurate climate/weather data is vital for farmers, project implementers and government policy makers in assessing community vulnerabilities to climate change and adverse weather. M10 prepared radio programmes in order to be able to reach out to their project

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<sup>50</sup> Similar observations were documented in EUEI-PDF (2009).

beneficiaries and disseminate information on how to undertake various tasks related to managing jatropha trees. The respondent highlighted that this was an expensive exercise but necessary in order to disseminate information and develop the capacities of the stakeholders as they were unfamiliar with growing jatropha trees. For the laws and policies in Malawi to have an impact on renewable energy deployment there was a need to increase awareness about renewable energy and reach out to many people. M18 acknowledged that the media had significant challenges in engaging many communities as they had logistical and transport problems to access rural communities be it to obtain material for the production of environmental programmes or to disseminate information on environmental issues/renewable energy. This could explain why NGOs were considered influential and key sources for disseminating information since (most of) their projects were (rural) community based and they had sufficient resources/budgets for mobility between communities. M22 stated that the media was keen to produce programmes on environmental issues and social development but as Fund Managers for various environmental projects, they had insufficient funds to support media practitioners most of the time. Enhancing people's knowledge and awareness about renewable energy was therefore a necessary condition to make laws and policies to be effective because it could assist in creating a demand for RETs and enable consumers to demand greater utilisation of renewable energy from project implementers and utilities.

### **7.3.8 What Aspects Can Make Laws and Policies Not to Have an Impact on the Development of Renewable Energy Sources in Malawi?**

Lack of funding and lack of awareness were two critical issues that could make laws and policies to be ineffective. Funding was important for many aspects related to renewable energy development such as training of staff, establishment of pilot projects and increasing awareness (M3; M4; M5; M11; M13; M15; M18; M21; M22; M23).<sup>51</sup> M11 pointed out two issues that had an adverse impact on funding and the operations of government institutions. Firstly, government departments annually presented their proposed budgets (i.e. covering training requirements, utility and travel costs, stationery,

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<sup>51</sup> Issues on the influence of funding and awareness on renewable energy deployment were also highlighted in Uganda and Ghana during the pre-test. These were highlighted under perceptions on aspects to be addressed in the renewable energy sector, perceptions on the support that needs to be provided to stakeholders and perceptions on important issues and aspects that can encourage the active participation of the private sector and investors to promote the utilisation and development of RESs.

etc.) for the forthcoming year to the Ministry of Finance to be included in the National Budget which goes for Parliamentary Approval. In most instances, the departments' budget allocations were trimmed down by the Ministry of Finance before they were included in the National Budget. Secondly, departments requested funding monthly from the Ministry of Finance during the course of the year. Since the National Budget worked on the premise and assumptions of financial pledges from various donors<sup>52</sup> and projected internal revenues from domestic taxes, it was very common for both these sources of funding to be below target at specific times of the year. Through the course of the year, government departments were therefore not always provided with the full allocation of their (already trimmed) approved monthly budgets. Most government departments therefore resorted to only undertaking essential services as such the training of staff, capacity building activities and establishing pilot projects could be side-lined.<sup>53,54</sup>

Related to the issue of funding was also the issue of sustaining renewable energy projects more especially donor funded projects once the main donors pulled out or the project cycle had come to an end (M21; M22; M23). M23 made references to the Department for International Development (DFID) sponsored Energy Efficient Light Bulb Project which principally aimed at distributing energy efficient light bulbs but other project components included setting up a policy and regulatory framework for renewable energy efficient light bulbs and establishing a fund to ensure that the project objectives were sustained and other capacity development activities continued. The project target was to distribute 2 million Compact Fluorescent Lamps (CFL)/energy saver light bulbs to

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<sup>52</sup> Malawi's aid per capita at US\$69 is much higher than other countries in Africa (US\$42) or Southern Africa (US\$45), making the country vulnerable to fluctuations in donor inflows (AfDB, 2013).

<sup>53</sup> Similar sentiments about government funding and its impact on the provision of services are provided in Mbeko (2012). In his assessment of the challenges of enforcing Environmental Impact Assessment (EIA) in Malawi, Mbeko highlighted that the effectiveness of the Environmental Impact Assessment process in Malawi was continuously compromised due to funding shortfalls. It was revealed that the budget estimate for the Environmental Affairs Department during the 2011/2012 Financial year was MK300 million (€554,066). Of this only MK65 million (€120,048) was approved and the actual disbursement was even less. Of the disbursed funds only MK4 million (€7,387) was allocated to Environmental Impact Assessment Section.

<sup>54</sup> During the research period (2010-2014) Malawi had experienced two aid suspensions. The first was due to poor governance and accountability, and the second one was due to mismanagement of public resources. This highlights the scale to which government departments could be constrained of resources and not implement their desired plans as their sources of funding are constantly closed and funding for programmes and operations is uncertain.

replace incandescent lamps/incandescent light bulbs. The project activities included the distribution of CFLs through selected electrical retailers to ensure participation of the private sector, who would ultimately be the key to the promotion of energy efficient lighting; establishment of a Revolving Fund supported by the proceeds of the sale of CFLs to the private consumers to support other DSM programmes that would help ESCOM in managing the future demand;<sup>55</sup> and a Consumer Awareness and Promotion Campaign to change consumer perceptions about DSM and focus on the benefits of using efficient lighting in the long term (Gooneratne and Visser, 2010). Such a comprehensive framework for the planning and implementation energy sector interventions highlighted two issues that could assist in sustaining some renewable energy projects.

Firstly, the project included a fund to help in sustaining the objectives of the project. Secondly, the project showed due consideration to enhancing implementation modalities. The policy and regulatory activities, and operational plans were undertaken concurrently. This contrasted with how the Malawi Energy Regulatory Framework was developed as the National Energy Policy was launched in 2003 but not all the implementation modalities had been established up to now.<sup>56</sup> In Uganda, the Energy Policy was established in 2002 but the complimentary Renewable Energy Policy in 2008. In Ghana, the Renewable Energy Act was established in 2010 and its complimentary Renewable Energy Policy in 2011 and the FIT rates in 2013. Such delays potentially undermine the effectiveness of policies as they bring about a perception of a lack of clarity, prioritisation and political will on renewable energy developments.

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<sup>55</sup> The Granger-causality (GC) for Malawi that examined cointegration and causality between electricity consumption (kWh) and, respectively, overall GDP, agricultural-GDP (AGDP) and non-agricultural-GDP (NGDP) detected bi-directional causality between kWh and GDP suggesting that kWh and GDP are jointly determined, but one-way causality running from NGDP to kWh suggesting that a permanent rise in GDP may cause a permanent growth in electricity consumption (Jumbe, 2004). In other words, when causality runs from electricity consumption to GDP then conserving electricity may be problematic as that implies that as electricity consumption drops, GDP and economic growth will suffer. However, in the Malawi case per capita GDP causes per capita electricity consumption hence promoting energy efficiency and developing energy conservation policies can make more energy to be available for economic activity and reduce the economic losses incurred by the shortage of energy supply.

<sup>56</sup> The Renewable Energy Act, Biomass Act and Coal Act have not been developed as proposed by the National Energy Policy (2003) hence there were shortfalls in sub-sector legislation and regulation which have made it challenging to improve energy sector governance.

Various aspects and perspectives on how levels of awareness had influenced stakeholders and the implementation of renewable energy policies and access to climate finance were identified during the study. M14 considered radio adverts on RETs as a contributing factor to increased inquiries and sales of their renewable energy products. On the other hand, Rwanda's National Domestic Biogas Program (NDBP) failed to reach its target of building 15,000 family sized biogas plants because of a lack of awareness or a dissemination strategy aimed at familiarising people with the new technology (Landi et al., 2013). Similarly in Malawi, the level of awareness on renewable energy projects was low hence without corresponding efforts to increase awareness of the policy objectives themselves (i.e. to engage various stakeholders) and increase awareness on different types of RETs, the deployment of RETs would continue to be constrained.<sup>57</sup> As a possible solution to increase the awareness of renewable energies and engage various stakeholders, M13 alluded of the need for a framework where potential renewable energy project developers could be provided with assistance to establish pilot/model projects which could help to demystify some technologies as consumers and project implementers would become more familiar with the technologies.

### **7.3.9 Do Laws and Policies Have an Impact on Improving Access to Climate Finance in Malawi?**

Arguably, the majority of Malawians consider or perceive climate change as a change in rainfall patterns caused by the cutting down of trees/deforestation (Hara, 2012; pp. 18). Moreover, many climate change activities are also based on climate change adaptation and agriculture due to the country's livelihood and economic structure (i.e. dependence on rain-fed agriculture). Malawi was a net emitter of GHGs mostly through deforestation and land use changes as such climate change mitigation also required to be considered as a priority in the Malawi landscape. Energy sector renewable energy projects had usually been associated with mitigation activities such as replacing conventional energy sources that emit GHGs with RETs. The GHGs from Malawi had therefore been usually considered comparatively low due to the country's low industrialisation and low

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<sup>57</sup> The importance of awareness as an essential element of a (renewable) energy policy is also shown in the Ghana National Energy Policy 2010. The foreword to this document states that "the implementation of this Policy will require putting in place new legislation for renewable energy resources development and also for oil and gas administration and management of petroleum revenues, developing and implementing a communication strategy to manage public anxiety and expectations" (GoG, 2010b).

utilisation of conventional energy sources. However, RES had a part to play in both climate change mitigation (e.g. providing alternative energy sources to firewood and charcoal) and adaptation (e.g. undertaking afforestation and reforestation activities using bioenergy and biofuel crops which could create alternative income generating and livelihood opportunities).<sup>58</sup>

Knowledge and awareness on climate finance modalities was low as noted by M3, M8, M13 and M15. This was further illustrated by the lack of CDM projects in Malawi. Through funding and assistance from the UNEP Risø Centre, Malawi's climate finance landscape improved slightly from 2012 onwards as the DNA was provided with support and funding for capacity building activities and workshops to sensitise various stakeholders on the emission reduction potentials and climate finance project potential for Malawi (Appendix 2).

Policies and laws had a significant influence on access to climate finance as they could create a regulatory framework for the allocation, creation and sale of carbon credits. For example, the European Union which constituted a big market for purchasing CERs through CDM projects resolved that for the third trading period (2013-2020) of the European Union Emissions Trading Scheme (EU-ETS), eligible CERs for trading would

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<sup>58</sup> The Cancun Accords consider that adaptation must be addressed with the same priority as mitigation. Paragraph 2(b) of Decision 1 of the UNFCCC Conference of Parties 16 (held in Cancun in 2010), Further affirms that adaptation must be addressed with the same priority as mitigation and requires appropriate institutional arrangements to enhance adaptation action and support (UNFCCC, 2011b: pp. 3). Paragraph 2(d) of Decision 1 of the UNFCCC Conference of Parties 16 Further affirms that mobilisation and provision of scaled-up, new, additional, adequate and predictable financial resources is necessary to address the adaptation and mitigation needs of developing countries (UNFCCC, 2011b: pp. 3). Paragraph 6 of Decision 5/CMP.6 (the sixth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, Cancun, 2010) Continues to encourage Parties included in Annex I to the UNFCCC (Annex I Parties) and international organisations to provide funding to the Adaptation Fund, which will be additional to the share of proceeds from CDM project activities (UNFCCC, 2011c: pp. 13). However, the implementation of climate finance modalities are highly construed towards mitigation efforts whereby 91% of climate finance flows are for mitigation efforts, 7% for adaptation efforts and 2% for activities with both mitigation and adaptation objectives (Buchner et al., 2014: pp. 32) because mitigation projects had potential to provide ancillary benefits/co-benefits and there was a lack of adaptation finance credits (Abadie et al., 2013). However, bioenergy projects can be developed either as part of climate change mitigation or climate change adaptation strategies depending on local contexts and needs hence provided an attractive option for investors and project developers wishing to utilise climate finance modalities as they could use either route to generate saleable carbon credits which could be a source of additional revenue to a project.

be the ones specifically from projects in LDCs. This approach was adopted to counter the unequal distribution of CDM projects as explained in Chapter 3.4 (The UNFCCC and Climate Finance Project Implementation in Malawi and table 3.3). M3 concurred that there had been a growth in interest in CDM activities in Malawi as a result of this regulatory amendment hence showing that global policies and laws could influence the supply and demand, and regional distribution of climate finance projects.

Laws and policies that created conducive business environments were also noted to improve access to climate finance. Even though the CDM and other climate finance modalities were conceived to be instruments for mitigating and adapting to climate change in order to promote sustainable development, the arena of climate finance was a field of competition between various countries in order to attract climate change projects and investments. Whilst many studies pointed out the inequitable distribution of CDM projects amongst global regions (Pegels, 2010; Boyd et al., 2009), other studies have pointed out that within countries, CDM/climate finance projects were also not uniformly distributed amongst various regions/states because local governance issues and the effectiveness of local promotional centres influenced the number of projects that a region/state could host (Phillips and Newell, 2013).

M1 and M2 were amongst the respondents that considered the Malawi investment climate to be unattractive for general investments and also for renewable energy investments. CDM investors are noted to prefer implementing their projects where the net profitability is highest for them (not necessarily where the costs are the lowest), and they implement their projects when it is advantageous for them to do so (not necessarily when host countries would need their projects most) (Burian et al., 2011; Arens et al., 2011). Furthermore, similar to any FDI, an enabling framework for CDM investments/climate finance requires political and macroeconomic stability and sound regulatory frameworks. In short, factors that promote FDI inflows include effective governance structures, openness to trade, better infrastructure, a higher return on investments, and higher levels of human capital hence making most of the countries in SSA more especially LDCs (such as Malawi), poor candidates for both FDI inflows and CDM projects (Winkelman and Moore, 2011). So even though climate finance is



motivated by equitable and sustainable development aspirations by developed nations, it can be seen that it has a basis on market forces, and solid economic and business principles similar to those of normal energy investments and projects. Therefore, getting the climate finance investment framework right in Malawi could indirectly enhance the energy sector investment framework and/or getting the energy sector investment framework right could indirectly enhance the climate finance investment framework. In either case, addressing either issue by developing appropriate policy and regulatory frameworks could provide substantial benefits that could probably improve the diffusion of RETs and investments in the (renewable) energy sector more than historical trends due to the complementary nature of these activities.

#### **7.3.10 What Conditions are Needed in order to Make Laws and Policies to Have an Impact on Improving Access to Climate Finance in Malawi?**

As explained in the previous section (7.3.9), improving the business environment and people's understanding of climate change could enhance climate finance activities. Greater inter-agency coordination at different levels should be prioritised as the analysis provided in 7.3.9 implied that in order to improve access to climate finance in the country, there would be a need to improve the investability of the renewable energy sector and also the investability of a spectrum of infrastructure and other sectors such as roads, communication systems and vocational training.

M19 and M25 highlighted that inter-departmental coordination was a major problem for both renewable energy and climate change issues as officers from different departments preferred to concentrate on specific tasks within their departmental mandates. Among some of the justifications to develop a climate change policy in Malawi was the need to overcome the disintegrated and overlapping sectoral mandates that did not clearly define roles and responsibilities of stakeholders; and the need to eliminate the piecemeal introduction of new institutional and management frameworks for climate change which had resulted in conflicts of institutional mandates, responsibilities and confusion in coordination and leadership in climate change issues in the country (GoM, 2012c). It therefore has to be seen if the climate change policy that will be developed in Malawi will address the twin challenges identified above by simultaneously addressing

socio-economic and environmental climate change issues, and business and investment issues that can attract climate finance.

Malawi developed the National Environment and Climate Change Communication Strategy (GoM, 2012d) in 2012 in order to provide insight into issues, concerns and opportunities to improve communication on environmental and climate change issues. The Strategy was launched in response to the realisation that despite the immensity of climate change impacts and various response measures being taken, few people in the country appreciated the causes, impacts and consequences of environmental degradation and climate change and how that linked to national development. As stated in Chapter 7.2.9, most Malawians associated climate change with variations in rainfall patterns.<sup>59</sup> In order to reach out to different stakeholders, the communication strategy suggested the use of different channels to engage various stakeholders (e.g. print media, electronic media, help-lines and interactive programmes, social marketing, and advertising, etc.). However, M17, M18 and M22 highlighted that producing materials and reaching out to most rural communities was problematic due to funding shortfalls and poor infrastructure (roads) in rural areas. Climate change awareness and management was therefore still being constrained since the National Environment and Climate Change Communication Strategy just highlighted issues constraining climate change awareness and how they could be minimised but did not put an action plan and budget to realise the objectives. Arguably, improved awareness of climate change is important in many dimensions as it can improve the engagement of people in environmental activities and also influence behaviour changes. As explained Chapter 3.3.5 (Malawi's Intended Nationally Determined Contributions (INDCs)), Malawi is experiencing rampant deforestation and this reduces the sequestration potential of the country, and promotes soil erosion and flooding. Improved knowledge and awareness of climate change causes, mitigation actions, adaptation strategies and how deforestation increases climate change vulnerability might therefore empower communities to enhance their conservation of trees and forests, and businesses to consider funding and sponsoring

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<sup>59</sup> In actual fact, as elaborated by M11, at national level, the data collected suggests that temperatures in Malawi have risen by 0.8% since 1960 whilst the rainfall amount has not changed (but the country is experiencing delayed onsets of rainfall and prolonged dry spells within seasons are higher).

ventures that can promote the use of alternative energy sources/renewable energy and afforestation/reforestation initiatives.

### **7.3.11 Is There a Need for Other Supporting Frameworks and Institutions to Improve Access to Climate Finance in Malawi? / Is There a Need for Other Supporting Frameworks and Institutions to Improve the Implementation of Energy Related Climate Finance Projects?**

M10, M13 and M26 considered Climate finance (CDM) transactions costs to be high and that there was little expertise on climate finance in the country (i.e. consultants to develop projects and/or to audit and evaluate projects) which further increased project costs. Access to climate finance and implementation of energy climate finance projects could therefore greatly benefit from the introduction of supporting frameworks and new institutions to reduce cost and technical barriers related to climate finance projects. As explained in Chapter 7.3.9, some of the countries that had progressed in the climate finance arena had supporting institutions in addition to the DNA. Climate Finance activities in Malawi also only kicked-off later after 2012 following technical input and assistance from UNEP Risoe (i.e. the ACP-CD4CDM Project) hence highlighting how external assistance and expertise was crucial to develop the capacity of stakeholders and institutions in Malawi on climate finance issues.

Malawi experienced a growth in the manufacturing and sale of energy efficient cookstoves. This could be attributed to a combination of growing interest in climate finance initiatives (i.e. for PoAs and VCMs) and general business activities not related to climate finance but people's realisation that energy efficient cookstoves reduce spending on money for firewood and charcoal. M3 considered this as a positive development but cautioned that the development of unregulated projects utilising VCMs and the increased deployment of energy efficient cookstoves for VCM projects could lead to exploitation of the carbon crediting and financing system if the activities of the project implementers were not monitored or evaluated by some public or private authority. M3 therefore suggested that Malawi needs an overseer/regulator of the voluntary carbon market/sector activities that would also organise capacity building activities to enhance

different stakeholders and be a one stop point of contact for potential carbon buyers and/or project implementers.

On the other hand, the proliferation of the energy efficient cookstoves at the different stages in the supply chain could lead to quality control issues. With so many players in the energy efficient cookstoves sector (some attached to carbon projects and others not), there was scope for sub-standard products to enter the market and these could ruin the market and confidence of buyers should the products not achieve the anticipated savings in energy consumption and cost reductions. M26 and M25 highlighted how some of their products were imported and cost more than other products. M12 highlighted how their products were locally made but comparatively more expensive and durable than other efficient cookstoves on the market hence sometimes had sales problems as buyers tended to prioritise the cost price of acquiring the efficient cookstoves rather than durability and overall performance. Reference can also be made to Chapter 7.3.8 and M23 who highlighted that cheaper and lower quality CFLs on the market were a threat to their project and people's perceptions of the technology/CFLs hence the inclusion of subsidised good quality CFLs in retail outlets to enable consumers not to revert back to using incandescent light bulbs.

## **7.4 Discussion**

### **7.4.1 Shortfalls of Malawi's Climate Finance and CDM Framework**

A significant aspect identified through this study was that Malawi had a lackadaisical<sup>60</sup> approach to climate finance which was detrimental to the development of climate finance projects and the promotion of RETs. The DNA lacked innovation in the administration of climate finance and CDM modalities. Malawi had a basic climate finance and CDM framework where the DNA was the only entity that was active in the promotion of CDM and other climate finance activities. Table 3.1 highlighted that other countries had additional institutions like CDM promotion centres to assist with attracting climate finance investments as well as raising the awareness of climate finance activities. The lack of additional institutions to support the activities of the DNA and promote CDM and

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<sup>60</sup> The MacMillan English Dictionary for Advanced Learners (MEDAL, 2014) defines lackadaisical as doing something in a lazy, slow or careless way that shows that you are not interested in it.

other climate finance activities cannot be a shortfall in most circumstances but in the Malawi context it was since the government had fundamental funding problems and deficits hence the DNA operations were arguably compromised. Also in the Malawi context, climate finance project implementers and prospective climate finance project implementers did not have a platform to share information hence there was no exchange of resources and best practice amongst various stakeholders to facilitate climate finance investments and capacity development.<sup>61</sup>

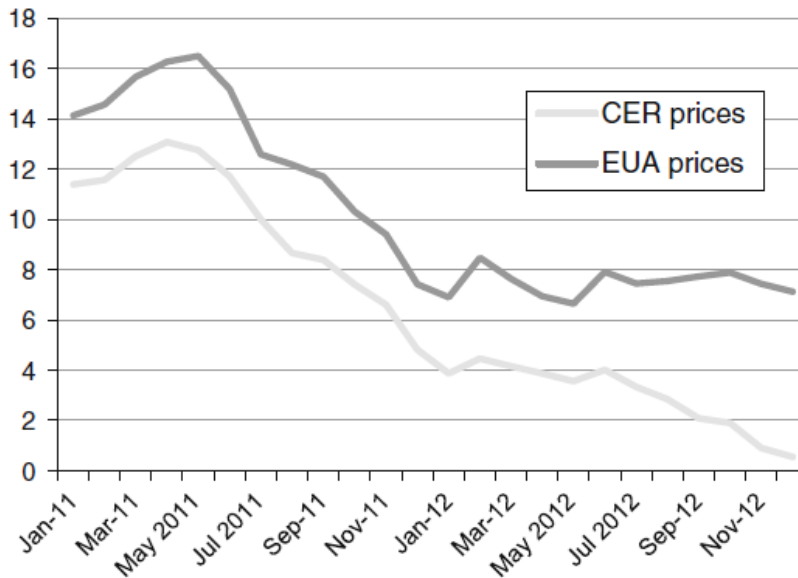
Malawi needs innovative approaches to attract climate finance not only because of the country's unfavourable investment climate (CDM investment climate and general business climate) but also because of the problems that are characteristic and inherent of market based systems such as the CDM and other VCMs. It was reported that the institutional uncertainty in the future of Kyoto institutions (Brohé, 2013), an oversupply in the EU-Emission Trading Scheme (EU-ETS) allocations, budgetary pressures in developed countries (Zadek, 2011), and a reduction in demand for CERs had collectively led to a fall in the price of carbon credits (Hogarth, 2012) thereby creating little incentive for investors to pursue investments in climate finance project (Bhattacharyya, 2013).

Whilst an agreement for the second commitment to the Kyoto Protocol restored some certainty to the carbon market, carbon prices were still low and below pre-2011 prices hence could be unattractive to climate finance project implementers (figure 7.5). Moreover, uncertainty which caused the price of carbon to fall towards the end of the first commitment period could probably resurface in the run up to the second commitment period hence in the long run this could still be a deterrent for renewable energy project developers as renewable energy projects require high capital investments

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<sup>61</sup> During data collection, M13 mentioned that Uganda was more advanced in hosting CDM activities as their DNA had facilitated the mobilisation of funds to assist with the capacity building of local authorities to implement CDM activities hence was of the opinion that if the DNA in Malawi was proactive like that, CDM activities would be promoted. During the course of the data analysis the researcher identified the CDM Loan Scheme as a facility that could help potential climate finance project implementers to access funding and support to assist with the development of their projects. More importantly, it was noted that one of the few institutions that had implemented a PoA had obtained a loan via this scheme. In an ideal situation where project implementers would not want to keep a competitive advantage and there was a better sharing of information, M13 would have been made aware by the other project implementer of the existence of the CDM Loan Scheme.

and a long period of certainty to recover the financial investment made.<sup>62</sup> With these considerations in mind, it can be argued that the DNA in Malawi is impeding the growth of the climate finance sector in Malawi by not positioning itself as an ideal climate finance investment country.



CER: Certified Emission Reductions are carbon credits generated through the CDM  
 EUA: EU Allowance Units are carbon credits generated through the EU Emissions Trading Scheme

Figure 7.5 CER prices January 2011 to December 2012

Source: Brohé, 2013

Various innovative approaches are available in order to create long term certainty in the climate finance and CDM market in individual countries. For example, Ethiopia and Kenya have shown a proactive approach to attract climate finance projects by being involved in the early stages of the Joint Crediting Mechanism (JCM). The Government of Japan initiated the JCM in collaboration with partner countries in order to facilitate the diffusion of advanced low carbon technologies, products, systems, services and infrastructures, which advance mitigation action in developing countries. The JCM intends to contribute to the ultimate objective of the UNFCCC by facilitating global action

<sup>62</sup> From as early as 2006, the DNA in India perceived that the unclear future of the CDM beyond 2012 to be an important barrier to the development of more CDM projects in India (GTZ, 2006). This shows the long time frames to which climate finance investors plan and consider their investments and more importantly in-line with the argument in this section, the current commitment period for the Kyoto Protocol is 2012-2020 hence there is still some uncertainty as to what will be adopted after 2020. Arguably, there could be potential CDM investors that could be sceptical about making such investments with the CDM commitment period approaching and no post CDM architecture in place.

for GHG emission reductions or removals and complementing the CDM. The JCM is similar to the CDM in that it facilitates the trading of carbon credits. However, the JCM is based on bilateral agreements between specific countries hence it could offer lower transaction costs to participating countries thereby improving the deployment of climate finance projects in participating countries. Figure 7.6 and figure 7.7 depict how the JCM operates, and the relationship and interactions between Japan and host countries for JCM projects. Figure 7.6 and figure 7.7 may also be compared to figure 3.5 (How the CDM works; pp. 53) as both the JCM and CDM depend on both state and non-state actors to develop and verify appropriate projects.

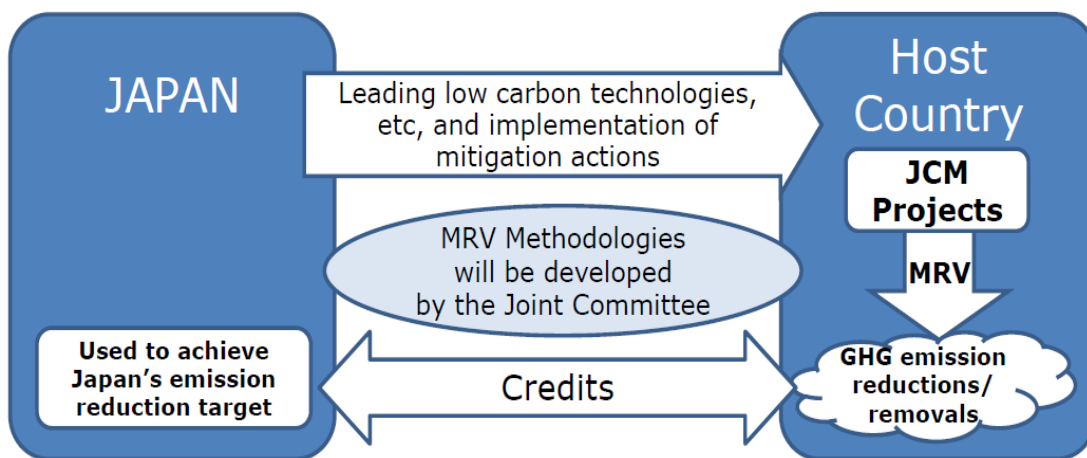


Figure 7.6 Basic concept of the Joint Crediting Mechanism (JCM)  
Source: PMR, 2013

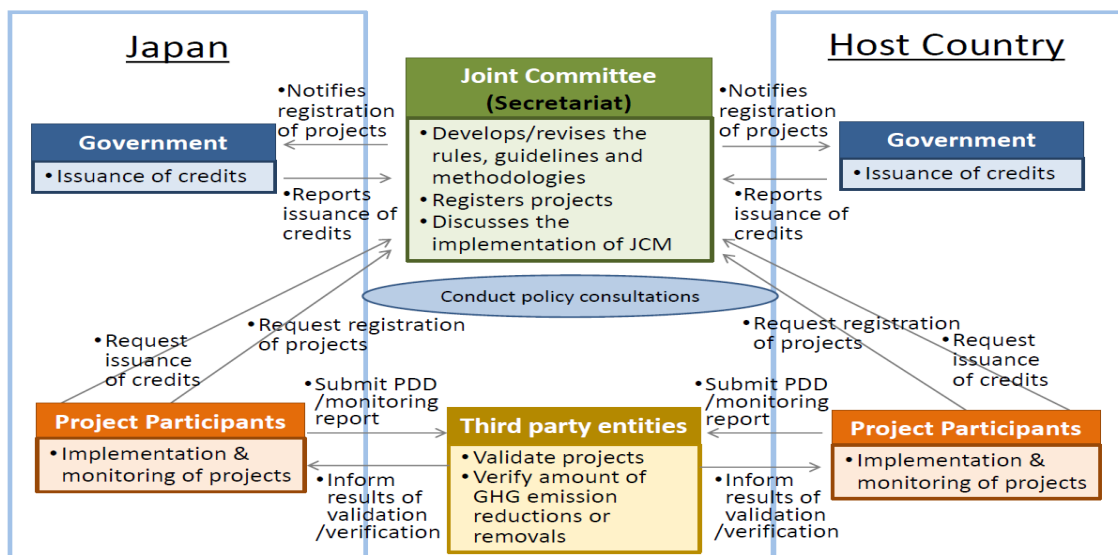


Figure 7.7 Schematic of the Joint Crediting Mechanism (JCM)  
Source: PMR, 2013

Another climate finance related initiative that can enhance the climate finance sphere in Malawi is the International Partnership on Mitigation and MRV (i.e. Measuring, Reporting and Verification). The overall aim of the Partnership is to support practical exchanges on mitigation-related activities and Measuring, Reporting and Verification (MRV) between developing and developed countries in order to help close the global ambition gap. The Partnership therefore enhances the cooperation between peers; stimulates discussions; and promotes the exchange of strategies in the field of Low-Emission Development Strategies (LEDS), Nationally Appropriate Mitigation Actions (NAMAs), and Measuring, Reporting and Verification (MRV) systems. Countries such as South Africa, Ethiopia, Kenya, Ghana and Zambia are members of the Partnership and can arguably be said to be benefiting from the Partnership's capacity building (technical workshops, peer-to-peer programmes, etc.) activities which could assist them with the design and effective implementation of NAMAs and LEDS (IPMM, 2014). As a consequence of Malawi's DNA's lackadaisical approach to climate finance, the DNA and other government institutions in Malawi have therefore not explored the opportunities that exist in developing their capacities for better climate finance operations and there is no leadership to improve the climate finance investment environment to be able to attract renewable energy projects (apart from the relative success in having PoAs for efficient cookstoves).

With regard to Malawi's climate finance and climate investments framework, it can be argued that the country is also missing out on some investment opportunities because the country does not have a framework for NAMAs. The UNFCCC promotes NAMAs as a means for governments to describe the actions that they will pursue to achieve a reduction in emissions relative to 'business as usual' emissions in 2020 hence they are a key tool to be used by developing countries to structure and promote their potential emission reductions. NAMAs can take different forms: as sector plans, specific policies and programmes or individual projects, hence they can directly link to investment plans providing a framework to define domestic and international support needs and creating mechanisms for channelling (climate) finance to facilitate the implementation of the planned actions (OECC, 2015). In order to make NAMAs to become a key element of mitigation negotiations in the UNFCCC process, developing countries such as Malawi



are supposed to set up the institutional, policy and regulatory frameworks to mobilise and channel public and private investments into low carbon options. This will enable investments (e.g. from private sector and financial institutions) to be directed to the appropriate sectors, while public finance (e.g. government budgets or international public sources) will provide enabling conditions by creating the appropriate risk/return profile for the investment to encourage private sector participation (Sharma and Desgain, 2013). A delay in the development of a NAMA in the country, in addition to a lack of a climate change policy are arguably contributing to a lack of funding towards climate finance renewable energy development in the country and possibly giving out a perception that the country does not have sufficient political will and motivation to tap into international climate finance instruments. So whilst the country's climate change ambitions from 2020 onwards have been institutionalised through the country's submission of an INDC (Chapter 3.3.5; pp. 49), the country's immediate ambitions (2012-2020) of which NAMAs institutionalise are not yet in place. Below are some examples of energy related NAMAs that are at various stages of development in Africa, hence table 7.3 illustrates how some countries plan to tap into various climate finance mechanisms and potentially improve their energy sectors and promote sustainable development once their NAMAs are fully implemented.

Table 7.3 Proposed energy sector NAMAs in selected African countries

Country	NAMA Title	NAMA Description	Sector/Focus Area	Proponent	Stage
Kenya	Accelerated geothermal electricity development	To support and expand on existing efforts undertaken by the Government of Kenya in the geothermal sector to create an enabling environment for a significant up-scaling of private investment necessary to achieve the desired accelerated growth	Renewable Energy (Geothermal)	Ministry of Energy and Petroleum	Under Development
Burkina Faso	Burkina Faso Biomass Energy NAMA Support	Support Project is to make biomass energy a commercially viable, renewable and low emission energy sector.	Renewable Energy (Biomass)	Ministry of Environment and Sustainable Development	Under Development
Morocco	Demand-side energy efficiency programme in industry	To promote energy efficiency activities in the manufacturing sector based on specific incentives and demonstration projects	Energy Efficiency	No Data	Feasibility Study
Uganda	Developing appropriate strategies and techniques to reduce methane emissions from livestock production in Uganda	To develop appropriate strategies and techniques of reducing methane emissions associated with livestock production	Agriculture	Climate Change Department	Under Development
Algeria	Development of concentrating solar power plants in Algeria	To help Algeria in developing its solar potential, which is one of the most important in the world, by launching major projects in solar thermal.	Renewable Energy (Solar)	No Data	Feasibility Study
Uganda	Development of grid-connected renewable energy	Support of the development of grid-connected renewable energy generation through a feed-in-tariff and through carbon credit generation	Renewable Energy	No Data	Feasibility Study
Egypt	Egyptian renewable energy investment	Contribute to the target of 20% renewable electricity generation by 2020.	Renewable Energy	No Data	Feasibility Study
Rwanda	Electrification with solar PV mini-grids in rural villages in Rwanda	Development and implementation of solar PV mini-grids in rural areas	Renewable Energy (Solar)	Rwanda Ministry of Infrastructure; Rwanda Energy Group (REG)	Under Development
Rwanda	Energy Efficiency Improvement in the Tea and Coffee Sector in Rwanda	Promotion of energy efficiency in the tea and coffee sector through Incentives and demonstration projects	Energy Efficiency	Rwanda Ministry of Infrastructure; National Industrial Research and	Under Development

				Development Agency (NIRDA)	
Ethiopia	Ethiopian Green Energy NAMA	To develop a rural electrification program, starting with pilot projects using RE mini grids	Renewable Energy	Ministry of Water, Irrigation and Energy (MoWIE)	Under Development
Sudan	Feed-in tariff NAMA for renewable energy	Development of a feed-in tariff policy NAMA for renewable energy in Sudan	Renewable energy (wind), Renewable energy (biomass)	Ministry of Water Resources & Electricity (MWRE)	Under Development
Gambia	Forestry NAMA in The Gambia	Convert forestry sector from emissions source to emissions sink	Forestry	Department of Forestry	Under Development
Gambia	Improved cooking stoves	Production and utilization of 200,000 improved cooking stoves for saving about 450,000 tons of wood and 419,000 tons of charcoal to avoid over 9 million tons of GHG emissions by 2030 compare to the BAU	Energy Efficiency	Department of Energy, Department of Community Development	Under Development
Mali	NAMA in renewable energy and energy efficiency in Mali	Reduction of GHG emissions by 1,285,034 tCO <sub>2</sub> per year through renewable energy production (e.g. with hydro, wind, biomass and solar PV)	Renewable energy (solar), Renewable energy (wind), Renewable energy (biomass)	Agency for Environment and Sustainable Development (AEDD)	Under Development
Mali	NAMA in the forestry sector	Reduction of GHG emissions by 12 MtCO <sub>2</sub> per year through afforestation and reforestation	Forestry	Agency for Environment and Sustainable Development (AEDD)	Under Development
Namibia	Rural Development in Namibia through Electrification with Renewable Energies	To support Namibia in achieving the goal defined in the Off-Grid Energy Master Plan(OGEMP	Renewable energy	Ministry Of Environment And Tourism	Under Development
Uganda	Sustainable charcoal in Uganda	To improve the value chain of charcoal in Uganda including the introduction of improved kilns and thereby increase energy security while fighting one of the drivers of deforestation.	Refining and energy production	No Data	Under Development

Source: Own compilation with data from NAMA database, 2015

## 7.4.2 Regulatory Responses to Livelihood Strategies

Another significant aspect identified through this study was a lack of acknowledgement of the critical interface between energy use, climate change, and livelihood strategies at various levels in Malawi. This has created an ineffective framework for laws and policies to improve the deployment of renewable energy and access to climate finance in Malawi.<sup>63</sup> The lack of alternative affordable energy sources contributes to a high consumption of charcoal more especial in the urban areas and other biomass sources in rural areas. The lack of alternative livelihoods for the majority of people in Malawi also contributes to environmental degradation. In the absence of good crops, rural populations usually resort to destructive practices such as cutting trees and charcoal production for their earnings (Kaunda and Mtalo, 2013).

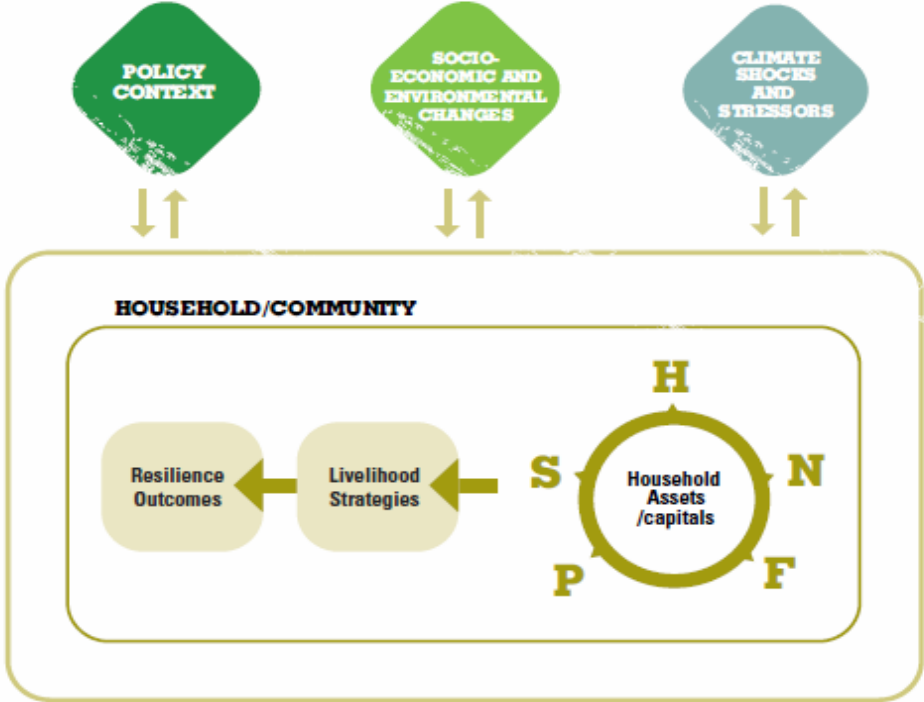
An effective policy for any sector in Malawi should consider how poverty and livelihoods are addressed and/or can be addressed by the local communities and households. For example with reference to climate change, as depicted in figure 7.8, there is a variety of actors and factors that exist at various scales (local, national, international) external to the household, which are simultaneously impacted by climate variability and change, and which impact on household livelihood strategies. Livelihood strategies are seen as an outcome of assets and/or capital at household level, the shocks and stressors<sup>64</sup> affecting these, as well as the policy and institutional environment in which all these elements interact (Kirrane et al., 2012). Arguably, policies and laws within this sustainable livelihood framework (and in all instances) have many functions some of which include to direct resources and focus to priority areas, direct investments to appropriate sectors and actors, provide strategies for overcoming the barriers and constraints faced by households and

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<sup>63</sup> On a global scale, the Intergovernmental Panel on Climate Change's (IPCCs) Assessment Report 5 noted that a viable climate resilient pathway would be to enhance renewable energy use, which could increase energy access for billions of people currently without access to safe and efficient energy hence boosting employment, and cost savings relative to fossil fuels. However, it was also noted that that the current CDM design is neither pro-poor nor contributes to sustainable development since the CDM does not have any requirements for monitoring and verification of development impacts as required for emissions reductions (Agrawal et al., 2014: pp. 797). These issues highlighted that even though there is acknowledgement that climate change and climate variability worsen existing poverty and exacerbate inequalities, the understanding of the impacts of climate change on livelihoods and poverty still required closer examining (i.e. the complexities of poverty and the lives of poor and non-poor people, as well as the multifaceted and cross-scalar intersections of poverty and livelihoods with climate change are not well understood).

<sup>64</sup> Livelihood stressors include climate variability and change; high poverty levels; socio-economic and political marginalisation; rapid population growth; increased pressure on natural resources, especially land and water; limited livelihood opportunities; and illness, which then contribute to vulnerability.

institutions to achieve their full potential (e.g. financial costs, and skills and education deficits), harmonise strategies being promoted by a range of actors to avoid conflicts and improve the collection and dissemination of technical and non-technical information (i.e. promote awareness).



Note: H = human capital; N = natural capital; F= financial capital; P = physical capital; S = social capital.

Figure 7.8 Sustainable livelihoods framework  
 Source: Kirrane et al., 2012

Biomass (use and availability) is not only an energy issue but a livelihood issue due to the various communities’ high dependence on biomass. With projections showing that Malawi’s population is on the increase whilst the supply of biomass is on the decrease, various socio-economic issues can be anticipated in Malawi (e.g. urban migration). In other countries and settings, biomass energy might not have a significant bearing on livelihoods because of the availability of alternative energy sources. However, in Malawi biomass production and consumption is intrinsically linked to agriculture, water, human health, energy, fisheries, wildlife, forestry and gender equality issues hence closely aligned to the country’s socio-economic development prospects at different levels. A preliminary preview of the main strategies and projects in Malawi related to climate change however show an

omission of the inextricable link between biomass, energy demand and climate change and the role that renewable energy can play to make this link sustainable.

Within the current institutional set up it is possible for energy components to be recommended or stipulated within major policies and strategies (more especially agriculture based projects as many interventions are based on enhancing the agricultural sector due to its vulnerability to climate change and impact on rural livelihoods). During project and policy development consultations there are opportunities for government policymakers to recommend what the stakeholders and project implementers (i.e. NGOs and International Development Organisations) should include in their projects hence this could present an opportunity to highlight the need for energy aspects to be included in the proposals. This approach of promoting community energy needs and demands in projects cannot only increase the awareness of energy issues amongst communities and stakeholders but it can also improve the penetration and diffusion of renewable energy technologies and development of local energy technologies. M18 and M22 alluded to the fact that NGOs are a valuable source for reaching out and raising awareness in rural communities, and ensuring the sustainability of projects (projects close to the base of NGOs/implementers are shown to be more sustainable than the ones where the NGOs/implementers has no local base). Without such definitive action, the diffusion of alternative energy sources into rural and urban areas will continue to be sluggish and this would be detrimental to the socio-economic aspirations of communities and the country.

The low level of acceptance or reluctance of households to utilise RETs is a major barrier to the wide-scale deployment of RETs. In the case of energy efficient light bulbs, the provision of free light bulbs in the first instance and availability of subsidised light bulbs may be considered as an effective strategy to assist with the adoption of the technology. In the case of energy efficient cook stoves, M25 highlighted that past projects that had distributed free cookstoves did not achieve their required goals as the free cookstoves were neither valued nor well utilised by the beneficiaries. These two scenarios highlighted the challenges related to engaging stakeholders in order to influence behavioural change and initiate the adoption of new technologies.

Whilst the Malawi energy policy and other renewable energy strategies prominently highlighted the need to encourage investors to invest in the renewable energy sector, little attention was given to the need for renewable energy policies' need to show an appreciation of the behaviour of stakeholders (consumers) in order to successfully address renewable energy sector challenges. As depicted in figure 7.9, some of the aspects that can influence a community's acceptability to new technologies include:

1. Relative advantage of the technology- in terms of expediency, saving money, effort and time, and reduced inconvenience in using or adopting an innovation;
2. The cost of renewable energy- from both the initial investment required to purchase the technology and their periodic maintenance costs;
3. Perceived ease of use- the degree to which users easily understand, operate and maintain a new technology;
4. Awareness- the degree to which users are cognizant of the existing new technology and its benefits and drawbacks and can keep track of updates on new technologies. The information gap makes the acceptance of new technology much less likely and it should not be assumed that good renewable energy products sell themselves (i.e. effective marketing plans must be in place to stream information to users, so that they can scrutinise the information to make an informed choice); and
5. Perceived behavioural control- how much control a person has over the behaviour (action), and how confident a person feels about being able to perform or not perform the behaviour (action). Perceived behavioural control is determined by the individual's beliefs regarding the power of both situational and internal factors to facilitate performing the behaviour (action). The more control an individual feels that he or she has over taking a renewable energy product into consideration, the more likely it is that he or she will do so (Alam, et al. 2014).

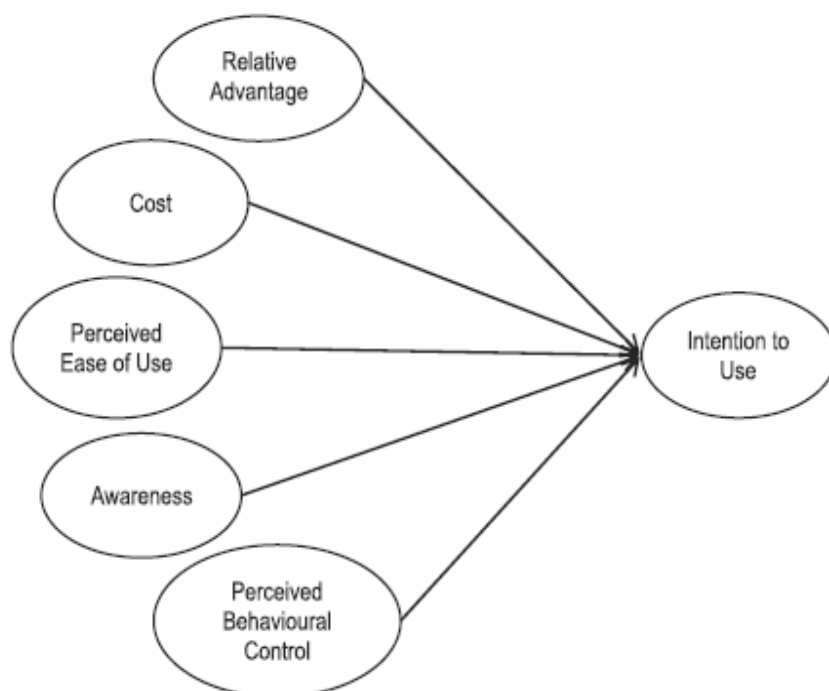


Figure 7.9 Conceptual framework for adoption of renewable energy  
Source: Alam et al., 2014

A better understanding of the living standards and other socio-economic parameters of the target group/beneficiaries for renewable energy projects/initiatives can therefore assist in developing effective renewable energy policies and regulatory frameworks. As highlighted in Chapter 7.2.5, Nepal's Rural Energy Policy (2006), Renewable (Rural) Energy Subsidy Arrangement (2009) and Additional Financial Support Mechanism for Micro and Mini Hydro (2011) though successful in enhancing renewable energy deployment in more accessible communities, were not very successful in improving the affordability of RETs for poor households and improving the accessibility of RETs to remote communities. Consequently, this led to an inequitable distribution of RETs and inequitable economic development. To address this challenge, the Subsidy Policy for Renewable Energy (2013) was introduced with refined subsidy rates that varied according to use of technology (domestic, communal, productive), remoteness/accessibility of community, type of renewable energy used (wind, solar thermal, solar photovoltaic, biomass (improved cookstoves), biogas plants, mini and micro hydro power, and improved water mill), and size of renewable energy scheme (i.e. actual power generation and number of actual households connected). The subsidy also covered rehabilitation of damaged projects and personal circumstances (i.e. dispensations for single women, disaster victims,



conflict affected persons, endangered ethnic groups, etc.). Such a holistic approach highlighted the challenges of renewable energy deployment and policy considerations in less affluent areas where energy use is linked to livelihoods. Malawi, too therefore arguably needs such a holistic approach to improve the deployment and utilisation of renewable energy technologies.

#### **7.4.3 Malawi's Climate Finance Investment Determinants**

This research can contribute to the existing body of knowledge on the deployment of climate finance projects in the SADC region. Various studies have attempted to determine the different aspects that influence the development of CDM projects in developing countries. For example, Ellis and Kamel (2007) and Cubbin and Stern (2004) looked at aspects such as the level to which national-level factors not related to the CDM (policy and legislative framework), national-level CDM-related factors (CDM institutional capacity and policy framework), project-related risks, and international-level constraints influence CDM deployment. Other researchers have focused on the relationship between FDI and CDM investment to shed light on the circumstances which can aid different countries to succeed in hosting CDM projects as they considered CDM funding to be a form of FDI hence was likely to be influenced by the same factors that influence FDI flows (Niederberger and Saner, 2005). It was suggested that two types of FDI exist – market seeking and non-market seeking investments. In principle, these two types of FDI are likely to have different determinants, with market seeking investments requiring strong domestic demand for products and non-market seeking FDI being driven by the cost and availability of factor inputs such as cheap labour and natural resources. Similarly, CDM projects therefore may either be market or non-market seeking. For projects that produce emissions reductions and a co-product such as electricity, CDM determinants are more likely to resemble market seeking FDI. For projects that only produce CERs, host country attractiveness may follow non-market seeking patterns with cheap and abundant emission reduction opportunities driving investment patterns (Asiedu, 2002). The findings from this research point out that Malawi's CDM determinants are more likely to resemble non-market seeking FDI. For starters Malawi does not host a regular CDM project in any sector despite the potential presented in Appendix 2 and table 3.5. Secondly, the three PoAs that have been implemented in the country are all related to generating CERs through the promotion of improved cookstoves

technology and not necessarily having any co-products such as electricity of which the market is expected to consume.

## **7.5 Sombre Thoughts – The Impact of Governance and Accountability (Corruption) on Renewable Energy Development in Malawi**

Perceptions about corruption, economic performance/invest-ability and governance have been shown to have a direct impact on Malawi's renewable energy sector regardless of the effectiveness or ineffectiveness of energy sector related policies. A fundamental aspect that has hampered the development of Malawi and still threatens the development of Malawi is the misappropriation of public funds (i.e. fraud and mismanagement of Malawi Government finances). In October 2013 Baker Tilly was asked by DFID to provide forensic and system security audit services support to the Government of Malawi following the discovery of irregularities by staff of the Accountant General during a routine examination of the Budget Exception Report. In what is now known as the Cashgate Scandal, the report revealed the means and extent to which government funds (from donor funds and tax revenues) were stolen and misappropriated. For the period between 1 April 2013 to 30 September 2013, the report showed payments amounting to MK6,096,490,705 (€11,132,500) were made for the provision of goods or services but there was no evidence to support the provision of the goods or services in relation to the payments made; payments totalling MK3,955,366,067 (€7,222,720) were made with no supporting documentation; and payments totalling MK3,619,539,979 (€6,609,490) were made for goods or services at inflated procurement prices. Following the publication of these revelations various donors including the German Government, World Bank and UK Government withheld their budgetary support to Malawi.

Another investigation was done in 2015 in order to identify anomalies in the Government paying systems and identify the extent of suspected irregular transactions which warranted further investigations. This second analysis showed that the total value of payments on the bank statement during the period 1 January 2009 to 31 December 2014 for the Government of Malawi amounted to MK1,850,439,776,036.36 (€3,382,888,073). The total value of cashbook entries during the same period amounted to MK1,273,200,935,525.69 (€2,327,606,829) which amounted to a shortfall of MK577,238,840,510.67 (€1,055,281,244) of

payments reflected on the bank statements, but not on the cashbook (this amounted to 31.19% of the value of payments not reflecting in the cashbook) or electronic payment database (PWC, 2015). To put this in perspective, it can be argued that the Malawi Government lost about MK577,238,840,510.67 (€1,055,281,244) between 1 January 2009 to 31 December 2014 due to corrupt practices such as theft, fraud and misappropriation of public funds. Suffice to say this revelation extended Malawi's aid freeze with dire consequences on the delivery of social services in the country and economic growth.

Malawi's current aid freeze is arguably a manifestation of a loss of donor and investor confidence in the public systems and institutions of Malawi.<sup>65,66</sup> Other reports have stated that annually funds amounting to approximately 30% of the national budget disappear and go unaccounted for due to corruption and theft (Nyasa Times, 2014). All of these revelations therefore only shed more light on the sentiments of M11 (Chapter 7.3.8- What Aspects Can Make Laws and Policies Not to Have an Impact on the Development of Renewable Energy Sources in Malawi) who stressed that government ministries have perpetual funding shortfalls and all these revelations portray the scale of the problem and how government accounts are systematically looted.

In the renewable energy sub-sector, governance can be understood as the process of designing and enforcing the rules of the game in order to create a supportive renewable energy environment (Schillebeeckx et al., 2012). Some commentators argue that climate finance funding is a form of FDI and is likely to be influenced by the same factors that influence FDI inflows (Winkelman and Moore, 2011). In this

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<sup>65</sup> Foreign donors suspended MK58,274,000,000 (€110,148,000) of aid to Malawi until civil servants, politicians and businesspeople involved in the alleged looting of more than MK38,617,800,000 (€73,858,000) from government coffers were prosecuted and there were clear assurance, independently verified, that donor resources were all being used for their intended purpose (Guardian, 2014).

<sup>66</sup> In Chapter 3.5 (Climate Finance Challenges) it was suggested that the Malawi policy context has two great challenges. Whilst the country has seemingly good policies, there seems to be problems in the policies reacting favourably when crises occur and secondly for climate and environmental related policies and programmes to be maintained as priorities in the midst of economic crises. It therefore has to be seen how this Cashgate Scandal will impact the short to medium renewable energy and climate change management related programs. Malawi's budget consists of 40% contributions from donors. Already the aid freeze has hampered the provision of government services and the government is in a process of devising a budget that does not incorporate donor contributions for its forthcoming year (July 2014 - June 2015) as the donor freeze might still be in operation. This therefore means that the government will be running on a highly constrained budget for which on crucial programmes and services will be undertaken.

regard, the low implementation of climate finance projects can be a manifestation of a poor business environment and failures in demonstrating effective governance structures and openness to trade.<sup>67</sup> This revelation that Malawi has substantial governance shortfalls and high levels of misappropriation of public funds can therefore derail all the efforts and policies that have been put in place to encourage climate finance investments and promote investment in the energy sector and hence the uptake of renewable energy. The responsibility for creating an enabling environment for private investment rests with governments as political stability is a pre-requisite for attracting private investors and FDI whereby issues of democratic reforms and elections, and corruption impinge on a country's attractiveness as an investment destination (UNECA, 2006: pp. 52). Governance issues have arguably significantly affected energy access, services quality, and the mainstreaming of low-carbon energy in the country.

The factors influencing renewable energy deployment and the implementation of renewable energy climate finance projects in Malawi as discovered through this research are presented in figure 8.1 and 8.2 respectively. However, in the light of these shortfalls in the governance and accountability of public institutions in the country, arguably the aspects that need more urgent attention to promote renewable energy investments are to deal with addressing the many flaws in the country's governance and accountability systems since they ultimately affect the factors in figure 8.1 and 8.2 negatively.

This demonstration of misappropriation of public funds, theft and corruption as seen in Malawi arguably shows that Malawi's greatest challenge is therefore ensuring that proper laws, policies, regulatory frameworks and systems are developed and implemented to eradicate the culture and practices of theft, fraud, corruption, and misappropriation and mismanagement of public funds. Failure to do this will only lead to the poor implementation of programmes, policies and regulatory frameworks related to the development of the renewable energy sector and other vital sectors of Malawi's society.

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<sup>67</sup> However, the connection between FDI and CDM investment (climate finance funding) may not be perfect, as some countries that have experienced difficulty attracting FDI have succeeded in hosting CDM projects (Niederberger and Saner, 2005). This can therefore imply that Malawi can still be able to tap into climate finance mechanisms to promote renewable energy projects even when the country's investment and economic prospects are not encouraging.

The period to which this research was conceived, developed and finally undertaken (2009-2015), has been of immense insight into the structure and operations of the Government of Malawi, public policy, and the energy sector. The profound effects of politics<sup>68</sup> and non-energy sector issues on the development of the renewable energy sub-sector were experienced in real time as changes and new developments were occurring. From an academic and research perspective documenting the events and analysing the effects of various policy changes in real time as history was unfolding was fascinating. However, for consumers experiencing the effects of such changes such as increases in the prices of petrol (figure 7.10) and an almost 200% devaluation of the local currency between this period, their opinions would be somewhat different due to the economic constraints and hardships that such changes brought about. For example, in absolute terms, the average petrol prices increased by approximately 500% within eight years (i.e. the average petrol prices were MK139 in June 2006 and MK839 in February 2014).<sup>69</sup>

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<sup>68</sup> In 2009 the governing political party in Malawi was the Democratic Progressive Party. The president of the political party and president of the Country was Dr. Bingu Wa Mutharika. The vice president of the Country was Mrs. Joyce Banda from the Democratic Progressive Party. In December 2010 Mrs. Joyce Banda was expelled from the Democratic Progressive Party. She subsequently formed her own political party named the Peoples Party. She however retained her seat as the vice president of Malawi as the president had no constitutional powers to remove the vice president. Tragically, Dr. Bingu Wa Mutharika, the president of Malawi and the Democratic Progressive Party died in April 2012. This effectively made the Country's vice president, Mrs. Joyce Banda the president of the Peoples Party to become the de facto president of Malawi until the next tripartite elections in May 2014. Suffice to say the Peoples Party has been consolidating its power and implementing its own policies and strategies and due to weaknesses in the framing and interpretation of the Malawi Constitution, various people and Members of Parliament from various political parties (including the Democratic Progressive Party) defected to join the Peoples Party.

<sup>69</sup> The devaluation of the Malawi Kwacha also had significant impacts on the electricity sector. In order to improve cost recoverability for ESCOM, MERA approved an increase in electricity tariffs by 63.52% following the devaluation of Malawi kwacha in May 2012. The 63% review was after a January 2011 review which pegged the tariff at US\$0.06 per unit. Following the devaluation, the Malawi Kwacha based tariff was reduced in US dollar terms to US\$0.04 (MERA, 2012).

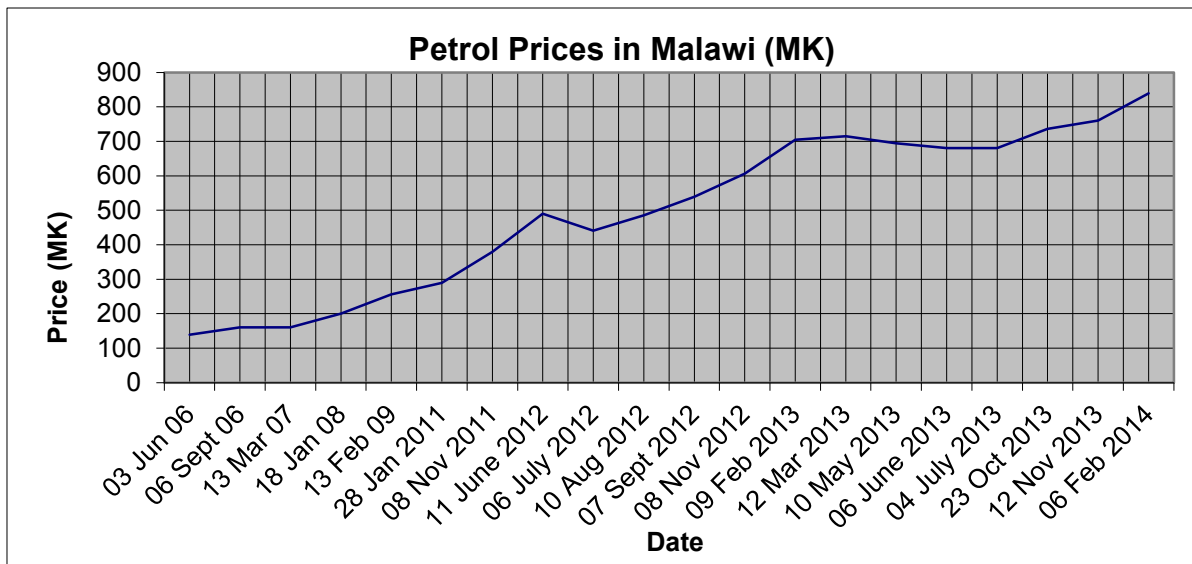


Figure 7.10 2006-2014 petrol prices in Malawi  
 Source: Own compilation from MERA (2014) reports

After all is said and done, in the short to medium term what will determine if the renewable energy sector in Malawi will attain its full potential is not whether the best renewable energy policies and incentives are put in place, but it will be whether the best policies and strategies to enhance government accountability and governance are effective and implemented in order to improve donor and investor confidence in the Malawi.

Lastly, this research has been very insightful in showing me the various challenges that I will likely face and experience as I try to establish myself as a policy analyst focusing on trying to improve the development prospects of Malawi and contributing to global climate change research and policy formulation. Even though future assignments might be challenging, it is evident that the rewards for establishing an effective policy framework that can improve the livelihoods of various people and communities could be very fulfilling.

## 7.6 Limitations

The research had a three stage approach to collecting primary data where by the research had two pre-tests followed by face to face interviews. The study enhanced its validity and reliability by triangulating the primary and secondary data, and the study followed the processes that were undertaken when developing actual renewable energy policies for different countries. For example, the National Energy Policy for Ghana (GoG, 2010b: pp. 1) was formulated through a consultative process

which involved the review of policies of several countries, discussions with institutions of Government, local authorities, civil society organisations and academia, among others. The use of multiple data sources and triangulating key points in this research enhanced the validation process by ensuring that weaknesses inherent in one approach were counterbalanced via strengths in another (Phillips and Newell, 2013; Komendantova et al., 2012; Fay, 2013).

In addition to this, the researcher also adopted a similar approach as that of Fay (2013) who tried to identify the key considerations (policies) influencing renewable energy promotion and CDM utilisation<sup>70</sup> by examining “the role of market-based incentives in promoting low carbon development in developing countries”. The researcher therefore sought to have some of his findings to be peer reviewed and published in order to seek further validity. This exercise culminated in three publications namely Chirambo (2014), Chirambo (2016a) and Chirambo (2016b), hence some of the findings and assertions contained in this research have been through various peer reviews to substantiate some of the results and conclusions as presented in this study.

The study could have arguably benefited from including focus group discussions as part of the research methodology. According to Scott (2011) focus groups are increasingly being used to elicit intelligence and evidence for policy and research outputs. Additionally, Svenfelt et al. (2011) consider focus groups as research tools that can assist in exploring conceptions, attitudes and valuations about specific subjects, and can lead to uncertainties about environmental problems to be recognised and the assumptions of decision-makers and other stakeholders about each other's behaviour and motives to be illuminated. Focus group discussions were not undertaken as part of this research due to financial constraints and logistical challenges as experts who would make up the focus group discussions would have had to be invited from various towns to congregate at specific times and locations.

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<sup>70</sup> In a PhD thesis titled “The Role of Market-Based Incentives in Promoting Low Carbon Development in Developing Countries” (Fay, 2013), the researcher produced a single-themed cohesive PhD thesis using publications comprised of five interlinked papers that individually and collectively addressed the main research question. Each empirical paper directly investigated one or more subordinate research questions hence the papers collectively responded to the main research question.

## **Chapter 8 Conclusions and Recommendations**

### **8.1 Introduction to Chapter Eight**

Chapter eight presents the conclusions drawn from the research findings within the framework of the study objectives. In addition to the conclusions, it suggests avenues for further research and provides two recommendations that can improve the deployment of RETs and access to climate finance in Malawi (and possibly other countries in the region) based on the research findings.

### **8.2 Conclusions**

The first objective of this study was to analyse major factors undermining the development of renewable energy sources in Malawi. This study reveals that the renewable energy framework in Malawi is incomplete as such there have been some implementation shortfalls. The Malawi National Energy Policy (2003) proposed the formulation of an Energy Regulatory Framework in the form of an Energy Regulation Act and related sub-sector legislation, including the Electricity Act, the Rural Electrification Act, the Liquid Fuels and Gas Act, the Coal Act, the Biomass Act, and the Other Renewable Energy Services Act, to provide a legal basis for improved energy sector governance. As it stands, the Energy Regulatory Framework comprises of The Energy Regulation Act 2004, The Electricity Act 2004, The Rural Electrification Act 2004, and The Liquid Fuels and Gas (Production and Supply) Act 2004 hence three sub-sector legislations including the Other Renewable Energy Services Act have not yet been developed. Some of the Acts that were implemented have arguably improved the various facets of the energy sector to which they were developed for (i.e. The Rural Electrification Act is successfully mobilising funds from various sources to promote rural electrification and has marginally increased the rural electrification rate; and The Energy Regulation Act (2004) provided the framework for the establishment and operation of the Malawi Energy Regulation Authority (MERA) to regulate the energy sector (e.g. provide oversight over the approval of tariffs and prices of energy sales and services, and receive and process licence applications for energy undertakings.)).

Funding and awareness are also seen to have a profound influence on the effectiveness and implementation of policies and laws. Funding is important as it not only helps in developing and realising renewable energy projects, but also helps with



the human capacity building and technical capacity building of relevant stakeholders. Knowledgeable stakeholder are in a better position to understand the technical aspects related to different types of RETs and the environmental and social-economic factors that determine how acceptable a community can be to the use of certain RETs. Awareness on the other hand is important to enable people to understand the value of renewable energy to the environment and also enable various stakeholders to understand the potential uses and limitations of various RETs.

Another objective of the study was to assess the challenges and opportunities of Malawi's existing laws and policies as instruments for promoting renewable energy in Malawi more particularly using climate finance mechanisms such as the CDM. Here it was discovered that laws and policies can have an impact on increasing renewable energy deployment by providing the right incentives to attract IPPs and providing tax exemptions which could reduce the cost of RETs. However, the main challenge is to ensure that non-energy related policies do not undermine aspects that attract investment in the (renewable) energy sector. This follows that whilst the potential market and demand is there for energy services, Malawi as a LDC has structural challenges and infrastructural inadequacies (e.g. a poor road network and communication systems, lack of skilled personnel, etc.) which deter investments not only in the renewable energy field but also in other sectors such as mining and manufacturing. These issues therefore increase operational costs for businesses and also increase the risks for renewable energy projects hence deterring potential investments in the various sectors of Malawi. In addition to this, the energy sector is dominated by ESCOM. ESCOM is a 100% state owned company that generates, transmits, and distributes electricity. The company arguably has a monopoly in the electricity sector which the government utilises to influence electricity tariffs to make electricity affordable but this is counterproductive as low tariffs discourage the private sector from undertaking (renewable) energy sector investments.

The study also attempted to determine law and policy instruments that can promote the development and implementation CDM projects and access to climate finance in Malawi. Here it was discovered that the factors that have led to positive developments and more activity in the climate finance and CDM sector were

international efforts and modification to the CDM framework to include PoAs and the prioritisation of CERs from LDCs for the EU-ETS. Malawi still has no regular CDM projects hence highlighting the problems to do with the investment climate in Malawi as it was discovered that CDM investments and renewable energy investments are usually influenced by similar issues (e.g. political and macroeconomic stability, sound regulatory frameworks, efficient supporting institutions enforcing the relevant laws and regulations, etc.) hence for Malawi to be attractive for CDM and other climate finance projects the DNA should lobby for more investment incentives (e.g. tax exemptions) to be provided to potential CDM investors since CDM investors are likely to invest in a country that they can generate the most commercial profits and benefits from.

The climate finance operation and implementation modalities in Malawi also seem to be out of sync with the existing realities of the socio-economic situation of the country. Knowledge and understanding on the aspects that can improve climate change mitigation and adaptation are not well understood by various stakeholders in Malawi and subsequently there is also limited awareness on the objectives of climate finance. The climate finance capacity building initiatives that have been undertaken in Malawi have arguably been inadequate to generate enough knowledge and awareness amongst stakeholders to enable them to have the expertise and confidence to develop climate finance projects. Climate finance modalities though beneficial are therefore still considered cumbersome and costly hence most stakeholder will continue their business as usual approach to development which could be environmentally harmful. During the research, whether by coincidence or by design, it was discovered that most stakeholders that were at an advanced stage in the development or implementation of their PoAs or other VCM projects were unavailable for interviews due to other commitments or because of their busy schedules hence they could not be part of the study. On the other hand, the stakeholders that were finding challenges in conceptualising climate finance opportunities, modalities and projects were more forthcoming in being part of the study possibly to be able to share their experiences and learn from other people's experiences. This could signify that outside the framework of the workshops hosted by the DNA there is limited information and experience sharing amongst stakeholders

as such they cannot support each other to promote the development of climate finance projects.

Lastly, it was important to identify approaches, mechanisms and innovations that can assist with the development of renewable energy in Malawi so that future policies in Malawi can be more effective at improving the deployment of RETs and attracting climate finance projects. Certain schools of thought consider the choice/type of policy instrument to use to promote the deployment of renewable energy (i.e. FITs, Renewable Portfolio Standards, tax exemptions, subsidies, etc.) not to be as significant as the actual design of the renewable energy support instrument because countries, regions and communities differ in economic structure, technological development, the cognitive environment, awareness levels and specific market characteristics (i.e. to promote renewable energy, emphasis should be placed on the design (incentives and operation) of the policy rather than in deciding which policy instrument to use). A better understanding of the livelihood strategies, energy use patterns and income levels of the different segments of society in Malawi are therefore imperative in understanding how the communities can embrace or reject new technologies that are introduced in the community.

Figure 8.1 is a representation of the issues that the study discovered as key factors that determine the rate of utilisation of renewable energy sources in Malawi. Arguably, these are the issues that should always be incorporated in the design and implementation of the country's renewable energy policies and strategies, and climate change policies and strategies.

Figure 8.2 is a representation of the issues that the study discovered as key factors that determine the accessibility of climate finance and implementation of climate finance projects in Malawi. Arguably, these are the issues that should always be considered in Malawi's climate change policies, climate risk management strategies, and renewable energy policies. Some approaches, mechanisms and innovations that can assist with the development of renewable energy and attracting climate finance projects are provided in the next section.

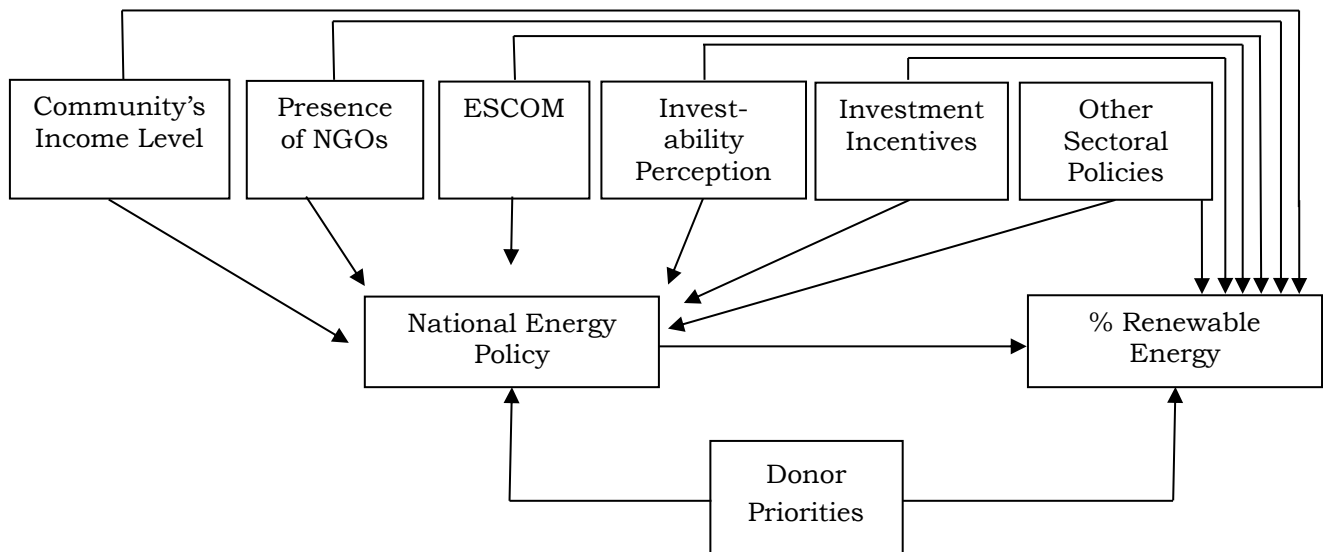


Figure 8.1 Factors influencing renewable energy deployment in Malawi

**Community's Income Level-** This influences whether or not a community can adopt RETs as most communities in Malawi are poor and have biomass as a cheap and alternative energy source. Arguably, the lesser the cost of the RETs, the higher the probability that communities will be willing to buy and use the RETs.

**Presence of NGOs-** NGOs are a vital stakeholder in the renewable energy sector as they are responsible for undertaking renewable energy projects that are not economically viable but socially advantageous consequently promoting the diffusion of RETs. Moreover, NGOs fund other energy sector stakeholders and are also a source of information that raises awareness on various environmental and social issues to many rural communities.

**ESCOM-** The organisational and technical inefficiencies of ESCOM have led to capacity and infrastructural deficits in Malawi's energy sector. ESCOM's low tariff rates and the lack of a renewable energy development plan by the organisation arguably have deterred private sector led investments in the renewable energy sector and limited the diffusion of RETs.

**Investability Perception-** The Ease of Doing Business Index (2014) (World Bank, 2014b) ranked Malawi 171 out of 189 economies (or a rank of 34 out of 47 countries in SSA) in terms of how conducive the regulatory environment was to starting and

operating a business locally. At rank 171, Malawi was near the bottom of the list hence investors could perceive the country as lacking consistency in the implementation of its policies thereby giving investors the perception that the country does not have a good business environment for energy and non-energy sector investments.

**Investment Incentives-** Attracting renewable energy sector investments is competitive. Energy deficits are not only characteristic of Malawi but the SSA region as a whole has low electrification rates as such international investors and IPPs have many options and countries to choose from for their investments and will likely choose to invest in the countries that have the best investment incentives (i.e. countries that reduce their risks and increase their profits). (The new approach in Malawi where power producers and (major) power consumers will be able to negotiate and agree on tariffs independent of government prescribed prices can therefore be seen to be a commendable incentive that has potential to promote the use of RETs.)

**Other Sectoral Policies-** Renewable energy deployment can be hampered by constraints from and conflicts with other policies that have contradictory objectives. This scenario can emanate from other policies within the energy sector (e.g. government prioritising the development of conventional energy supply systems) hence making RETs comparatively more expensive. Other non-energy related policies such as the imposition of import duties on various RETs and government prioritising investments in other sectors can also influence RET deployment.

**Donor Priorities-** Donors play a significant part in the socio-economic development agenda of Malawi since over 40% of the national budget is financed by donors. Donors therefore influence renewable energy deployment by determining the amount of funds to be provided to the country (at what time and under which circumstances), funding different renewable energy projects and also stipulating the types of projects that the government is allowed to undertake.

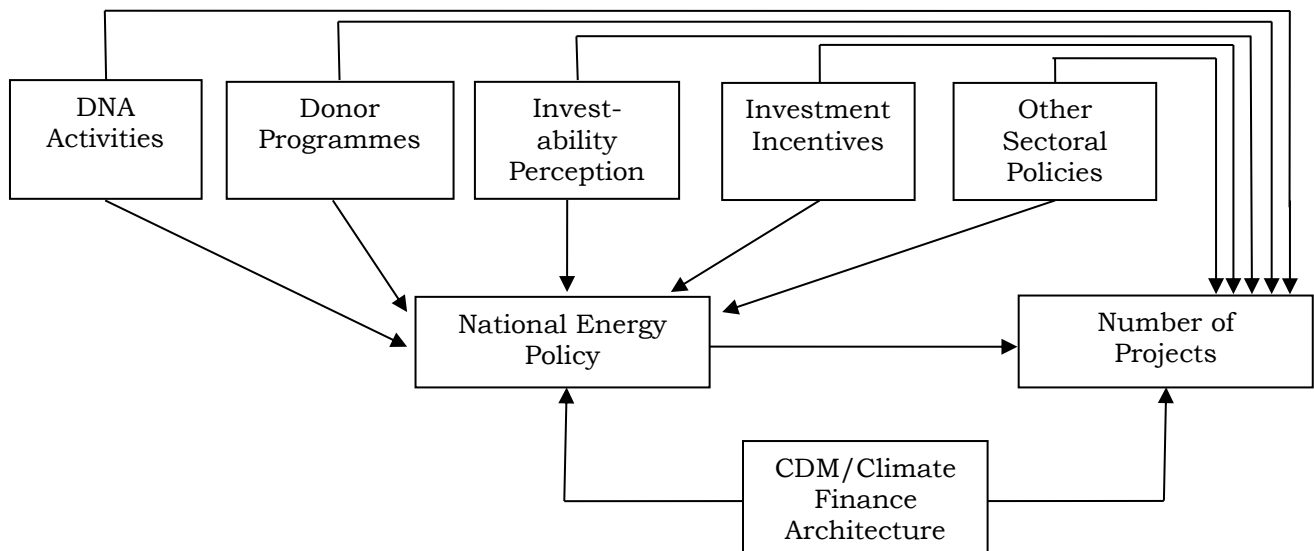


Figure 8.2 Factors influencing climate finance projects in Malawi

**DNA Activities-** Malawi does not have dedicated CDM and climate finance promotion centres as it is the case in the countries that are regarded as being successful in hosting many CDM and climate finance projects. In the absence of the dedicated CDM and climate finance promotion centres, the DNA therefore has to come up with innovative approaches to attract climate finance investments, and create partnerships that can improve its capacity and resources.

**Donor Programmes-** Various NGOs and International Development Organisations have different projects that are directly or indirectly related to climate risk management (e.g. enhancing agricultural systems and increasing the resilience of people to disasters). Donors also provide funding and technical assistance to various stakeholders and this assists in promoting their understanding of climate change issues and how to utilise climate finance modalities.

**Investability Perception-** The Ease of Doing Business Index (2014) (World Bank, 2014b) ranked Malawi 171 out of 189 economies (or a rank of 34 out of 47 countries in SSA) in terms of how conducive the regulatory environment was to starting and operating a business locally. At rank 171, Malawi was near the bottom of the list hence investors could perceive the country as lacking consistency in the implementation of its policies thereby giving investors the perception that the country does not have a good business environment for energy and non-energy sector

investments. These aspects could increase the perception amongst investors that climate finance projects will not be able to successfully go through all the stages in a climate finance cycle and achieve their projected project emission reductions.

**Investment Incentives-** Attracting climate finance projects is competitive. Different developing countries understand the value of climate finance projects in minimising environmental degradation and promoting renewable energy development. Climate finance investors have therefore got options to invest in different developing countries in different world regions hence are likely to choose host countries that provide the highest net profitability and implement their projects when it is advantageous for them to do so.

**Other Sectoral Policies-** Malawi has no climate change policy as such different sectors have various programmes and strategies that try to deal with climate change issues. In the absence of a climate change policy, the country's climate change related programmes and strategies are consequently not well coordinated which in some circumstances also leads to the various programmes and strategies being in conflict. Synergies and other opportunities to utilise climate finance modalities to enhance climate change management are therefore not well developed.

**CDM/Climate Finance Architecture-** Prior to the introduction of CDM PoAs Malawi had no registered climate finance project under the compliance carbon market. Even up to now Malawi has no project under regular CDM projects. This therefore highlights that the climate finance landscape in the country is still not attractive for many climate finance projects. In its present status Malawi can probably only gain from climate finance modalities through interventions by global policy makers that give the country special dispensations due to its LDC status, introduction of new carbon crediting methodologies and through VCMs.

### **8.3 Recommendations**

This study evaluated the policy and regulatory framework in Malawi with regard to renewable energy deployment and access to climate finance (implementation of climate finance projects). Some of the country's socio-economic challenges include environmental degradation, deforestation, poverty, food insecurity, and climate

change which is contributing to and exacerbating poverty as well as the development of the renewable energy sector. The issues that have entrenched Malawi into a poverty trap such as a weak implementation capacity or lack of capacity to steer reforms within and across sectors (IDA/IMF, 2012) were also highlighted and reaffirmed through this research, and have also been shown to have a profound influence on the development of renewable energy and the general investment climate for both renewable energy investments and climate finance related investments.

Two recommendations are provided below as a means of charting a path to which the renewable energy sector investments and the implementation of climate finance projects can be accelerated.

### **8.3.1 Dual Renewable Energy and Climate Finance Promotion Agency**

This research has revealed that various policies and strategies have been formulated for the energy sector and climate risk management but they lack effective means for implementation and coordination due to inadequate skilled personnel and inconsistent funding. This can be said to contribute to increasing policy risks in Malawi as a lack of effective coordination and cooperation among relevant government agencies often leads to low efficiency in public resource allocation and use, and delays in building consensus and formulating concrete policy measures (Zhang et al., 2010). Malawi therefore needs a coordinating mechanism for renewable energy policy formulation and implementation which can also assist with energy related climate risk management activities such as promoting renewable energy climate finance activities.

In order to enhance the utilisation of renewable energy and improve the implementation of renewable energy projects, this research is proposing the establishment of a Renewable Energy and Climate Finance Promotion Agency.<sup>71</sup> This is different from the other renewable energy regulatory and institutional

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<sup>71</sup> Governments and state-owned utilities can easily help lower the costs for individual project development by providing detailed information on the country's renewable energy potential e.g. the publication of national solar and wind atlases informs potential investors about suitable areas for investment and reduces the costs for feasibility studies (HBS, 2013). A Renewable Energy and Climate Finance Promotion Agency can be useful by undertaking such activities.



proposals that have been suggested as other researchers on Malawi's renewable energy sector proposed that the country needs to develop a stand-alone renewable energy policy or technology specific renewable energy policies in order to improve the use of renewable energy sources (Jumbe and Mkondiwa, 2013; Kaunda, 2013). In the light of the findings of this research, developing renewable energy policies and strategies on their own would likely not significantly improve renewable energy deployment and project implementation.

The Renewable Energy and Climate Finance Promotion Agency could have an overall mandate over for all matters relating to renewable energy such as soliciting funding for renewable energy projects from concessional and non-concessional sources, drafting and implementing renewable energy policies, developing renewable energy pilot projects, developing and implementing renewable energy climate finance programmes, implementing programmes for the development of renewable energy sources, coordinating and intensifying Research & Development in the renewable energy sector, and increasing awareness on renewable energy.<sup>72,73</sup> In Chapter 7.3.7 (What are the Necessary Conditions that are Needed In Order to Make Laws and Policies to Have an Impact on the Development of Renewable Energy Sources in Malawi?), some respondents mentioned the Ministry of Energy as being ineffective in pushing forward the renewable energy agenda. Arguably, incorporating a Renewable

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<sup>72</sup> For example in Egypt, there exists the Ministry of Electricity & Energy and the New & Renewable Energy Authority (NREA). In as early as 1986 Egypt established the New & Renewable Energy Authority (NREA) to act as the national focal point for expanding efforts to develop and introduce renewable energy technologies to Egypt on a commercial scale together with implementation of related energy conservation programs (NREA, 2014). Nepal has the Alternative Energy Promotion Centre (AEPCC) as an independent Government institution under the Ministry of Science, Technology and Environment. AEPCC strives to promote the use of alternative/renewable energy technologies to meet the energy needs in Nepal. Acting as an intermediary institution between the operational level NGOs/private promoters of renewable energy and the policy decision levels in relevant ministries, AEPCC's activities include renewable energy policy formulation, planning and facilitating the implementation of the policies/plans (AEPCC, 2014).

<sup>73</sup> It has also been observed that countries that have had strong institutional support to bioenergy (renewable energy) programmes have registered significant success in promoting improved bioenergy (renewable energy) technologies. A good example is India, which registered significant success in modern bioenergy development through government programmes implemented by the Ministry of New and Renewable Energy. Between 1984 and 2003, an estimate of 35 million improved cooking stoves had been disseminated. The biogas programme of India also had over 3.8 million bio-digesters installed. The success was attributed to investment in research and technology development and dissemination through policy measures and incentives. In Brazil, the ProAlcool Program is a bioenergy programme based on ethanol produced for molasses. Currently, over 80% of vehicles in Brazil operate on a blend of ethanol and petroleum resulting in over 20% substitution of petroleum use in the vehicle industry. The Brazilian success is attributed to state intervention in the establishment and support to the ethanol programme, infrastructural development as well as research and development (Okello et al., 2013).

Energy and Climate Finance Promotion Agency in the energy sector institutional framework can be seen as a possible solution to counter inefficiencies that can come about as a result of changes in government priorities and the restructuring of government ministries. For example, in Kenya, regardless of the existence of the Ministry of Energy and Petroleum that has a Department of Renewable Energy (to focus on activities relating but not limited to renewable energy technologies and energy efficiency and conservation), a state-owned enterprise called the Geothermal Development Company Ltd (GDC) was established, with the responsibility for speeding up geothermal power production. The GDC is responsible for exploration, drilling and assessment of geothermal resources up to a point where a clear and sustainable statement of resource potential has been prepared, with sufficient confidence that potential developers would be encouraged to invest in designated generation projects (GDC, 2014). This intervention by the Government of Kenya not only further illustrates how different renewable energy sources vary in technical requirements, investment potential and energy output hence require specific interventions, but also that specialised renewable energy institutions are required to fully realise the renewable energy potential that different countries have.

In the case of Malawi, the Renewable Energy and Climate Finance Promotion Agency should be an independent entity to limit government and political interference which often contributes to ineffective policy implementation. The private sector is adequately poised to act on the behalf of the Government as the Renewable Energy Promotion Agency as this arrangement can be more effective since policy and programme success is enhanced when various stakeholders such as the private sector are genuinely involved in pertinent activities and given ownership of policy measures and programmes including implementation, monitoring and evaluation processes (GoZW, 2010). More importantly, if a private enterprise is given the mandate to be the country's Renewable Energy and Climate Finance Promotion Agency, it might have the possibility of being able to source financing from more financing sources both nationally and internationally since in the current status, the Department of Energy, as a Government department is constricted in terms of the types of funding that it can access or apply to. The Renewable Energy and Climate Finance Promotion Agency as a private or semi-private institution will therefore have access to bilateral, multilateral, philanthropic and private finance for the development

of renewable energy initiatives. This can subsequently minimise the impacts of government underfunding and budget shortfalls as elaborated in Chapter 7.3.8 (What Aspects Can Make Laws and Policies Not to Have an Impact on the Development of Renewable Energy Sources in Malawi?)

Another major challenge affecting the development of renewable energy in Malawi is the sustainability of projects. The operations of most projects are constrained by the lack of local technical expertise to maintain systems more especially a year or so after system commissioning because the defects-liability period during which a contractor is responsible for after-sales-services comes to an end and some renewable energy projects and installations are donor funded hence they suffer from maintenance problems when the donors hand-over the projects to the government or local communities (Zalengera et al., 2012). This was further collaborated by M21 (Chapter 7.3.8- What Aspects Can Make Laws and Policies Not to Have an Impact on the Development of Renewable Energy Sources in Malawi?). Community ownership, capacity building and training are therefore a key requirement to improve the development, implementation and maintenance of energy access projects (Chaurey et al., 2012). The Renewable Energy and Climate Finance Promotion Agency, with its trained personnel on various issues relating to RETs can then also offer the possibilities of incorporating these issues in its operations and mandates. The Agency can also work with donors and other project implementers to ensure that the projects that are set-up are acknowledged by the Agency and to the standards and requirements of the Agency so that the projects could be periodically inspected and/or maintained by the Agency so as to improve sustainability of the systems and result in increased impact of the RETs.

### **8.3.2 Renewable Energy Fund**

Even though every country in Africa has surplus energy resources, financing difficulties have prevented the vast majority of countries from being able to exploit their energy potential (Sanoh et al., 2014). Energy development in many countries in SSA also suffers from poor energy financing and incentive mechanisms, inadequate energy planning and the weakness of national energy policies (Mohammed et al., 2013b). Malawi's inadequacies in providing the appropriate financial support and investments for renewable energy sector are therefore not particular to the country, but characteristic of SSA. Malawi does not only have to address the question of

attracting local and international investors to develop renewable energy projects but the country also has to increase awareness of the value of RETs, improve the availability of RETs and improve the accessibility of RETs.

Scaling up the effort to solve energy-poverty problems require innovation in service delivery which includes possible changes in both ownership of energy service delivery organisations and the ways in which energy is financed (Zerriffi, 2011). A lack of finance was cited as an issue that has impaired the deployment of renewable energy in Malawi and other countries in the region. Funding constraints arguably limit the extent to which renewable energy related research and development and capacity building activities can be undertaken. Policies in Malawi should therefore be geared at increasing the sources to which the renewable energy sector stakeholders can access finance possibly through a Renewable Energy Fund. No electrification project has ever succeeded without significant government backing and strong political will (CORE, 2003), as such a Renewable Energy Fund is particularly helpful not only as it will demonstrate political will to improve renewable energy generation. It so happens that experience gained from first-generation market development projects show that, in almost all cases, significant public resources have been necessary to increase the affordability of clean energy technologies, provide access to financing for the poor, and remove non-economic barriers (Glemarec,2012).

Below are three options which present a means for creating and sustaining a Renewable Energy Fund. Since donor commitments can be erratic, the three options provided are independent of donor support or anticipated grants as such present a more sustainable approach to developing renewable energy sources through other resources.

### **Option 1- Energy Levies**

Following on from the proposals contained in the Malawi National Energy Policy (2003), the Rural Electrification Act (2004) was enacted to make provision for the promotion, funding, management and regulation of rural electrification; and for matters connected therewith and incidental thereto (GoM, 2004c: par 21). The key provisions of the Act include the establishment of the Malawi Rural Electrification Fund comprising of such sums as shall be appropriated by Parliament for the purposes of the Fund and rural electrification levies on energy sales. The funds

collected through the Rural Electrification Act have greatly contributed to the development and sustainability of the Malawi Rural Electrification Programme (MAREP) which was mainly funded by donors prior to the enactment of this Act.

The price of petrol and diesel in Malawi incorporates the Rural Electrification Levy in its price build up as such there is a consistent flow of funds available for rural electrification that are protected by national legislation. In addition to this, there are also annual allocations from the national budget towards the Rural Electrification Fund. In a similar manner, it is conceivable for Malawi to develop a similar piece of legislation that can stipulate national budget allocations and levies from fossil fuels to be directed towards a fund for financing renewable energy initiatives. Or alternatively a certain percentage of money collected for rural electrification through the Rural Electrification Act/Rural Electrification Levy can be allocated for electrification and other activities that only deal with renewable energy developments in order to assist with the diffusion of RETs. Moreover, it has been reported that the US\$55,000,000 (€40,315,275) Kapichira II Hydropower Project (2011-2013) was financed through revenues from the Rural Electrification Levy hence since the project was finished and commissioned it theoretically means that Malawi can generate US\$55,000,000 every three years to make available for rural electrification and renewable energy development.

### **Option 2- Environmental Taxes**

Various countries have introduced or are proposing to introduce various taxes which can be considered environmental taxes since they tax anything or a proxy for anything that has a negative impact on the environment. Pertinent current or proposed environmental taxes include plastic packaging materials and products (Ghana), vehicle carbon tax (Zimbabwe) and carbon emissions tax (South Africa). Such taxes are not imposed in Malawi even though the environmental issues that these taxes are trying to address are also prominent in Malawi. There is therefore potential to impose these taxes and establish a fund for which the funds collected can be transferred to and be utilised for renewable energy development.

This study further proposes that the environmental taxes should be introduced through annual national budgets rather than through the enactment of an Act of

Parliament. National budgets are more versatile and adaptable as a means of increasing and reducing taxes, introducing and eliminating taxes (surtax, duty) and waiving taxes as every year the budgets include various incentives and provisions to enable the government to achieve specific agendas and revenue collection goals. National budgets are also particularly ideal in that the environmental taxes, can be introduced on a trial basis and extended in successive years should they be seen to be effective towards the purpose. Such an arrangement can therefore enable a quicker way of building consensus amongst various stakeholders. In order for this to be undertaken various stakeholders as identified in the research will need to lobby the government on this issue.

### **Option 3- Carbon Credits**

Carbon credits can be used to improve the financial viability of renewable energy projects and also generate revenues that can support the development of renewable energy projects. Whilst normal projects usually incorporate carbon credits into their economic feasibility for projects, the approach taken for the Lake Turkana Wind Power Project (LTWP) highlights an alternative approach where carbon credits aid projects to be financially viable even though they are not incorporated as part of the revenue stream.

The LTWP is a 300MW wind farm (i.e. equivalent to 20% of the country's current total installed generation capacity) in Kenya. The LTWP provides various points that can be emulated in order to promote renewable energy deployment. The €459,000,000 project was developed without drawing any public funding which is a challenging task since the mobilisation of private enterprises to support renewable energy projects is challenging as investors are reluctant to allocate resources to technologies that guarantee uncertain returns (Masini and Menichetti, 2013). The project is expected to mitigate the emission 16 million tons of carbon emissions during its 20-year lifespan as such it was registered under the Clean Development Mechanism so as to generate additional finances through the sale of carbon credits (LTWPL, 2011).

In order to improve the project's financial viability, reduce financial risks, and attract investors, the project developers came to an agreement with the national utility whereby a higher tariff and guaranteed price was agreed between the two parties on

the condition that some funds from the sale of carbon credits from the project would be paid to the utility. This arrangement is rather unique as usually many projects base their financial viability and projections on the revenue from the sale of carbon credits whose value changes with market forces. This innovative arrangement can be seen to have significantly improved the sustainability of the project as the carbon price (figure 7.5-CER prices January 2011 to December 2012) has been seen to be falling with no significant detriment to the revenues and credentials of the project.

In a similar fashion, renewable energy project developers can negotiate with ESCOM and large power consumers for preferential/premium tariffs on condition that the projects will be registered with compliance or voluntary carbon schemes and the funds generated from the sale of the carbon credits will be directed towards the Renewable Energy Fund so as to assist with the development of other renewable energy projects in Malawi thereby further promoting the diffusion of RETs and reducing energy related GHG emissions.

#### **8.4 Future Research Opportunities**

This research has evaluated various renewable energy and non-renewable energy policies and strategies that influenced the rate of deployment of RETs and implementation of climate finance projects in Malawi. Two areas that require further analysis are to explore the development and implementation of Malawi's registered PoAs; and to explore the rate to which enquiries for private power generation/independent power producers eventually become operational projects.

Table 3.4 lists the three PoAs that have been successfully registered with the UNFCCC. Unfortunately, during this research it was not feasible to interview the project implementers and promoters for these projects in order to ascertain some of the strategies and factors that contributed to the projects gaining the technical and financial support to be registered. Other researchers can therefore undertake the task of investigating these projects so as to discover barriers and opportunities to PoA implementation in Malawi and other aspects that can improve access to climate finance in the country.

Not all proposed renewable energy proposals and inquiries actually culminate into implemented projects. M5 noted that there has been an increased interest by the private sector to develop various renewable energy projects due to some changes in both the energy sector regulation and developments in other sectors (Chapter 7.2.6- Which Laws and Policies Have an Impact on the Development of Renewable Energy Sources in Malawi?). M3 also alluded that there has been an increase in inquiries about developing various climate finance projects (Chapter 7.2.8- Do Laws and Policies Have an Impact on Improving Access to Climate Finance in Malawi?). Research therefore needs to be undertaken to determine the investor's perspectives in making those inquiries and also determining how far down the project cycle the projects will go since not all projects actually complete the whole process from conception to commissioning for a variety of reasons hence the inquiries might not materialise into actual projects for various reasons including changes in policies.<sup>74</sup> Alternatively, the research could go further back by assessing what energy sector proposals and inquiries were received after the inception of the National Energy Policy 2003 to determine which ones were actually implemented or why the various project developers did not proceed with their projects. The results from this proposed research can therefore determine the actual motivators, obstacles and disincentives for people and institutions to undertake energy sector related projects and climate finance projects in Malawi (i.e. highlight a renewable energy investor's perspective on the challenges and opportunities for developing renewable energy projects in Malawi).

## **8.5 Thesis Conclusions**

Improving the accessibility and affordability of renewable energy has the potential to improve the livelihoods of people in developing countries such as Malawi. This follows that the use of renewable energy can facilitate the creation of jobs and use of modern communication and educational technologies such as mobile phones. In addition to this, the provision of modern energy can help to reduce deforestation and environmental degradation of which the lack of alternative energy sources is a

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<sup>74</sup> For example, changes in the monetary policy for Malawi and the subsequent devaluation of the Malawi Kwacha in 2012 is reported to have increased the landed costs on renewable energy equipment such as solar panels, solar batteries, charge controls, inverters solar pumps and heaters by an average of 70% (MERA, 2012) hence could have impacted the profitability and invest-ability of Malawi's renewable energy sector.



proximate cause. Improving the use of renewable energy sources in Malawi is however hampered by a variety of political, economic, social, technological and legal challenges. This study therefore sought to investigate how the utilisation of RESs can be improved in Malawi by using climate finance modalities. This follows that climate change mitigation and adaptation are a global aspiration hence international partnerships and conventions such as the UNFCCC provide various financial and technical assistance to enable developing countries to improve their deployment of RESs.


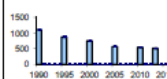
The study used questionnaires, case study analyses, policy reviews, academic literature reviews and interviews in order to determine the regulatory and institutional challenges and prospects for enhancing renewable energy deployment through climate finance instruments in Malawi. The study discovered that there are various types of climate finance instruments (e.g. carbon finance/emission reduction based payments, payment for eco-system services, loan guarantees, etc.) which can facilitate renewable energy deployment in Malawi. However, for Malawi to fully benefit from these instruments and utilise these resources, the country needs to establish an innovative institution that can specifically address the technical requirements that most climate finance instruments have, as well as to spread awareness and knowledge amongst various renewable energy stakeholders so that they will be in a better position to implement pertinent projects. Consequently, this study recommended the establishment of a Renewable Energy and Climate Finance Promotion Agency, and Renewable Energy Fund.

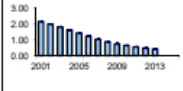
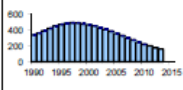
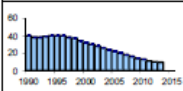
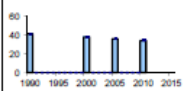
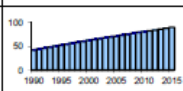
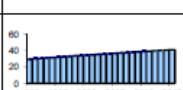
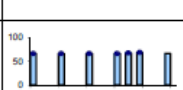
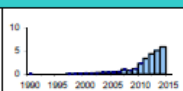
Whilst the formulation of policies and strategies for the energy sector was not problematic, shortfalls were highlighted in the implementation of the policies and the provision of funds to assist with the implementation of energy sector programmes. Improving this aspect was however not within the remit of only the renewable energy stakeholders particularly the Ministry of Energy, but actually the whole government system. Consequently, improving the governance and accountability of public funds was seen to have a significant influence on the development of the renewable energy sector, effectiveness of renewable energy policies and implementation of climate finance projects as that influenced perceptions about the investment potential for Malawi, presence/activities of NGOs and implementation of donor programmes.

Despite these challenges, Malawi can still improve its deployment of RESs as there are many international initiatives (e.g. International Partnership on Mitigation and MRV, the Sustainable Development Goals, Sustainable Energy for All, etc.) that are actively promoting the need for countries with low electricity access rates to be provided with technical and financial support so that climate change mitigation can be enhanced and universal energy access can be attained by 2030. There are also VCM schemes which offer a more flexible channel for implementing carbon finance projects in cases where implementing carbon finance projects through compliance carbon schemes could be challenging. Modifications to procedures for different climate finance instruments and new methodologies for calculating GHG emission reductions can also enable Malawi to tap into various climate finance resources. Moreover, Malawi has a variety of proposed policies that can improve climate change and energy sector governance when successfully implemented. These include a FIT policy and a climate change policy. Arguably, if these two policies will have the necessary innovation and be based on market realities, and economic and business principles, then they will create a climate finance investment framework that might be able to transform the renewable energy sector.

## Appendices

### Appendix 1: Malawi MDGs Progress Snapshot (August 2015)

MDG Country Progress Snapshot:		Malawi					Last update: August, 2015			
Goals and Targets	Indicators	First Year		Latest Year		Percent- age Change	Country Progress		Region Latest Data: Sub-Saharan Africa	
		Value	Year	Value	Year		Level <sup>2/</sup>	Chart	Value	Year
<b>Goal 1: Eradicate Extreme Poverty and Hunger</b>										
Reduce extreme poverty by half	Proportion of population living below \$1.25 (PPP) per day (%)	83.2	1997	72.16	2010	-13	very high poverty		46.8	2011
Reduce hunger by half	Proportion of population below minimum level of dietary energy consumption (%)	44.7	1991	20.7	2015	-54	moderately high hunger		23.2	2014-2016
<b>Goal 2: Achieve Universal Primary Education</b>										
Universal primary schooling	Net enrolment ratio in primary education (enrollees per 100 children)	99.1	1999	97.5	2009	-2	high enrolment		79.7	2015
<b>Goal 3: Promote Gender Equality and Empower Women</b>										
Equal girls' enrolment in primary school	Ratio of girls to boys in primary education	0.87	1990	1.03	2013	19	parity		0.93	2015
Women's share of paid employment	Share of women in wage employment in the non-agricultural sector (%)	10.5	1990	11.3	1995	8	low share		32.9	2013
Women's equal representation in national parliaments	Proportion of seats held by women in national parliament (single or lower house only - %)	9.8	1990	16.7	2015	70	low representation		22.7	2015
<b>Goal 4: Reduce child mortality (New data will be available in late September 2015)</b>										
Reduce mortality of under-five-year-old by two thirds	Under-five mortality rate (deaths of children per 1,000 births)	245.3	1990	67.9	2013	-72	moderate mortality		92	2013
<b>Goal 5: Improve maternal health (New data will be available in late September 2015)</b>										
Reduce maternal mortality by three quarters	Maternal mortality ratio (maternal deaths per 100,000 live births)	1100.0	1990	510.0	2013	-54	very high mortality		510	2013
Access to universal reproductive health	Contraceptive prevalence rate (percentage of women aged 15-49, married or in union, using contraception)	13.0	1992	58.6	2014	351	moderate access to reproductive health		26.6	2013
	Unmet need for family planning (percentage of women aged 15-49, married or in union, with unmet need for family planning)	36.5	1992	19.4	2014	-47			24.5	2013

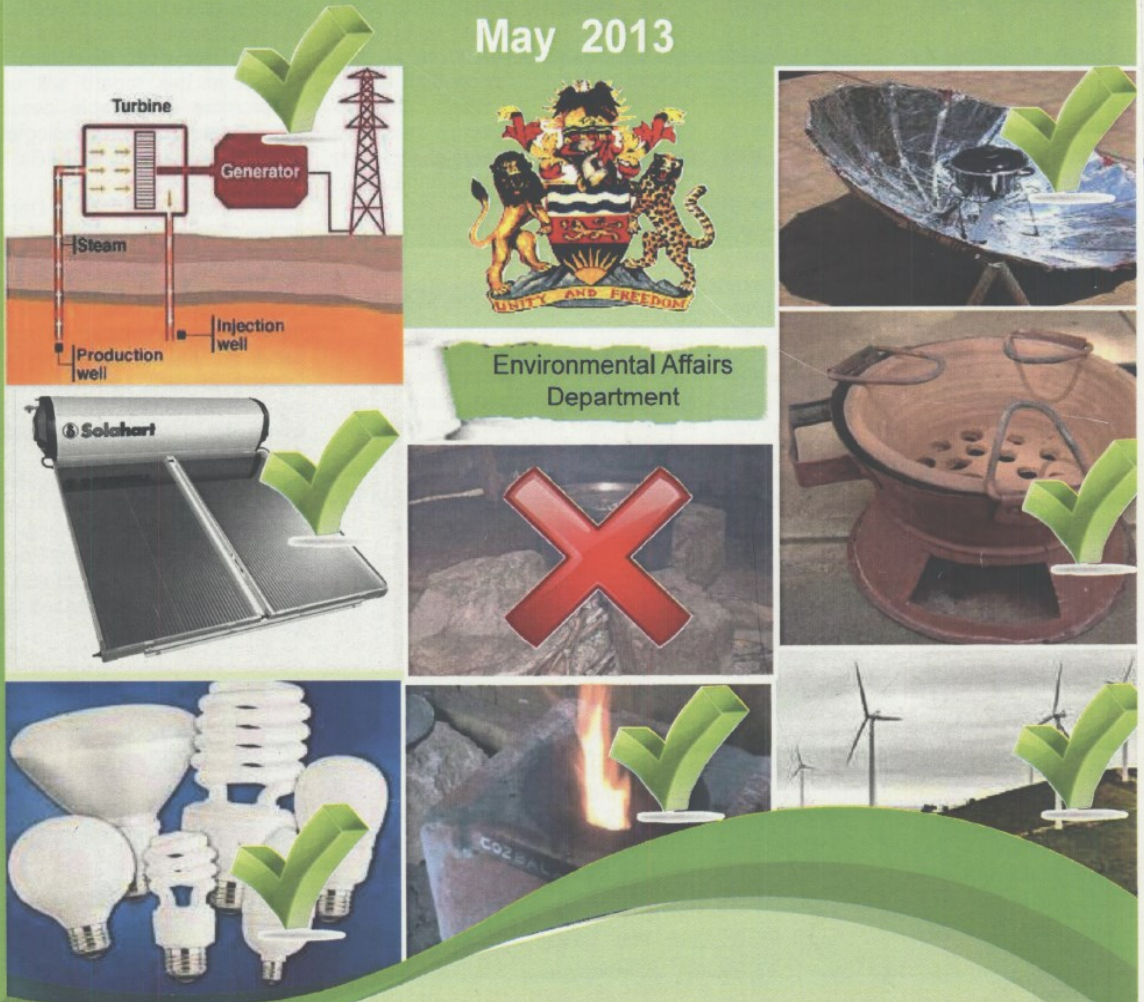
MDG Country Progress Snapshot: <b>Malawi</b>										Last update: August, 2015	
Goals and Targets	Indicators		First Year		Latest Year		Percent- age Change	Country Progress		Region Latest Data: Sub-Saharan Africa	
			Value	Year	Value	Year		Level <sup>2/</sup>	Chart	Value	Year
<b>Goal 6: Combat HIV/AIDS, malaria and other diseases</b>											
Halt and begin to reverse the spread of HIV/AIDS	HIV incidence rate (number of new HIV infections per year per 100 people aged 15-49)		2.14	2001	0.41	2013	-81	high incidence		0.29	2013
Halt and reverse spread of tuberculosis	Incidence rate and death rate associated with tuberculosis	Number of new cases per 100,000 population	335.0	1990	156.0	2013	-53	moderate mortality		282.0	2013
		Number of deaths per 100,000 population	40.0	1990	9.3	2013	-77			43.0	2015
<b>Goal 7: Ensure environmental sustainability</b>											
Reverse loss of forests	Proportion of land area covered by forest (%)		41.4	1990	34.4	2010	-17	medium forest cover		28.1	2010
Halve proportion without improved drinking water	Proportion of population using an improved drinking water source (%)		42.5	1990	90.2	2015	112	high coverage		68.0	2015
Halve proportion without sanitation	Proportion of population using an improved sanitation facility (%)		29.3	1990	41.0	2015	40	very low coverage		30.0	2015
Improve the lives of slum-dwellers	Proportion of urban population living in slums (%)		66.4	1990	66.7	2014	0	very high proportion of slum dwellers		55.2	2014
<b>Goal 8: Develop a global partnership for development</b>											
Internet users	Internet users per 100 inhabitants		0.0	1990	5.8	2014	-	low usage		16.9	2013
<p><b>The MDG Country Progress Snapshot</b> provides an overview of the progress achieved at country level since 1990 towards the Millennium Development Goals. The snapshot is intended mainly to provide the international community easy access to the information and are not meant to replace in any way the country profiles produced at the national level in several countries. They are also meant to reflect the contribution of country-level progress to the global and regional trends on progress towards the MDGs.</p> <p>The data used in the snapshot are from the MDG global database (<a href="http://mdgs.un.org/unsd/mdg/Data.aspx">http://mdgs.un.org/unsd/mdg/Data.aspx</a>). The metadata and responsible agencies can be found on <a href="http://mdgs.un.org/unsd/mdg/Metadata.aspx">http://mdgs.un.org/unsd/mdg/Metadata.aspx</a>. Sources of discrepancies between global and national figures are due to, among others, different methodology and definitions or different choice of data sources. At the global level, the monitoring of the progress aims to ensure better comparability of data among countries. Country can contact the responsible agencies for resolving data discrepancies.</p> <p><b>Note:</b> 1) The country progress level indicates the present degree of compliance with the target based on the latest available data. The technical note on the progress level can be found at <a href="http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2012/technicalnote.pdf">http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2012/technicalnote.pdf</a>.</p>											

Source: UNSD (United Nations Statistics Division) (2015). Millennium Development Indicators: Country and Regional Progress Snapshots. <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Data/snapshots.htm>. Last accessed 26.10.2015.

**Appendix 2: Investor's Guide to Clean Development Mechanism (2013)**

# Investors' Guide to Clean Development Mechanism in Malawi

May 2013



Environmental Affairs Department

## 1. GENERAL OVERVIEW OF MALAWI

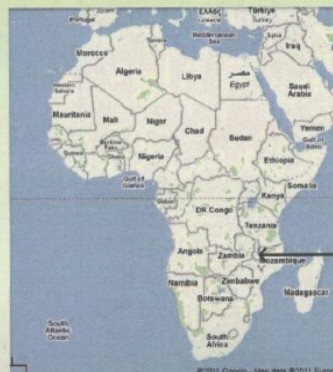
### 1.1 Location

Malawi is a Least Developed Country (LDC) in Sub-Saharan Africa, lying in the southern end of the Great East African Rift Valley. It lies between latitudes 09°25'S and 17°08'S and longitudes 32°40'E and 35°55'E. The total area is 118,484 km<sup>2</sup> of which 20% is covered by water mainly Lake Malawi, the third largest lake in Africa. The country is bordered by Mozambique to the east, south and west; Tanzania lies to the north; and Zambia to the north-west. The terrain of Malawi is breath taking, comprising of plateaus, plains, hills and mountains. Mulanje Mountain, home to the rare Mulanje cedar, is the highest

mountain in Central Africa, with the highest point, Sapitwa peak, rising to 3050 metres above sea level.

### 1.2 Economic activities in Malawi

Agriculture is the backbone of Malawi's economy, accounting for about 34% of GDP, and employing about 80% of the country's population. The crops grown include maize, groundnuts, tobacco, wheat, sorghum, millet, cassava, tea, pulses and sweet potatoes. The country's



export trade is dominated by tobacco, tea, cotton, coffee, and sugar. Malawi is also endowed with fresh water resources with the highest freshwater diversity of fish in the world, having more than 1000 fish species endemic to Malawi.

With increased investment and development in the private sector, the energy sector has become significant in the economy of the country. Malawi's energy sector has five key components; electricity, liquid fuels and gas, coal, biomass and other renewable sources of energy. Energy needs are derived mainly from fuel wood, which accounts for 88.5% of the total energy demand, and this puts too much pressure on the forestry resources which are sinks of carbon. Hydrocarbon fuels account for 6.4% of the energy, electricity 2.8%, and coal 2.4%. Biomass energy sources include firewood, charcoal, and crop/ industrial residues.

#### Fast Facts about Malawi

- Official language: English
- Common language: Chichewa
- Area: 118,484 km<sup>2</sup>
- Population: 15.4 million (2010)
- Population Annual Growth Rate: 2.8%
- Per Capita: -US\$ 356.4 (2010)
- Currency: Malawi Kwacha (MK)
- Corporate tax rate: 30%
- Real GDP growth rate:- 6.5% (2010)

Cities of Lilongwe, Blantyre, Zomba and Mzuzu have at least one waste dumping site each. No engineered landfill site available.

There are a lot of investment opportunities in various sectors. There is potential for expanding agro-processing, which is currently at an infant stage. Most of the crops grown are exported as raw materials, while a small percentage is locally processed into semi or finished products. The mining sector is also another booming area for investment. The country has a wide range of mineral resources, and it is expected that the mining sector will contribute about 5% of GDP by 2015. Activities in the sector include production of coal, uranium concentrates, cement, limestone, gemstone, agricultural lime and rock aggregates, among others.

The manufacturing sector is diverse and accounts for about 12% of

Malawi's GDP. The processing of tea, tobacco, sugar, coffee, cement and cotton accounts for most of its output. Factories manufacture soap, detergents, cigarettes, furniture, cookies, bread, blankets, drugs, and mineral water, just to mention a few. Manufacturing of these products demands a lot of energy, and also produces a lot of waste including greenhouse gases like methane.

### 1.3 Environment

Over the last few decades, Malawi has experienced extreme weather events, ranging from droughts to floods and flush floods. These extreme weather events clearly show that there are large temporal and spatial variability in the occurrence of climate-related disasters and calamities. These events have had irreversible and damaging effects on crop and livestock production, infrastructure and fatalities.

Vulnerability and adaptation (V&A) assessment studies conducted in Malawi have predicted that temperatures are likely to increase by 1.0, 2.0 and 4.0 oC for the years 2020, 2075 and 2100, respectively, and that rainfall will increase by between 2.0 and 8.0% by the year 2100. Measures and strategies are therefore required to be put in place to mitigate against such eventualities.

## 2.0 CLEAN DEVELOPMENT MECHANISM IN MALAWI

### 2.1 Institutional Framework

Malawi signed the United Nations Framework Convention on Climate Change (UNFCCC) on 10th June 1992 and ratified it on 21st April 1994. It acceded to the Kyoto Protocol on 26th October 2001. Clean Development Mechanism (CDM) is one of the Kyoto Protocol provisions (Article 12) that promote cleaner technologies in developing countries to mitigate GHGs while contributing to sustainable

development. Therefore, CDM creates new opportunities for Malawi to reduce its contribution to GHG emissions while securing investment through the implementation of well designed projects that generate carbon credits. Malawi in this regard will endeavor to promote sustainable development through adoption of technologies aimed at reducing emission of GHGs.

Environmental Affairs Department is the Designated National Authority (DNA) for the CDM in Malawi. CDM Approval Procedures and Sustainable Development Criteria for CDM projects have been developed. These tools assist in the assessment of CDM projects in their contribution towards sustainable development of Malawi. Given the importance of sustainable development in the CDM approval process, social considerations and public participation are important elements of CDM projects in the country. The CDM Approval Procedures and Sustainable Development Criteria for Malawi may be accessed on <http://www.nccpmw.org>.

#### Benefits of CDM to Malawi

- Additional financial inflow of investment.
- Employment opportunities.
- Environmentally benign technology.
- Improved standard of living in rural areas.
- Clean and safe environment.
- Mitigate the effects of Climate Change.

### 2.2 Capacity Building for CDM initiatives in Malawi.

Through the United Nations Environment Programme – European Union (UNEP-EU) cooperation activity on 'Capacity Building related to Multilateral Environmental Agreements (MEA) in African, Caribbean and Pacific (ACP) Countries' project, Malawi is conducting training and awareness-raising activities and has developed a pipeline of CDM projects. The Capacity Building project has conducted workshops and seminars at both sectoral and national level, provided legal and other inputs to the CDM framework, and supported the development of six PINs and two PDDs. Visit the project website on <http://www.acp-cd4cdm.org/> for more details.

## 2.3 Opportunities for CDM project activities in Malawi

Table 1 below depicts available opportunities for CDM project development that were identified for Malawi. Investors are invited to invest in any of the areas indicated below.

SECTOR	PROJECT ACTIVITY	DESCRIPTION
Energy	Efficient energy technologies	Use of energy saving bulbs
	Efficient energy technologies	Use of efficient firewood cooking stoves
	Increase ethanol to petrol blending ratios	Increase ethanol blend from the current 20%
	Wind power generation	Wind power along the shores of Lake Malawi and Lakeon Island Malawi.
Renewable energy options	Geothermal power generation	Potential of using ground source heat pumps for space heating and cooling in buildings
	Solar energy (heating and lighting)	Electricity from solar panels for domestic uses Use of solar water heaters in household and service sectors. Use of solar parabolic cookers for the school feeding programme
	Mini hydro power generation	Mini hydro power generation
Cement Industry	Changeing Blending/Mix of Cement	Increase in the proportion of additives, such as limestone, pozzolana and fly ash in the fine grinding process thereby reducing the clinker content
	Alternative fuels	Use of renewable resources for less resource-intensive processes such as grinding In-pyro-processing fossil fuels can be partly replaced by alternative fuels such as gas or unconventional masses (tires, plastics, textiles or rubber, etc.)
	Energy Efficiency	Multi-technology options including: upgrading of preheaters, upgrading clinker coolers, optimization of grinding media, automatic controls, variable speed drives, efficient motors, etc.
	Waste Heat Recovery	-capture of waste heat vented at the pre-clinker and/or cooler end of kilns and use to preheat raw materials and fuel -Heat recovery at boilers and generation units and production of electricity
	Co-generation (Combined Heat and Power)	Combustion of sugar cane biomass residues (bagasse) to produce steam and electricity. The electricity to be fed into grid to supplement the generation capacity and reduce private fossil generation.
Sugar Industry	Bio-ethanol	Sugar mills can install bio-ethanol production equipment and produce bio-ethanol from sugar cane and molasses.
	Agriculture	Improved rice cultivation, animal husbandry, manure and fertilizer management, conservation farming, agroforestry.
AFOLU	Forestry	Expand stand of trees, maintain existing stands of trees, sustainable forestry e.g. forest plantation
	Housing redevelopment/development	Use of stabilised cement blocks, use of timber and grass
Waste Management	Reduce waste generation	Reduce, Reuse, Recycle, Reduce (4R's) waste generation
	Composting	Composting
Mechanical biological treatment	Mechanical biological treatment	Biogas generation from human and animal waste
	Disposal of waste in sanitary landfill	Methane capture and electricity generation from municipal landfills
Timber Industry	Use of timber waste (thinings, cuttings and saw dust) in boilers for electricity production. This will protect the frequent bush fires that destroy the forest and turn CO <sub>2</sub> into the atmosphere through uncontrolled burning or decomposition.	
	Co-generation (Combined Heat and Power)	

## 2.3 CDM Projects in the Pipeline, May 2013.

Malawi has developed a number of CDM project concepts, most of which are at the PIN level and require some of collaboration as indicated in Table 2 below.

Name of Project	Project Status	Developer	Estimated GHG reduction/year	Estimated start date	Collaboration sought
1 Improved Cook-stoves Programme for Malawi	PIN	Renewable Resources Holdings Contact Person: Zani Omana Email: <a href="mailto:zani@renewableresourcesholdings.com">zani@renewableresourcesholdings.com</a>	51,290 tCO <sub>2</sub> e/yr	October 2013	Uplift payment for both PJD and development
2 Promotion of Efficient Cook Stoves in Malawi	LoA issued, pending registration	SADE Regional Carbon Facility & Malawi Renewable Energy Agency (MARELA) Contact Person: Mr. Vincent Gondwe Email: <a href="mailto:vincentgondwe2002@yahoo.com">vincentgondwe2002@yahoo.com</a>	37,072 tCO <sub>2</sub> e/yr	September 2013	Buyer for CERs
3 Disposal of effluent (waste) management at EthCo Ltd, Dweungwa, Malawi	PIN	Heston Innovation Limited Contact Person: Mr. John O'Connor, <a href="mailto:john.oconnor@hestoninnovation.com">john.oconnor@hestoninnovation.com</a>	40,000 tCO <sub>2</sub> e/yr	April 2013	Uplift payment for both PJD development and the technology
4 Improved cook stoves for Malawi	PIN	CO2Balance UK Ltd Contact Person: Richard Hillie Email: <a href="mailto:rossie@co2balance.com">rossie@co2balance.com</a>	52,000 tCO <sub>2</sub> e/yr	September 2013	Uplift payment for PJD development.
5 CarbonSift Open Source PoA, LED lighting distribution, Pan-Africa	LoA issued, pending registration	CarbonSift Corporation UK and Solar Solutions Malawi Contact Person: Mr. John Henry Email: <a href="mailto:john.henry@carbon-sift.com">john.henry@carbon-sift.com</a>	49,187 tCO <sub>2</sub> e/yr	October 2011	None
6 PoA for Landfill Gas Capture Project	PIN	Malawi City Councils Environment Consortium, Contact Person: Mr. S.P. Mhali Nkhoma Email: <a href="mailto:beckie@malawi.net">beckie@malawi.net</a>	130,000 tCO <sub>2</sub> e/yr	June, 2013	Uplift payment for both PJD development and the technology
7 PoA for the Reduction of Emissions from Non-renewable fuel from cooking at household level	LoA issued, pending registration	Green development, US Contact Person: Art Howard Northside Email: <a href="mailto:art.howard.northside@gmail.com">art.howard.northside@gmail.com</a>	100,000 tCO <sub>2</sub> e/yr	April, 2012	Buyer for CERs
9 International Water Purification Programme	PIN	South Pole Carbon Asset Management Contact Person: Christoph Seifert Email: <a href="mailto:christoph.seifert@southpole.com">christoph.seifert@southpole.com</a>	60,000 tCO <sub>2</sub> e/yr	February 2012	Uplift payment for PJD development and buyer for CERs
10 Blingyre City CDM Compact making project from MSW	PIN	Avire Tzofli Initiative for Social Finance Contact Person: Christoph Seifert Email: <a href="mailto:christoph.seifert@southpole.com">christoph.seifert@southpole.com</a>	50,000 tCO <sub>2</sub> e/yr	October, 2013	Uplift payment for PJD development and buyer for CERs
11 Malawi Sustainable Urban Energy Project (Promotion of efficient alternative lighting sources) coalitions with Saverio coalitions	PIN	Initiative for Climate Change Management Ltd. Contact Person: Mr. Theobald Chirwa Email: <a href="mailto:theobald@iccm.com">theobald@iccm.com</a>	970,300 tCO <sub>2</sub> e/yr	January, 2014	Uplift payment for PJD development and buyer for CERs
13 Nkhoskhosha Geothermal Power Project	PIN	Dept. of Energy Studies, Mazov University, Contact Person: Kondwani Thapanda Email: <a href="mailto:kondwani@energy.mz">kondwani@energy.mz</a>	205,530 tCO <sub>2</sub> e/yr	January, 2017	Uplift payment for PJD development and buyer for CERs
14 Efficient lighting programme - CFL lights in pilot areas in Malawi	PIN	Dept. of Energy Studies, Mazov University Contact Person: Kondwani Thapanda Email: <a href="mailto:kondwani@energy.mz">kondwani@energy.mz</a>	9,843 tCO <sub>2</sub> e/yr	January, 2017	Uplift payment for PJD development and buyer for CERs
15 Electrification in Malawi	PIN	Coordinator Agis, Dzinubuswanga Contact Person: Sharon Peterson Email: <a href="mailto:sharon@dzinubuswanga.com">sharon@dzinubuswanga.com</a>	29,760 tCO <sub>2</sub> e/yr	September, 2013	Uplift payment for PJD development and buyer for CERs
16 Green Rural Small PoA	PIN	Victor Carbon, Paris, France Contact Person: Eric Malanda Email: <a href="mailto:eric@victorcarbon.com">eric@victorcarbon.com</a>	650,000 tCO <sub>2</sub> e/yr	August, 2013	Uplift payment for PJD development and buyer for CERs
17 Improved Cookstoves Programme for Malawi and Cross-border regions of Mozambique	LoA issued, pending registration	Total Land Care, Malawi Contact Person: Mr. Trent Baulerbaum Email: <a href="mailto:trentb@totalcare.com">trentb@totalcare.com</a>	10,000 to 16,239 tCO <sub>2</sub> e/yr	2012	Uplift payment for PJD development and buyer for CERs
18 Use of GHG Emissions in the city of Lilongwe	PIN	Zao Emission Resource Initiative (ZEERI), Contact Person: Mr. R. Kawaya Email: <a href="mailto:kawaya@zao.com">kawaya@zao.com</a>	80,000 tCO <sub>2</sub> e/yr	November, 2013	Uplift payment for PJD development and buyer for CERs
19 Improved Cookstoves for Rural Households in Malawi	PIN	Cultural Foundation, Malawi AT: Mr. S. Chikwanda Email: <a href="mailto:chikwanda@cultural.org">chikwanda@cultural.org</a>	198,800 tCO <sub>2</sub> e/yr	June 2012	Uplift payment for PJD development and buyer for CERs
20 Project of Compact Making from MSW in the City of Lilongwe	PIN	Archway Carbon Limited Contact Person: Mr. R. Karikoma Email: <a href="mailto:karikoma@archwaycarbon.com">karikoma@archwaycarbon.com</a>	80,000 tCO <sub>2</sub> e/yr	July, 2013	Uplift payment for PJD development and buyer for CERs
21 Efficient Cook Stove Programme	LoA issued, pending registration	Archway Carbon Limited Contact Person: Mr. Michael Shery Email: <a href="mailto:mshery@archwaycarbon.com">mshery@archwaycarbon.com</a>	250,000 tCO <sub>2</sub> e/yr	September 2013	Uplift payment for PJD development and buyer for CERs

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Resilient nations.*

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## Appendix 3: Study Questionnaire



b.tu

Brandenburgische  
Technische Universität  
Cottbus

# **Brandenburgische Technische Universität Cottbus- Senftenberg**

## **Faculty of Environmental Sciences and Process Engineering Energy Sector Surveys**

On the behalf of the staff at Brandenburgische Technische Universität Cottbus-Senftenberg Faculty of Environmental Sciences and Process Engineering, I would like to request your participation in a survey that is being undertaken as part of a PhD project in order to determine the state of Energy Sectors in Developing Countries.

Your confidentiality is guaranteed as data from this survey is confidential and will be used for academic research and analysis purposes only. Your responses will in no way be made public or be directly or indirectly linked to you or your institution.

The questionnaire has 37 statements and 23 questions that will take 40-70 Minutes to complete.

Thank you very much for your cooperation.

Please return completed questionnaires preferably by email to:

Mr Dumisani Chirambo

PhD Candidate

Brandenburgische Technische Universität Cottbus- Senftenberg

Erich-Weinert-Str. 1, LG 10/334

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**Part A:** Below are 37 Statements.

Please mark the answers that best suit your experience and expert judgment.

You may skip statements that are not applicable to your circumstances or relevant to your work area.

**Note:** Renewable Energy Sources include small hydro, micro hydro and pico hydro power generation but excludes hydro projects above 10 Megawatts.

Q 1	Malawi's National Energy Policy 2003 is contributing towards the development of a sustainable and viable energy sector. [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 2	Malawi's Electricity Act 2004 is contributing towards the development of a sustainable and viable energy sector. [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 3	Malawi's Energy Regulation Act 2004 is contributing towards the development of a sustainable and viable energy sector. [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 4	Malawi's Rural Electrification Act 2004 is contributing towards the development of a sustainable and viable energy sector. [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 5	Malawi's National Energy Policy 2003 is contributing towards the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.). [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 6	Malawi's Electricity Act 2004 is contributing towards the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.). [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 7	Malawi's Energy Regulation Act 2004 is contributing towards the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.). [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 8	Malawi's Rural Electrification Act 2004 is contributing towards the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.). [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 9	Energy sector related Policies and Laws (e.g. on electrification targets, rural electrification, power-sector restructuring/privatisation, etc.) have an important role to play towards the development of a				

	sustainable and viable energy sector.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 10	Non-energy sector related Policies and Laws (e.g. investment laws, Rapid Development Zones, special duty free industrial areas, etc.) have an important role to play towards the development of a sustainable and viable energy sector.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 11	Renewable energy sector related Policies and Laws (e.g. grants for renewable energy projects, Feed In Tariffs, import duty exemptions for renewable energy technologies, etc.) have an important role to play towards the development of a sustainable and viable renewable energy sub-sector and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 12	Non-energy sector related Policies and Laws (e.g. investment laws, Rapid Development Zones, special duty free industrial areas, etc.) have an important role to play towards the development of a sustainable and viable renewable energy sub-sector and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 13	Most Energy Sector stakeholders (e.g. the Media, Government Institutions, Non-Governmental Organisations, International Development Organisations, Academia, Financiers, Private Sector, etc.) are effectively undertaking their roles towards the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 14	The media (newspapers, TV and radio) is effectively undertaking its roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 15	Government Institutions (e.g. Ministry of Energy; Ministry of Environment and Natural Resources; Ministry of Planning and National Development; etc.) are effectively undertaking their roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree

Q 16	Non-Governmental Organisations are effectively undertaking their roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 17	Academic, and Research and Development Institutions are effectively undertaking their roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 18	Financial Institutions are effectively undertaking their roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Wind Power, etc.).  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 19	The Private Sector is effectively undertaking its roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 20	International Development Organisations are effectively undertaking their roles towards promoting the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.).  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 21	Malawi's National Energy Policy 2003 is still relevant in addressing the energy challenges affecting Malawi.  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 22	Malawi's National Energy Policy 2003 needs to be updated.  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 23	Malawi's Rural Electrification Act 2004 is successfully addressing the needs of the consumers and general public.  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 24	Malawi's Rural Electrification Act 2004 needs to be reviewed.  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree
Q 25	The Biomass/Bioenergy sub-sector is being used to its full potential.  [ ] Strongly Agree	[ ] Agree	[ ] Not Sure	[ ] Disagree	[ ] Strongly Disagree

	Agree		Sure		Disagree
Q 26	Climate Change issues are adequately addressed in Malawi's energy laws and policies.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 27	Energy development issues are adequately prioritized in Government of Malawi's Agendas.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 28	Energy access issues are adequately prioritized in Government of Malawi's Agendas.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 29	Improving access to energy (electricity) through the grid or decentralized renewable energy sources can assist poverty reduction in Malawi.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 30	The general public has a role to play towards promoting the development of a sustainable and viable energy sector.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 31	Non obligatory energy policies and targets (i.e. policies without fines and penalties for non-compliance) are as effective as mandatory energy policies and targets (i.e. policies with fines and penalties for non-compliance).				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 32	The framers of the Malawi National Energy Policy 2003 proposed the enactment of a Renewable Energy Supply Act. This has not taken effect to date.				
	The lack of progress on enacting a Renewable Energy Supply Act has negatively impacted the utilization and development of Renewable Energy Sources.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 33	Malawian Institutions have adequate resources for energy sector policy formulation, implementation and monitoring.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly	Agree	Not	Disagree	Strongly
	Agree		Sure		Disagree
Q 34	It is more effective to establish an autonomous and separate institution (e.g. for renewable development, rural electrification, etc.) rather than establish a department within existing institutions for such roles.				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
Q 35	There is a lack of awareness and information about financing opportunities through climate financing instruments (e.g. the Clean Development Mechanism (CDM)) for energy related projects (e.g. renewable energy, energy efficiency, etc.).				
	<input type="checkbox"/> Strongly Agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Not Sure	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
Q 36	Climate finance instruments (e.g. the Clean Development Mechanism (CDM)) can help improve the energy sector in Malawi.				
	<input type="checkbox"/> Strongly Agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Not Sure	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree
Q 37	A stable and supportive policy and regulatory environment (i.e. appropriate regulatory requirements, well formulated and implemented policies, etc.) can assist in promoting investments in the energy industry.				
	Malawi has stable and predictable policy frameworks that can attract investments in the energy sector.				
	<input type="checkbox"/> Strongly Agree	<input type="checkbox"/> Agree	<input type="checkbox"/> Not Sure	<input type="checkbox"/> Disagree	<input type="checkbox"/> Strongly Disagree

**Part B:** Below are 23 Questions.

Please provide brief answers according to your experience and expert judgment. Please present in order of priority with the first answer being the most important. You may skip questions that are not applicable to your circumstances or relevant to your work area.

**Note:** Renewable Energy Sources include small hydro, micro hydro and pico hydro power generation but excludes hydro projects above 10 Megawatts.

Q 38	What four aspects need to be addressed in order to improve the energy sector in Malawi? 1:  2:  3:  4:
Q 39	What four aspects need to be addressed in Malawi in order promote the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.)? 1:  2:  3:  4:

Q 40	<p>How do/how can (if at all) energy sector related Policies and Laws (e.g. on electrification targets, rural electrification, power-sector restructuring/privatisation, etc.) influence the development of a sustainable and viable energy sector in Malawi?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 41	<p>How do/how can (if at all) non energy sector related Policies and Laws (e.g. investment laws, Rapid Development Zones, special duty free industrial areas, etc.) influence the development of a sustainable and viable energy sector in Malawi?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 42	<p>How do/how can (if at all) non energy sector related Policies and Laws (e.g. investment laws, Rapid Development Zones, special duty free industrial areas, etc.) influence the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.)?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 43	<p>How do/how can (if at all) renewable energy sector related Policies and Laws (e.g. grants for renewable energy projects, Feed In Tariffs, import duty exemptions for renewable energy technologies, etc.) influence the utilization and development of Renewable Energy Sources (e.g. Biofuels, Solar Technologies, Hydro, Wind Power, etc.)?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 44	<p>Please list four important stakeholders in the renewable energy sector? You may include new stakeholders if they have not been included on the list provided in Q 13.</p> <p>1:</p> <p>2:</p>

	3:
	4:
Q 45	<p>What support needs to be provided to the stakeholders in Q 44 in order to assist them to scale up?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 46	<p>Please list (if any) important issues and aspects not included in the Malawi National Energy Policy 2003?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 47	<p>Please list (if any) important issues and aspects that can improve the Malawi Rural Electrification Programme (MAREP)?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 48	<p>Please list (if any) energy sector related Policies and Laws that need to be introduced/amended in Malawi in order to promote the utilization and development of Renewable Energy Sources?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 49	<p>Please list (if any) non energy sector related Policies and Laws that need to be introduced/amended in Malawi in order to improve the utilization and development of Renewable Energy Sources?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 50	<p>Please list (if any) important issues and aspects that can encourage the active participation of the private sector and investors to promote the utilization and development of Renewable Energy Sources in Malawi?</p>



	<p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 51	<p>Please list (if any) energy and climate change related issues that require more consideration in Malawi?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 52	<p>Please list (if any) aspects that can assist in making energy provision more effective in addressing poverty and sustainable development?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 53	<p>Please list (if any) the major constraints to wide-scale utilization and development of Renewable Energy Sources in Malawi?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 54	<p>Please list (if applicable) how laws and policies can reduce the constraints to wide scale utilization and development of Renewable Energy Sources in Malawi?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>
Q 55	<p>Please list (if applicable) how consumers can influence the development of a sustainable and viable energy sector in Malawi?</p> <p>1:</p> <p>2:</p> <p>3:</p> <p>4:</p>

Q 56	Please list (if applicable) how consumers can influence the utilization and development of Renewable Energy Sources in Malawi? 1:  2:  3:  4:
Q 57	Please list (if any) aspects that can assist in promoting the accessibility and utilization of climate finance instruments (e.g. the Clean Development Mechanism (CDM)) in Malawi? 1:  2:  3:  4:
Q 58	Please list (if any) current or past aspects/initiatives that have assisted with improving the energy sector in Malawi? 1:  2:  3:  4:
Q 59	Please list (if any) current or past aspects/initiatives that have assisted with improving the renewable energy sector in Malawi? 1:  2:  3:  4:
Q 60	Please list (if any) relevant comments or issues omitted in this survey? 1:  2:

Name of Respondent (optional)	
Name of Institution/Type of Institution	
Expertise/Job Title	

**Thank You Very Much**

## Appendix 4: Interview Guide

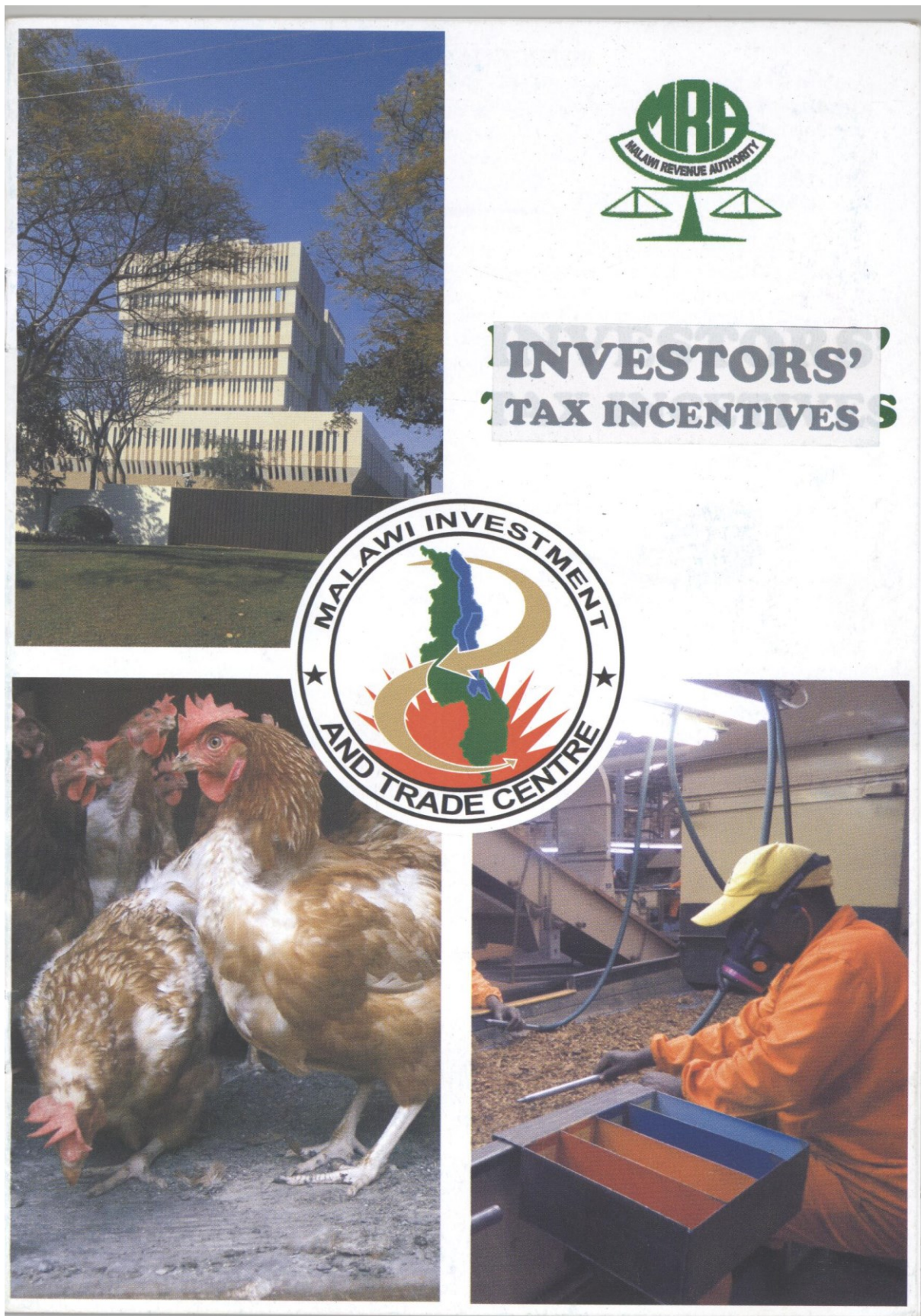
Q 1	What has delayed the Implementation of the Rural Electrification (RE) Supply Act?
Q 2	How can RE policy implementation be enhanced/ what can aid in better implementation of Rural Electrification (RE) projects.
Q3	How can Climate change policy implementation be enhanced/ what can aid in better implementation of Climate change projects.
Q4	What can improve the stability (coherency, consistent and conducive) of Rural Electrification (RE) related policies in Malawi (Financial incentives, policy stability, continuity, donor funding, market development, national and local coordination)?
Q5	Are there any steps or benefits taken to align Malawi Rural Electrification (RE) sector to pool with other regional sectors or facilitate trade in technologies.
Q6	How can Rural Electrification (RE) private sector participation be improved?(Financial support scheme, total remuneration, support duration, administrative process duration, risk of negative renewables policy, changes in the subsequent two years; grid access; legal security; and currency risk)?
Q7	How do renewable energy projects incorporate productive uses in the programmes? / What are your priorities/objectives for renewable energy projects? (Elements of Rural Electrification (RE) business models are organizational form, technology choice, target customers and financial structure; RE technology is “technically feasible, affordable, socially acceptable, institutionally sustainable and replicable”.)
Q8	Businesses and Entrepreneurs in Malawi face various challenges related to funding and financing any venture including RES. How can F&F in Rural Electrification (RE) sector be improved?

Q9	What can help with assisting the media to increase awareness about climate change and renewable energy issues?
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Q10	Should Malawi pursue the development of a Feed it Tariff or pursue other avenues/incentives for Rural Electrification (RE) promotion?
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Q11	How can the capacities of the government be enhanced for better governance and gaining political will / What are your priorities/objectives for renewable energy projects?
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## Appendix 5: Investors' Tax Incentives



## **INVESTORS' TAX INCENTIVES**

Malawi offers a wide range of tax incentives with the aim of encouraging development, enhancing output, earning or saving foreign exchange and expanding employment opportunities.

### **Domestic Taxes**

#### **1. MANUFACTURING SECTOR**

- Pre-business expenses of up to 18 months are allowable expenses (sec 41 of the Taxation Act)
- Losses are carried forward for six years to encourage investment in profitable business ventures
- Capital allowances & investment allowances are claimed as follows:
- 100% on new and unused plant and machinery and industrial buildings,
- 40 % on used plant and machinery and industrial building

#### **2. EXPORT SECTOR**

- 25% export allowance for non-traditional exports, these include: processed tea, processed tobacco etc.
- 15% international transport allowance for non traditional exports
- Exports are zero-rated for purposes of Value Added Tax. It implies that exporters can claim input tax in the course of production



#### **3. AGRICULTURAL SECTOR**

- Various capital expenditures in the agriculture sector in relation to construction of dams, dykes and land preparation are claimable,
- Growers of tea, coffee tobacco, sugar, cocoa to a plantation level are recognized as manufacturers which means they can claim all incentives available to a manufacturer
- Annual and initial allowances on staff housing in the agriculture sector is claimable

#### **4. MINING SECTOR**

- The whole capital expenditure on plant and machinery is claimable in the first year of operation.

### **Value Added Tax**

- In order to promote national development through the use of machines in the construction and transport industry, VAT charged on other lifting, handling, loading or unloading equipment such as conveyors, teleferics classified under Heading 84.28 of the Customs and Excise Tariffs Order has been removed
- Zero-rated special purpose motor vehicles other than those principally designed for transport of persons or goods under Customs Tariffs heading 8705.1.



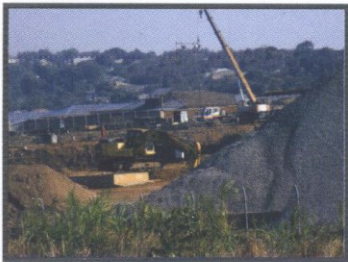
## 5. GENERAL TAX INCENTIVES

- Losses are carried forward up to 6 years for traders
- Initial and annual allowances at various rates are granted besides the depreciation (annual) allowances
- Initial and annual allowances are claimed at various rates as stipulated by the Taxation ACT
- Commercial building with a construction cost of MK 100 million or above, are subject to annual allowance of 2.5 %
- A taxpayer can claim 50% allowance on social contributions paid directly into the building of a public hospital or school, or the sponsoring of youth sporting development activities.

## Customs & Excise

The Malawi Government provides tax incentives on raw materials, machinery and equipment. The incentives are provided for either in the main Customs Tariff or in specific Customs Procedure Codes (CPC) of the Customs and Excise (Tariffs) Order. Below is a list of incentives which are implemented under the Customs and Excise Act (Chapter 42:01).

### 1. CONSTRUCTION SECTOR



Taxes on most machinery were removed in order to promote the various productive sectors of the economy. Government has further removed taxes on crane lorries, concrete mixer lorries, mobile drilling derricks and track laying tractors for the construction industry to boost the industry.

### 2. ELECTRICITY GENERATION AND DISTRIBUTION SECTOR (CPC 489)

Other business players can now invest in the energy sector following the extension of the Customs Procedure Code 489 under the Customs and Excise (Tariffs) Order to allow all investors to import electricity generation and supply of commercial electricity distributing as approved by the Minister responsible.

This will encourage investment in the energy sector and improve the electricity generation and distribution capacity and support the industry that requires use of electricity for production.

In order to promote the energy sector, the following goods for use in electricity generation and distribution are duty free but subject to 16.5% VAT. The goods include: fuses, transformers, sling, ring main unit, insulators, galle chain equipment, conductors, surge arrestors, column duplex, AAC/PVC and electricity supply meters.

In addition, other goods such as energy saver bulbs, solar batteries, solar battery chargers, energy lamps, generators and inverters are import duty free but VAT at 16.5% is payable.

Solar products are import duty free in their right in the Customs and Excise (Tariffs) Order for example solar batteries and solar energy lamps. VAT is payable at 16.5%

### 3. COMMUNICATION SECTOR (CPC 480)

Access to information and the promotion of investment in Information and Communication Technology (ICT) remains critical. By investing in this sector, business players will enjoy duty free on specialized broadcasting equipment for Television and Radio stations as approved by the Minister responsible.

### 4. TOURISM SECTOR

Investors intending to invest in the tourism sector in Malawi can enjoy the following incentives: free import duty, free import excise and VAT is zero-rated

#### **CPC 442 (a) Goods for hotels, Lodges and Inns – with 50 rooms and above.**

- Glass, china porcelain earthenware and stone articles of table ware, enamel and hollowware for table use electro plated nickel – silver and pated ware, knives, forks, spoons and similar articles for cutlery and marked linen etched stamped or in any manner marked with the name of the hotel.
- Industrial catering equipment, motor boats scuba diving, jet skis, kayaks, wind surfers, pedalos, air conditioners, generators, gym equipment, message equipment, industrial washing machines, bar fridges, sauna, hot steam baths for furniture and furnishings.
- Shuttle buses and off-road game/scenery viewing motor vehicles (Safaris) are duty free under CPC 450 and CPC 451 respectively.

#### **CPC 442 (b) Materials and equipment for the establishment of a conference centre of seating capacity of 200 people being:**

- Public address system, video conferencing equipment, television screens, amplifiers, LCD equipment and industrial catering and bar equipment and indelibly engraved, itched, stamped or in any other manner marked with the name of the hotel, lodge or inn.

### 5. AGRICULTURE SECTOR

#### **ANIMAL BREEDING**

- Agricultural equipment and machinery are duty free in their own right according to the Customs and Excise (Tariffs) Order. This is to encourage diversification and promote animal husbandry; importers will be exempted from taxes on importation of livestock meant for breeding. This covers live bovine animals, live swine, sheep and goats as approved by Ministry of Agriculture.





### **IRRIGATION (CPC 446)**

Investors in the irrigation sector enjoy import duty, import excise and VAT free (zero-rated) on the following goods for direct use in irrigation: - PVC pipes, asbestos pipes/rubber seals, galvanized pipes, elbow, sprinklers rainers, control valves, solvent cement, diesel engine ranging from 12 kw- 17kw with tubes, pressure gauges and nozzles imported by a farming entity recognized by the Secretary for Agriculture.



### **HORTICULTURE PRODUCTION (CPC 448)**

By investing in the horticulture industry, companies can enjoy exemption of duty, import excise and VAT free (zero-rated) on seeds, cuttings, seed netting green house structure, climate control equipment, 1 generator set, water pump or borehole, flower power lights, pump, electrical engines, diesel engine for irrigation with tubing, PVC piping, valves, sprinkler system, irrigation filters/nozzles, pressure regulators, new refrigerated trucks per five years, cold rooms, strapping materials and clips, metal wires, strings elastic bands, processing equipment, bag strikers, laboratory equipment, chemical and reagents, soil testing kits, moisture testers, graders, chemicals rose cutter, spray equipment, sealing equipment and fumigation equipment. These goods must be intended for export.

### **FISHING INDUSTRY (CPC 477)**

By investing in the fishing industry companies can enjoy import duty, import excise and import VAT free (zero-rated) on importation of machinery, plant, laboratory equipment and materials, aerators, pumps, blowers, diamond mesh, nets, measuring equipment, separators, specialized tanks and diffusers, boat engines and trawlers for deep sea fishing.



In addition, fishing vessels, factory ships and other vessels for processing or preserving fishery products are import duty free in their own right in the Customs and Excise (Tariffs) Order.

### **POULTRY FARMING (Under Tariff heading 84.36)**

By investing in poultry farming companies can enjoy import duty free clearance of machines for cleaning, sorting or grading eggs, fruit or other agricultural produce, machinery for preparing animal feeding stuffs, poultry incubators.

### **Other Agricultural Goods (Under Tariff heading 84.33)**

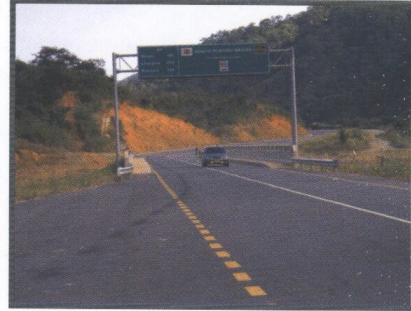
In addition to the incentives for the subsectors above, the following are some of the goods which are essential for farming and investors can enjoy duty free clearance in

their own right according to the Customs and Excise (Tariffs) Order: fertilizers, pesticides, herbicides, ploughs, agricultural horticultural or forestry machinery for soil preparation or cultivation i.e. ploughs harrows, scarifiers, cultivators, weeders, manure spreaders and fertilizer distributors and milking machinery.

## **6. TRANSPORT SECTOR**

### **Road Transport (CPC 440)**

Investors in the road transport industry can enjoy import duty, import excise and import VAT free (zero-rated) on new buses and buses used for a period not exceeding five (5) years of a seating capacity of forty five (45) persons or more persons including the driver.



### **Rail Transport (Chapter 86)**

In order to promote the railway industry, railway materials are import duty free and exempted from VAT.

### **Air Transport (Chapter 88)**

In order to promote the air transport sector, aero planes and other aircrafts of unladen weight exceeding 2,000kg are import duty free in their own right in the Customs and Excise (Tariffs) Order.

## **7. CAPITAL MACHINERY AND RAW MATERIALS OF GOODS UNDER EXPORT PROCESSING ZONE (EPZ) (CPC 475)**

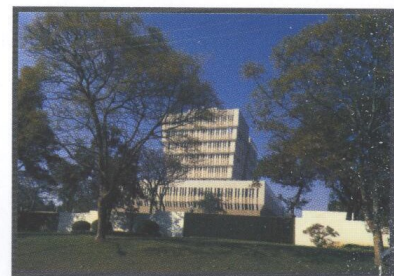
By investing in a designated EPZ, investors enjoy exemption of all duties (Import, Excise and VAT (zero-rated) on capital machinery and raw materials directly used in the production of goods for export under CPC 475.

## **8. MINING AND EXPLORATION SECTOR ( Under CPC 481)**

Specialized goods for use in mining being machinery plant and exploration equipment are duty free in the Customs and Excise (Tariffs) Order.

## **9. BANKING SECTOR (CPC 487)**

ATM machines, Point of Sale Machines and Mobile banking vans imported by commercial banks locally registered by the Reserve Bank of Malawi are allowed import duty and excise duty free under CPC 487. However, VAT is payable at 16.5%.



## **10. EDUCATION SECTOR (CPC 406)**

Investors in the education sector can enjoy import duty and import excise free clearance and VAT exemption of various educational materials when they are imported by educational institutions approved by the Secretary for the Ministry of Education.

The materials are as follows:- School stationery, instruments, apparatus, appliances and other tuitional requisites include specialized furniture for use in the Classroom, workshop or laboratory, athletic and sports goods, for tuitional purposes. In the case of pre-school play groups; photocopying machines, building materials, pianos, organs, keyboards and computers are import duty free. In addition books are duty free in their right in the Customs and Excise (Tariffs) Order.

#### **11. HEALTH (CPC 405)**

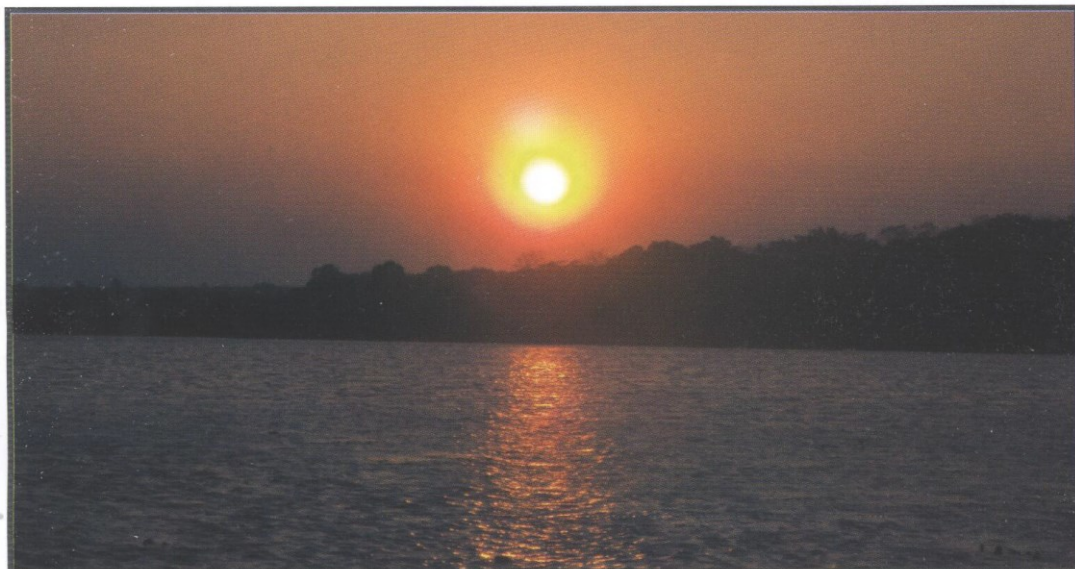
By investing in the health sector, investors can enjoy import duty and import excise free clearance and the exemption of VAT on the following goods:- Hospital, nursing home, clinic, surgery and dispensary instruments, apparatus, appliances and requisites including parts thereof and including specialized furniture diagnostic and laboratory reagents for use in the diagnosis or treatment of diseases or affections of humans or animals.

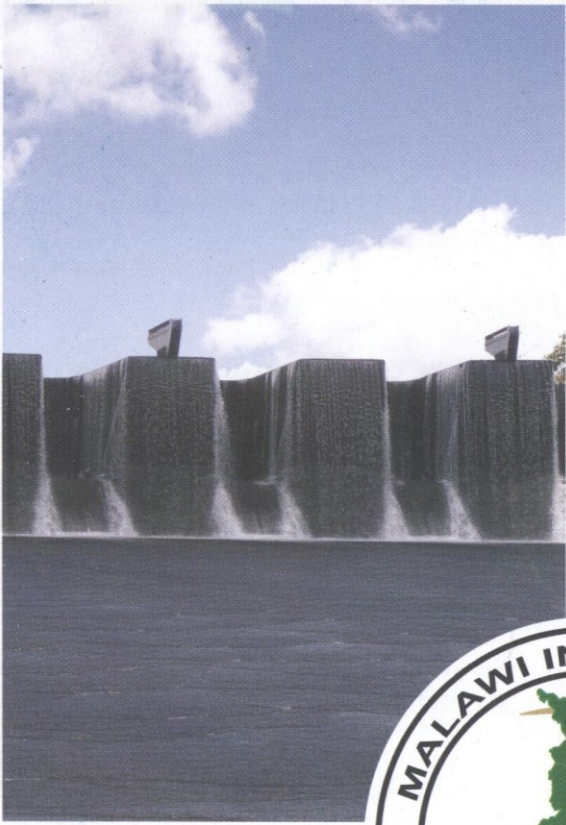


In addition medical, surgical, dental and sight testing instruments are also import duty free and exempted from VAT payment under Tariff heading 90.18 of the Customs and Excise (Tariffs) Order.

#### **CONCLUSION**

The Malawi Government has put on offer a wide range of tax incentives with a view to enable you tap them and grow or expand your business and immensely contribute to the overall socio-economic development of Malawi.

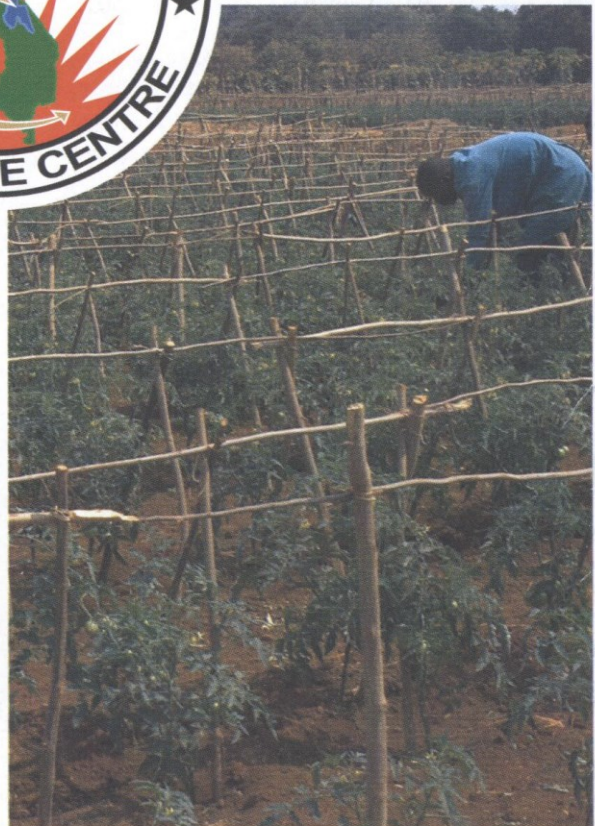
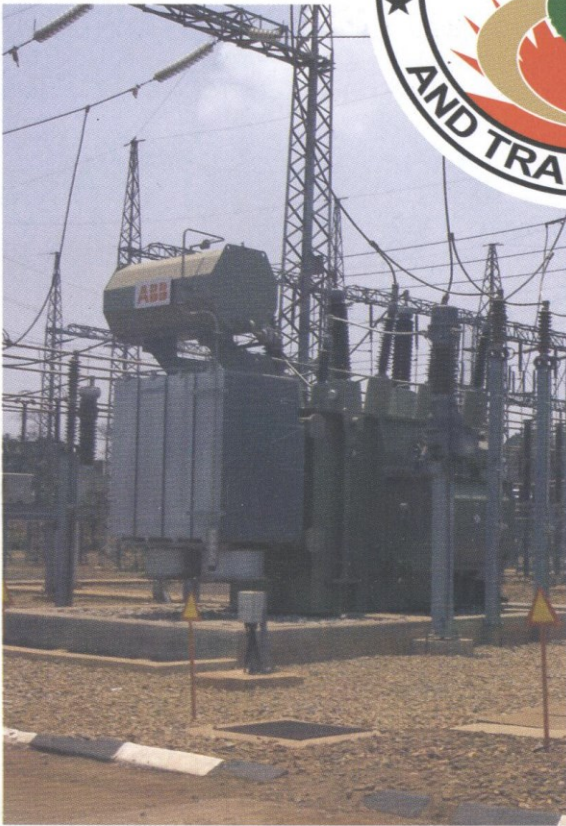




# INVESTORS' TAX INCENTIVES

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## References

- Abadie, L.M., Galarraga, I. and Rübhelke, D. (2013). An analysis of the causes of the mitigation bias in international climate finance. *Mitig Adapt Strateg Glob Change*, 18(7): 943-955.
- Abdullah, S. and Jeanty, P. W. (2011). Willingness to pay for renewable energy: Evidence from a contingent valuation survey in Kenya. *Renewable and Sustainable Energy Reviews*, 15: 2974-2983.
- Abdullah, S. and Markandya, A. (2012). Rural electrification programmes in Kenya: Policy conclusions from a valuation study. *Energy for Sustainable Development*, 16: 103-110.
- AEPC (Alternative Energy Promotion Centre) (2014). Roles and responsibilities of the AEPC. [http://www.aepc.gov.np/?option=aboutus&page=aboutsub&mid=1&sub\\_id=2&id=2](http://www.aepc.gov.np/?option=aboutus&page=aboutsub&mid=1&sub_id=2&id=2). Last accessed 13.04.2014.
- AfDB (African Development Bank) (2009). An Infrastructure Action Plan for Burundi: Accelerating Regional Integration. African Development Bank. <http://www.afdb.org/en/countries/east-africa/burundi/>. Last accessed 13.06.2013.
- AfDB (African Development Bank) (2013). African Development Bank Group, Malawi Country Strategy paper 2013-2017. <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/2013-2017%20-%20Malawi%20-%20Country%20Strategy%20Paper.pdf>. Last accessed 20.06.2013.
- AfDB (African Development Bank) (2014). Climate finance for Africa. African Development Bank. <http://www.afdb.org/cop/cop17-africa-pavilion/programme/climate-finance-for-africa/>. Last accessed 20.02. 2014.
- Agrawal, A., Eriksen, S., Ma, S., Perch, L. and Zakieldein, S. (2014). Livelihoods and poverty: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge. pp. 797. <http://www.ipcc.ch/report/ar5/wg2/>. Last accessed 14.09.2017.
- Ahlborg, H. and Hammar, L. (2014). Drivers and barriers to rural electrification in Tanzania and Mozambique – Grid extension, off-grid, and renewable energy technologies. *Renewable Energy*, 61: 17-124.
- Akella, A.K, Saini, R.P. and Sharma, M.P. (2009). Social, economical and environmental impacts of renewable energy systems. *Renewable Energy*, 34: 390-396.
- Alam, S.S., Hazrul, N., Hashim, N., Rashid, M., Omar, N.A., Ahsan, A. and Ismail, M.D. (2014). Small-scale households renewable energy usage intention: Theoretical development and empirical settings. *Renewable Energy*, 68: 255-263.
- Al-Ghorbany, A. (2014). The Potential of Strategic Environmental Assessment for Integrated and Sustainable Water Resources Management in the Republic of Yemen: Scenario-Based Strategic Assessment of the Water Resources Policies Adopted in 'Yemen's Strategic Vision 2025'. PhD Thesis. Brandenburg University of Technology Cottbus. pp. 5-6 <https://opus4.kobv.de/opus4-UBICO/frontdoor/index/index/year/2014/docId/12463>. Last accessed 21.06.2015.
- Amatayakul, W. and Berndes, G. (2012). Determining factor for the development of CDM biomass Power projects. *Energy for Sustainable Development*, 16: 197-203.
- Amigun, B., Sigamoney, R. and von Blottnitz, H. (2008). Commercialisation of biofuel industry in Africa: A review. *Renewable and Sustainable Energy Reviews*, 12: 690-711.
- Amigun, B., Musango, J.K. and Stafford, W. (2011). Biofuels and sustainability in Africa. *Renewable and Sustainable Energy Reviews*, 15: 1360-1372.
- Arens, C., Wang-Helmreich, H., Hodes, G. and Burian, M. (2011). Assessing Support Activities by International Donors for CDM Development in Sub-Saharan Africa with Focus on Selected Least Developed Countries. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).
- Aridas, T. and Pasquali, V. (2010). Countries by income group. *Global Finance*. <http://www.gfmag.com/tools/global-database/economic-data/12066-countries-by-income-group.html#ixzz2tx2oWWJ5>. Last accessed 15.04.2014.
- Asiedu, E. (2002). On the determinants of Foreign Direct Investment to developing countries: is Africa different? *World Development*, 30: 107-119.
- Aslani, A and Mohaghar, A. (2013). Business structure in renewable energy industry: Key areas. *Renewable and Sustainable Energy Reviews*, 27: 569-575.
- Azuri Technologies (2015). Pay as you go solar systems. <http://www.azuri-technologies.com/info-hub/azuri-quad>. Last accessed 29.09.2015.
- Babbie, E., (2010). *The Practice of Social Research*. 12<sup>th</sup> Edition. Wadsworth.

- Baker Tilly (2014). Report on Fraud and Mismanagement of Malawi Government Finances covering transactions and controls in the six month period 1 April 2013 - 30 September 2013. National Audit Office Malawi.  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/285877/20140221\\_National\\_Audit\\_Office\\_Malawi\\_-\\_Forensic\\_Audit\\_Report\\_-\\_FINAL\\_ISSUED.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/285877/20140221_National_Audit_Office_Malawi_-_Forensic_Audit_Report_-_FINAL_ISSUED.pdf). Last accessed 15.05.2014.
- Barry, M., Steyn, H. and Brent, A. (2011). Selection of renewable energy technologies for Africa: Eight case studies in Rwanda, Tanzania and Malawi. *Renewable Energy*, 36: 2845-2852.
- Bazilian, M., Nussbaumer, P., Rogner, H., Brew-Hammond, A., Foster, V., Pachauri, S., Williams, E., Howells, M., Niyongabo, P., Musaba, L., Ó Gallachóir, B., Radka, M. and Kammen, D.M. (2012). Energy access scenarios to 2030 for the power sector in sub-Saharan Africa. *Utilities Policy*, 20: 1-16.
- BBC Africa (British Broadcasting Corporation) (2015). Tanzania closing hydropower plants.  
<http://www.bbc.com/news/world-africa-34491984>. Last accessed 21.10.2015.
- Beck, F. and Martinot, E. (2004). Renewable Energy Policies and Barriers. *Encyclopedia of Energy*, Volume 5.
- Benessaiah, K. (2012). Carbon and livelihoods in Post-Kyoto: Assessing voluntary carbon markets. *Ecological Economics*, 77: 1-6.
- BERL (Bio Energy Resources Ltd) (2012). Fuelling a greener future for farmers in Malawi through the use of jatropha curcas. Project Description Document for Verified Carbon Standard.  
<https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=898&lat=-13%2E975727777778&lon=33%2E731211111111&bp=1>. Last accessed 17.01.2014.
- Bhanot, J. and Jha, V. (2012). Moving towards tangible decision-making tools for policymakers: Measuring and monitoring energy access provision. *Energy Policy*, 47: 64-70.
- Bhattacharyya, S.C. (2012a). Energy access programmes and sustainable development: A critical review and analysis. *Energy for Sustainable Development*, 16: 260-271.
- Bhattacharyya, S. (2012b). (Ed.) *Rural Electrification through Decentralised Off-grid Systems in Developing Countries*. Springer. pp. 134.
- Bhattacharyya, S.C. (2013). Financing energy access and off-grid electrification: A review of status, options and challenges. *Renewable and Sustainable Energy Reviews*, 20: 462-472.
- Biagini, B. and Sagar, A. (2004). Nongovernmental Organizations (NGOs) and Energy. *Encyclopedia of Energy*, Volume 4.
- Boko, M., Niang, I., Nyong, A., Vogel, C., Githeko, A., Medany, M., Osman-Elasha, B., Tabo, R. and Yanda, P. (2007). Africa. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J. and Hanson, C.E. (Eds). Cambridge University Press, Cambridge. pp. 437.
- Boyd, E., Hultman, N., Roberts, R.T., Corbera, E., Cole, J., Bozmoski, A., Ebeling, J., Tippman, R., Mann, P., Brown, K. and Liverman, D.M. (2009). Reforming the CDM for sustainable development: lessons learned and policy futures. *Environmental science & policy*, 12: 820-831.
- Brew-Hammond, A. and Kemausuor, F. (2009). Energy for all in Africa – to be or not to be?!. *Current Opinion in Environmental Sustainability*, 1: 83-88.
- Brohé, A. (2013). Whither the CDM? Investment outcomes and future prospects. *Environ Dev Sustain*. DOI 10.1007/s10668-013-9478-5.
- Brown, D. (2011). Making the linkages between climate change adaptation and spatial planning in Malawi. *Environmental Science & Policy*, 14: 940-949.
- Buchner, B., Falconer, A., Hervé-Mignucci, M., Trabacchi, C. and Brinkman, M. (2011). *The Landscape of Climate Finance: A CPI report*. Climate Policy Initiative. pp. 1.  
<http://climatepolicyinitiative.org/wp-content/uploads/2011/10/The-Landscape-of-Climate-Finance-120120.pdf>. Last accessed 13.06.2013.
- Buchner, B., Stadelmann, M., Wilkinson, J, Mazza, F., Rosenberg, A., Abramskiehn, D. (2014). *The Global Landscape of Climate Finance 2014*. Climate Policy Initiative. pp. 32.
- Bürer, M.J. and Wüstenhagen, R. (2009). Which renewable energy policy is a venture capitalist's best friend? Empirical evidence from a survey of international clean tech investors. *Energy Policy*, 37: 4997-5006.
- Burian, M., Aren, C., Sterk, W. and Wang-Helmreich, H. (2011). Integrating Africa's Least Developed Countries into the Global Carbon Market: Analyzing CDM Implementation Barriers. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).
- Byigero, A., Clancy, J. and Skutsch, M. (2010). CDM in sub-Saharan Africa and the prospects of the Nairobi Framework Initiative. *Climate Policy*, 10: 181-189.

- Carley, S., Lawrence, S., Brown, A., Nourafshan, A. and Benami, E. (2011). Energy-based economic development. *Renewable and Sustainable Energy Reviews*, 15: 282-295.
- CDM pipeline (2015a). Percentage share of the total number of projects of in the CDM categories. <http://www.cdmpipeline.org/cdm-projects-type.htm#2>. Last accessed 21.05.2015.
- CDM pipeline (2015b). CDM projects grouped in types. <http://www.cdmpipeline.org/cdm-projects-type.htm>. Last accessed 21.05.2015.
- CDM pipeline (2015c). CDM Regional Distribution. <http://www.cdmpipeline.org/cdm-projects-region.htm>. Last accessed 21.05.2015.
- CDMLS (CDM Loan Scheme) (2014). UNFCCC Loan Scheme for CDM. <http://cdmloanscheme.org/>. Last accessed 30.05.2014.
- CEPA (Centre for Environmental Policy and Advocacy) (2012). Draft Position Paper: Towards Development of Climate Change Policy in Malawi. Centre for Environmental Policy and Advocacy. Malawi. [http://www.cepa.org.mw/documents/ECRP\\_documents/CEPA\\_Draft\\_Position\\_Paper\\_Climate\\_Change\\_Policy.pdf](http://www.cepa.org.mw/documents/ECRP_documents/CEPA_Draft_Position_Paper_Climate_Change_Policy.pdf). Last accessed 5.12.2012.
- Chaurey, A., Krithika, P.R., Palit, D., Rakesh, S. and Sovacool, B.K. (2012). New partnerships and business models for facilitating energy access. *Energy Policy*, 47: 48-55.
- Chirambo, D. (2014). The Climate Finance and Energy Investment Dilemma in Africa: Lacking Amidst Plenty. *Journal of Developing Societies*, 30(4): 415-440.
- Chirambo, D. (2016a). Integrating Microfinance, Climate Finance and Climate Change Adaptation: A Sub-Saharan Africa Perspective. In Filho, W.L., Adamson, K. and Dunk, R. (Eds). *Climate Change Adaptation, Resilience and Hazards*. Springer.
- Chirambo, D. (2016b). Addressing the Renewable Energy Financing Gap in Africa: Integrated Renewable Energy Financing in Malawi. *Journal of Renewable & Sustainable Energy Reviews*, 62: 793-803.
- Climate Corporation (2013). Voluntary Carbon Market. <http://climatecorp.eu/the-co2-market/facts-figures/>. Last accessed 13.06.2013.
- Concern Universal (2014). National cookstove programme launch. [http://www.concern-universal.org/president\\_banda\\_attends\\_national\\_cookstoves\\_lau](http://www.concern-universal.org/president_banda_attends_national_cookstoves_lau). Last accessed 30.05.2014.
- CORE (2003). Issues and Options for Rural Electrification in SAPP Member Countries and Rural Electrification Planning in Lesotho Energy and Environment Training Program Global Bureau-USAID, Washington.
- Cruz, R.V., Harasawa, H., Lal, M., Wu, S., Anokhin, Y., Punsalma, B., Honda, Y., Jafari, M., Li, C., and Huu Ninh, N. (2007). Asia. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J. and Hanson, C.E. (Eds). Cambridge University Press, Cambridge. pp. 494.
- Cubbin, J. and Stern, J. (2004). Regulatory effectiveness: The impact of good regulatory governance on electricity industry capacity and efficiency in developing countries. Department of Economics, City University and London Business School.
- Cuvilas, C. A., Jirjis, R. and Lucas, C. (2010). Energy situation in Mozambique: A review. *Renewable and Sustainable Energy Reviews*, 14: 2139-2146.
- de Oliveira, J.A.P. (2009). The implementation of climate change related policies at the subnational level: An analysis of three countries. *Habitat International*, 33: 253-259.
- Doing Business (2014a). Doing business rankings. <http://www.doingbusiness.org/rankings>. Last accessed 13.04.2014.
- Doing Business (2014b). Doing business getting electricity rankings. <http://www.doingbusiness.org/data/exploretopics/getting-Electricity>. Last accessed 13.04.2014.
- Dupasquier, C. and Osakwe, P.N. (2006). Foreign direct investment in Africa: Performance, challenges, and responsibilities. *Journal of Asian Economics*, 17: 241-260.
- Eberhard, A. and Shkaratan, M. (2012). Powering Africa: Meeting the financing and reform challenges. *Energy Policy*, 42: 9-18.
- ECAL (Economic Consulting Associates Limited) (2009). South African Power Pool (SAPP) Case Study-Regional Power Sector Integration: Lessons From Global Case Studies and A Literature Review. ESMAP Briefing Note 004/10 June 2010.
- Egute, T.O., Albrecht, E. and Ateghang, E.M. (2017). Renewable Energy Law and Policy Review, 7(4): 17-30.
- Ekholm, T., Ghoddusi, H., Krey, V. and Riahi, K. (2013). The effect of financial constraints on energy-climate scenarios. *Energy Policy*, 59: 562-572.

- Ellis, J. and Kamel, S. (2007). *Overcoming Barriers to Clean Development Mechanism Projects*, Organization for Economic Co-Operation and Development (OECD), Paris, and United Nations Environment Program (UNEP) Risoe Center, Denmark.
- Engels, A., Hüther, O., Schäfer, M. and Held, H. (2013). Public climate-change skepticism, energy preferences and political participation. *Global Environmental Change*, 23(5): 1018-1027.
- EUEI-PDF (EU Energy Initiative Partnership Dialogue Facility) (2009). *Malawi biomass energy strategy*. Lilongwe: Malawi Department of Energy and Minerals. pp. 12. <http://www.euei-pdf.org/en/seads/policy-strategy-and-regulation/biomass-energy-strategy-best-malawi>. Last accessed 29.01.2013.
- Fay J.G. (2013). *The Role of Market-Based Incentives in Promoting Low Carbon Development in Developing Countries*. University of Cape Town. Published PhD Thesis. [http://uctscholar.uct.ac.za/R/?func=dbin-jump-full&object\\_id=100372&local\\_base=GEN01](http://uctscholar.uct.ac.za/R/?func=dbin-jump-full&object_id=100372&local_base=GEN01). Last accessed 29.04.2014.
- FoM (Face of Malawi) (2013). *Malawi coal energy deal*. <http://www.faceofmalawi.com/2013/06/government-has-signed-a-us667-2-million-coal-fired-plant-deal-with-china-gezhouba-group-company-cggc/#sthash.nM2b6Lri.dpbs>. Last accessed 17.03.2014.
- Freitas, I.M.B., Dantas, E. and Lizuka, M. (2012). The Kyoto mechanisms and the diffusion of renewable energy technologies in the BRICS. *Energy Policy*, 42: 118-128.
- Gamula G.E.T., Hui. L. and Peng W. (2013a). An Overview of the Energy Sector in Malawi. *Energy and Power Engineering*, 5: 8-17.
- Gamula G.E.T., Hui. L. and Peng W. (2013b). Development of Renewable Energy Technologies in Malawi. *International Journal of Renewable Energy Technology Research*, 2(2): 44-52.
- GDC (Geothermal Development Company Ltd) (2014). GDC services. <http://www.gdc.co.ke/>. Last accessed 03.02.2014.
- Glemarec, Y. (2012). Financing off-grid sustainable energy access for the poor. *Energy Policy*, 47: 87-93.
- GoB (Government of Botswana) (2009). *National Development Plan (NDP 10):2009-2016*. <http://www.finance.gov.bw/templates/mfdp/file/File/NDP%2010%20final%2016th%20Dec%202009%20edit%20in%2019%20Jan%202010.pdf>. Last accessed 20.02.2014.
- GoC (Government of Chad) (2008). *Poverty Reduction and Growth Strategy Paper for Chad: 2008-2011*. <https://www.imf.org/external/pubs/ft/scr/2010/cr10230.pdf>. Last accessed 16.08.2013.
- GoG (Government of Ghana) (2010a). *The Coordinated Programme of Economic and Social Development Policies 2010-2016*. <http://www.ghana.gov.gh/documents/coordinatedprogramme.pdf>. Last accessed 5.05. 2013.
- GoG (Government of Ghana) (2010b). *National Energy Policy (2010)*. Ministry of Energy. pp. 1. <http://www.purc.com.gh/purc/sites/default/files/ENERGYPOLICY.pdf>. Last accessed 5.05. 2013.
- GoK (Government of Kenya) (2008). *First Medium Term Plan 2008-2012*. [https://opendata.go.ke/api/file\\_data/u2Q7eIQKL61jL-IW26AFIc0FDiDRSwBpQFSLQx9fxPc?filename=Medium\\_Term\\_Plan\\_2008-2012%25255B1%25255D.pdf](https://opendata.go.ke/api/file_data/u2Q7eIQKL61jL-IW26AFIc0FDiDRSwBpQFSLQx9fxPc?filename=Medium_Term_Plan_2008-2012%25255B1%25255D.pdf). Last accessed 12.09. 2012.
- GoK (Government of Kenya), (2010). *National Climate Change Response Strategy*. [http://cdkn.org/wp-content/uploads/2012/04/National-Climate-Change-Response-Strategy\\_April-2010.pdf](http://cdkn.org/wp-content/uploads/2012/04/National-Climate-Change-Response-Strategy_April-2010.pdf). Last accessed 12.09. 2012.
- GoM (Government of Malawi). (1998). *Malawi Vision 2020*. <http://www.sdn.org.mw/malawi/vision-2020/>. Last accessed 15.02.2014.
- GoM (Government of Malawi) (2003a). *Malawi National Energy Policy (2003)*. Government of Malawi, Ministry of Energy and Mining, Lilongwe, Malawi. [http://www.cepa.org.mw/publications\\_legislation.php](http://www.cepa.org.mw/publications_legislation.php).
- GoM (Government of Malawi) (2003b). *Malawi's Climate change Technology Transfer and needs assessment report to UNFCCC*, Environmental Affairs Department, Lilongwe, Malawi. Available from: <http://unfccc.int/ttclear/pdf/TNA/Malawi/TNAReportMalawi.pdf>. Last accessed 27.03.13.
- GoM (Government of Malawi) (2004a). *Malawi Electricity Act. Act No. 2 of 2004*. Passed in Parliament on 19.03.2004. Government of Malawi. [http://www.malawilii.org/files/mw/legislation/act/2004/2/electricity\\_act\\_2004\\_pdf\\_59303.pdf](http://www.malawilii.org/files/mw/legislation/act/2004/2/electricity_act_2004_pdf_59303.pdf). Last accessed 3.03.2014.



- GoM (Government of Malawi) (2004b). Malawi Energy Regulation Act. Act No. 20 of 2004. Passed in Parliament on 19.03.2004. Government of Malawi. [http://www.malawilii.org/files/mw/legislation/act/2004/20/energy\\_regulation\\_act\\_2004\\_pdf\\_38000.pdf](http://www.malawilii.org/files/mw/legislation/act/2004/20/energy_regulation_act_2004_pdf_38000.pdf) . Last accessed 3.03.2014.
- GoM (Government of Malawi) (2004c). Rural Electrification Act. Act No. 21 of 2004. Passed in Parliament on 19.03.2004. Government of Malawi. [http://www.malawilii.org/files/mw/legislation/act/2004/21/rea2004220\\_pdf\\_13799.pdf](http://www.malawilii.org/files/mw/legislation/act/2004/21/rea2004220_pdf_13799.pdf). Last accessed 3.03.2014.
- GoM (Government of Malawi) (2006). Malawi's National Adaptation Programme of Action (NAPA). Government of Malawi, Ministry of Mines, Natural Resources and Environment, Lilongwe.
- GoM (Government of Malawi) (2007). Government of Malawi. Malawi Growth and Development Strategy: 2006-2011. [http://planipolis.iiep.unesco.org/upload/Malawi/Malawi\\_PRSP\\_2006\\_2011.pdf](http://planipolis.iiep.unesco.org/upload/Malawi/Malawi_PRSP_2006_2011.pdf). Last accessed 9.11.2013.
- GoM (Government of Malawi) (2010a). Malawi Millennium Development Goals Report: 2010. Malawi Government, Ministry of Development Planning and Cooperation, Lilongwe. <http://planipolis.iiep.unesco.org/upload/Malawi/MalawiMDGs2010Report.pdf>. Last accessed 9.01.2014.
- GoM (Government of Malawi) (2010b). Malawi State of Environment and Outlook Report: Environment for Sustainable Economic Growth. Environmental Affairs Department. ISBN 978-99960-21-00-8. Available from: <http://www.eadmw.org/docs/soer.pdf>. Last accessed 7.04.2013.
- GoM (Government of Malawi) (2011a). Concept Paper for the Energy Sector: Public Private Partnerships on Electricity Generation for Rural Areas. [http://www.mcam.gov.mw/documents/final\\_submission/MCA\\_Energy\\_Concept\\_Paper.pdf](http://www.mcam.gov.mw/documents/final_submission/MCA_Energy_Concept_Paper.pdf). Last accessed 21.07.2012.
- GoM (Government of Malawi) (2011b). The Malawi Growth and Development Strategy II (MGDS II): 2011-2016. Ministry of Finance and Development Planning. <http://www.gafspfund.org/sites/gafspfund.org/files/MGDS%20II%20final%20document%20january%202012.pdf>. Last accessed 15.10.2013.
- GoM (Government of Malawi) (2011c). CDM project approval procedure for Malawi. <http://malawi.acp-cd4cdm.org/media/330766/cdm-project-approval-procedure.pdf>. Last accessed 03.05.2014.
- GoM (Government of Malawi) (2012a). Integrated Household Survey 3 (2010–2011): Household Socio-Economic Characteristics Report. National Statistical Office, Zomba. [http://www.nsomalawi.mw/images/stories/data\\_on\\_line/economics/ihs/IHS3/IHS3\\_Report.pdf](http://www.nsomalawi.mw/images/stories/data_on_line/economics/ihs/IHS3/IHS3_Report.pdf). Last accessed 10.05.2014.
- GoM (Government of Malawi) (2012b). Malawi Economic Recovery Plan-2012-2017. <http://www.eisourcebook.org/cms/June%202013/Malawi,%20Economic%20Recovery%20Plan%202012.pdf>. Last accessed 15.10.2013.
- GoM (Government of Malawi) (2012c). National Climate Change Response Draft White Paper. Ministry of Environment and Climate Change Management. <http://www.cepa.org.mw/documents/legislation/policies/Malawi%20National%20Climate%20Change%20White%20paper%20Dec%202014.pdf>. Last accessed 13.04.2014.
- GoM (Government of Malawi) (2012d). National Environment and Climate Change Communication Strategy (2012-2016). Ministry of Environment and Climate Change Management. <http://www.nccpmw.org/index.php/national-climate-change-programme>. Last accessed 13.04.2014.
- GoM (Government of Malawi) (2013). National Climate Change Investment Plan (2013–2018). Ministry of Environment and Climate Change Management, Environmental Affairs Department.
- GoM (Government of Malawi) (2015). Republic of Malawi Intended Nationally Determined Contribution. Environmental Affairs Department, Government of Malawi. <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Malawi/1/MALAWI%20INDC%20SUBMITTED%20TO%20UNFCCC%20REV%20pdf.pdf>. Last accessed 17.10.2015.
- GoNe (Government of Nepal) (2013). Subsidy Policy for Renewable Energy (2013). [http://www.aepc.gov.np/docs/resource/rescenter/20130818060043\\_RE%20Subsidy%20Policy%202013%20-%20English.pdf](http://www.aepc.gov.np/docs/resource/rescenter/20130818060043_RE%20Subsidy%20Policy%202013%20-%20English.pdf). Last accessed 13.04.2014.

- Gooneratne, F. and Visser, A. (2010). Malawi: Development of a Large-Scale Energy Efficient Lighting Program-CFL Program Design and Implementation Plan (Final Report). <http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CFwQFjAF&url=http%3A%2F%2Fwww.evidenceondemand.info%2FCore%2FDownloadDoc.aspx%3FdocumentID%3D562%26contentID%3D1352&ei=hCEwU6CaCMTZsgbCnYHICw&usg=AFQjCNFn8cR52MnnCeuprGQ4f6AYWTTwVw&bvm=bv.62922401>. Last accessed 19.04.2014.
- GoU (Government of Uganda) (2012). Renewable Energy Investment Guide. <http://uganda.nlembassy.org/binaries/content/assets/postenweb/u/uganda/embassy-of-the-kingdom-of-the-netherlands-in-kampala/import/development-cooperation/renewable-energy-investment-guide.pdf>. Last accessed 11.16.2014.
- GoZW (Government of Zimbabwe) (2010). Medium Term Plan (MTP) 2010-2015. [http://www.kubatana.net/docs/econ/goz\\_medium\\_term\\_plan\\_100706.pdf](http://www.kubatana.net/docs/econ/goz_medium_term_plan_100706.pdf). Last accessed 10.02.2014.
- GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH) (2006). Capacity Development for the Clean Development Mechanism Lessons Learned in Ghana, India, Indonesia, South Africa and Tunisia. <http://www.oeko.de/oekodoc/577/2006-135-en.pdf>. Last accessed 22.05.2014.
- Gurdian Newspaper (2014). Malawi prepares for \$100m 'cashgate' corruption trial. <http://www.theguardian.com/world/2014/jan/14/malawi-prepares-cashgate-corruption-trial>. Last accessed 30.05.2014.
- Haanyika, C.M. (2006). Rural electrification policy and institutional linkages. *Energy Policy*, 34: 2977-2993.
- Haanyika, C.M. (2008). Rural electrification in Zambia: A policy and institutional analysis. *Energy Policy*, 36: 1044-1058.
- Hailu, Y.G. (2012). Measuring and monitoring energy access: Decision-support tools for policymakers in Africa. *Energy Policy*, 47: 56-63.
- Hamrick, K. and Goldstein, A. (2015). Ahead of the Curve: State of the Voluntary Carbon Markets 2015. Ecosystem Marketplace. Washington, DC.
- Hancock, K.J. (2015). The expanding horizon of renewable energy in sub-Saharan Africa: Leading research in the social sciences. *Energy Research & Social Science*, 5:1-8.
- Hara, K.N.G. (2012). An assessment on the knowledge, attitudes and practices among communities on climate change. Centre for Social Concern, Lilongwe. pp.5; pp.18. <http://www.cfscmalawi.org/CfSC%20Climate%20Change%20Survey%20Report%202012.pdf>. Last accessed 18.03.2014.
- HBS (Heinrich Böll Stiftung) (2013). Powering Africa through Feed-in Tariffs: Advancing renewable energy to meet the continent's electricity needs. <http://www.nepad.org/sites/default/files/Powering%20Africa%20through%20Feed-in%20Tariffs.pdf>. Last accessed 7.11.2013.
- Herran, D.S. and Nakata, T. (2008). Renewable technologies for rural electrification in Colombia: a multiple objective approach. *International Journal of Energy Sector Management*, 2: 139-154.
- Hofmann, M. and Khatun, K. (2013). Facilitating the financing of bioenergy projects in sub-Saharan Africa. *Energy Policy*, 52: 373-384.
- Hogarth, J.R. (2012). Promoting diffusion of solar lanterns through microfinance and carbon finance: A case study of FINCA-Uganda's solar loan programme. *Energy for Sustainable Development*, 16: 430-438.
- Hyder, P. (2008). Recycling revenue from an international carbon tax to fund an integrated investment programme in sustainable energy and poverty reduction. *Global Environmental Change*, 18: 521-538.
- ICEIDA (The Icelandic International Development Agency) (2012). Malawi Country Strategy Paper 2012-2016. ([http://www.iceida.is/media/pdf/Malawi\\_CSP\\_2012-2016.pdf](http://www.iceida.is/media/pdf/Malawi_CSP_2012-2016.pdf)). Last accessed 16.11.2013.
- ICER (International Confederation of Energy Regulators) (2012). Renewable Energy and Distributed Generation: International Case Studies on Technical and Economic Considerations. [http://www.naruc.org/international/Documents/ICER%20RES%20and%20DG%20Report\\_FINAL.pdf](http://www.naruc.org/international/Documents/ICER%20RES%20and%20DG%20Report_FINAL.pdf). Last accessed 02.12.2013.
- IDA/IMF (2012). IMF Country Report No. 12/223. Joint Staff Advisory Note on the Second Malawi Growth and Development Strategy (MGDS II) 2011-16. Prepared by the Staffs of the International Development Association and the International Monetary Fund. Available from: <http://www.imf.org/external/pubs/ft/scr/2012/cr12223.pdf>. Last accessed 18.12.2012.
- IEA (International Energy Agency) (2010). World energy outlook. IEA, Paris.

- IPCC (Intergovernmental Panel on Climate Change) (2011). Summary for Policymakers. In: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation. Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Seyboth, K., Matschoss, P., Kadner, S., Zwickel, T., Eickemeier, P., Hansen, G., Schlomer, S., and von Stechow, C., (Eds). Cambridge University Press, Cambridge. pp. 7.
- IPMM (International Partnerships on Mitigation and MVR) (2014). African Regional Group. <http://mitigationpartnership.net/about-partnership>. Last accessed. 18.05.2014.
- IRENA (The International Renewable Energy Agency) (2011). IRENA Renewable Energy Country Profiles: AFRICA. IRENA, Abu Dhabi. pp. 21. [www.irena.org/DocumentDownloads/Publications/CountryProfiles\\_Africa\\_WEB.pdf](http://www.irena.org/DocumentDownloads/Publications/CountryProfiles_Africa_WEB.pdf). Last accessed 12.09.2017.
- IRENA (The International Renewable Energy Agency) (2014). Africa Clean Energy Corridor: Analysis of Infrastructure for Renewable Power in Southern Africa. IRENA, Abu Dhabi. <http://www.irena.org/DocumentDownloads/Publications/ACEC%20Document%20V19-For%20Web%20Viewing-Small.pdf>. Last accessed 02.02.2014.
- IRENA (The International Renewable Energy Agency) (2016). Unlocking Renewable Energy Investment: The Role of Risk Mitigation and Structured Finance. IRENA, Abu Dhabi. pp. 20. [https://www.irena.org/.../IRENA\\_Risk\\_Mitigation\\_and\\_Structured\\_Finance\\_2016.pdf](https://www.irena.org/.../IRENA_Risk_Mitigation_and_Structured_Finance_2016.pdf). Last accessed 12.09. 2017.
- Jacobs, D. and Sovacool, B.K. (2012). Feed-In Tariffs and Other Support Mechanisms for Solar PV Promotion. *Comprehensive Renewable Energy*, 1: 73-109.
- Jenner, S., Groba, F. and Indvik, J. (2013). Assessing the strength and effectiveness of renewable electricity feed-in tariffs in European Union countries. *Energy Policy*, 52: 385-401.
- Jumbe, C.B.L. (2004). Co-Integration and Causality between Electricity Consumption and GDP: Empirical Evidence from Malawi. *Energy Economics*, 26(1): 61-68.
- Jumbe, C.B.L. and Mkondiwa, M. (2013). Comparative analysis of biofuels policy development in Sub-Saharan Africa: The place of private and public sectors. *Renewable Energy*, 50: 614-620.
- Kambewa, P. and Chiwaula, L. (2010). Biomass energy use in Malawi. A background paper prepared for the International Institute for Environment and Development (IIED) for an international ESPA workshop on biomass energy, 19-21 October 2010, Parliament House Hotel, Edinburgh. Chancellor College, Zomba, Malawi.
- Kanagawa, M. and Nakata, T. (2008). Assessment of access to electricity and the socio-economic impacts in rural areas of developing countries. *Energy Policy*, 36(6): 2016-2029.
- Kaunda, C.S. (2013). Energy situation, potential and application status of small-scale hydropower systems in Malawi. *Renewable and Sustainable Energy Reviews* 26: 1-19.
- Kaunda, C.S. and Mtalo, F. (2013). Impacts of environmental degradation and climate change on electricity generation in Malawi. *International Journal of Energy and Environment*, 4(3): 481-496. [http://www.ijee.ieefoundation.org/vol4/issue3/IJEE\\_13\\_v4n3.pdf](http://www.ijee.ieefoundation.org/vol4/issue3/IJEE_13_v4n3.pdf). Last accessed 18.03.2014.
- Kavaratzis, M. (2008). From City Marketing to City Branding: An Interdisciplinary Analysis with Reference to Amsterdam, Budapest and Athens. University of Groningen. Published PhD Thesis. ISBN: 978-90-367-3552-0. Available at: <http://dissertations.ub.rug.nl/faculties/rw/2008/m.kavaratzis/>. Last accessed 01.06.2014.
- Kaygusuz, K. (2012). Energy for sustainable development: A case of developing countries. *Renewable and Sustainable Energy Reviews*, 16: 1116-1126.
- Kemauor, F., Obeng, G.Y., Brew-Hammond, A. and Duker, A. (2011). A review of trends, policies and plans for increasing energy access in Ghana. *Renewable and Sustainable Energy Reviews*, 15: 5143-5154.
- Khennas, S. (2012). Understanding the political economy and key drivers of energy access in addressing national energy access priorities and policies: African Perspective. *Energy Policy*, 47: 21-26.
- Kirrane, C., Sharkey, C. and Naess L.O. (2012). Shaping strategies: factors and actors in climate change adaptation- Lessons from two-year case studies in Africa and Latin America. Trócaire and the Institute of Development Studies. [http://www.trocaire.org/sites/trocaire/files/climate\\_change\\_research\\_report\\_2012\\_0.pdf](http://www.trocaire.org/sites/trocaire/files/climate_change_research_report_2012_0.pdf). Last accessed 24.11.2013.
- Komendantova, N., Patt, A., Barras, L. and Battaglini, A. (2012). Perception of risks in renewable energy projects: The case of concentrated solar power in North Africa. *Energy Policy*, 40: 103-109.

- Kriegler, E., O'Neill, B.C., Hallegatte, S., Kram, T., Lempert, R.J., Moss, R.H. and Wilbanks, T. (2012). The need for and use of socio-economic scenarios for climate change analysis: A new approach based on shared socio-economic pathways. *Global Environmental Change*, 22: 807-822.
- Lahimer, A.A., Alghoul, M.A., Yousif, F., Razykov, T.M., Amin, N. and Sopian, K. (2013). Research and development aspects on decentralized electrification options for rural household. *Renewable and Sustainable Energy Reviews*, 24: 314-324.
- Landi, M., Sovacool, B.K. and Eidsness, J. (2013). Cooking with gas: Policy lessons from Rwanda's National Domestic Biogas Program (NDBP). *Energy for Sustainable Development*, 17(4): 347-356.
- Levin, K., Rich, D., Bonduki, Y., Comstock, M., Tirpak, D., Mcgray, H., Noble, I., Mogelgaard, K. and Waskow, D. (2015). *Designing and Preparing Intended Nationally Determined Contributions (INDCs)*. World Resources Institute. Washington, DC, USA. pp. 4.
- Lewis, J.I. (2010). The evolving role of carbon finance in promoting renewable energy development in China. *Energy Policy*, 38: 2875-2886.
- Lior, N. (2012). Sustainable energy development: The present situation and possible paths to the future. *Energy* 43, 174-191.
- Liu, P. and Tan, S. (2011). Comparison of Policies for Wind Power Development in China and abroad. *Procedia Engineering*, 16: 163-169.
- Lo, S. (2010). The differing capabilities to respond to the challenge of climate change across Annex Parties under the Kyoto Protocol. *Environmental Science & Policy*, 13(1): 42-54.
- LTWPL (Lake Turkana Wind Power Limited) (2011). *Clean Development Mechanism Project Design Document: Lake Turkana 310 MW Wind Power Project*. [http://cdm.unfccc.int/filestorage/F/Q/2/FQ2V8N6I5HRYJ41ASTZXE37D9OPU0K/Ref.%201e\\_LTWP%20CDM%20PDD%20v4%2007.01.2011?t=ak98bXUxYmN4fDDJYbrgBGp14sueREbDAE15](http://cdm.unfccc.int/filestorage/F/Q/2/FQ2V8N6I5HRYJ41ASTZXE37D9OPU0K/Ref.%201e_LTWP%20CDM%20PDD%20v4%2007.01.2011?t=ak98bXUxYmN4fDDJYbrgBGp14sueREbDAE15). Last accessed 1.10.2013.
- Marara, M., Okello, N., Kuhanwa, Z., Douven, W., Beevers, L. and Leentvaar, J. (2011). The importance of context in delivering effective EIA: Case studies from East Africa. *Environmental Impact Assessment Review*, 31: 286-296.
- Martinez, C.A. and Bowen, J.D. (2013). The Ethical Challenges of the UN's Clean Development Mechanism. *Journal of Business Ethics*, 117(4): 807-821.
- Mbeko, M. (2012). *The challenges of enforcing Environmental Impact Assessment (EIA) in Malawi: Lessons from the Kayelekera Uranium Mine*. University of Malawi. LLB (Hons.) Dissertation 2012. <http://www.nchimatrust.org/charity/LinkClick.aspx?fileticket=IVZz%2FRNWRqE%3D&tabid=109>. Last accessed 01.06.2014.
- MCC (Millennium Challenge Corporation) (2011). *Power Sector Revitalization Project (Millennium Challenge Compact between The Republic of Malawi and The United States of America acting through The Millennium Challenge Corporation)*. <http://www.mca-m.gov.mw/documents/Malawi%20and%20MCC%20Compact%20%20Agreement.pdf>. Last accessed 20.03.2014.
- MEDAL (The MacMillan English Dictionary for Advanced Learners) (2014). Definition of lackadaisical. <http://www.macmillandictionary.com/thesaurus-category/british/lazy-or-slow-to-act>. Last accessed 10.05.2014.
- Meisen P. and Akin I. (2008). *The Case for Meeting the Millennium Development Goals Through Access to Clean Electricity*. Global Energy Network Institute (GENI). [http://www.geni.org/globalenergy/research/meeting-mdgs-through-access-to-electricity/MDG\\_Final\\_1208.pdf](http://www.geni.org/globalenergy/research/meeting-mdgs-through-access-to-electricity/MDG_Final_1208.pdf). Last accessed 20.10.2012.
- MERA (Malawi Energy Regulatory Authority) (2012). *MERA Annual Report 2011-2012*. <http://www.meramalawi.mw/documents/MERA%20Annual%20Report%202011%20-%202012.pdf>. Last accessed 08.06.2014.
- MERA (Malawi Energy Regulatory Authority) (2014). *Malawi fuel price build up*. <http://www.meramalawi.mw/documents/Fuel%20Price%20Build%20Ups%20from%202000.pdf>. Last accessed 23.05.2014.
- Mezher, T., Dawelbait, G. and Abbas, Z. (2012). Renewable energy policy options for Abu Dhabi: Drivers and barriers. *Energy Policy* 42: 315-328.
- Modi, V., McDade, S., Lallement, D. and Saghri, J. (2006). *Energy and the Millennium Development Goals*. New York: Energy Sector Management Assistance Programme, United Nations Development Programme, UN Millennium Project and World Bank. [http://www.unmillenniumproject.org/documents/MP\\_Energy\\_Low\\_Res.pdf](http://www.unmillenniumproject.org/documents/MP_Energy_Low_Res.pdf). Last accessed 20.10.2012.

- Mohammadi, A., Abbaspour, M., Soltanieh, M., Atabi, F. and Rahmatian, M. (2013). Post-2012 CDM multi-criteria analysis of industries in six Asian countries: Iranian case study. *Climate Policy*, 13(2): 210-239.
- Mohammed, Y.S., Mustafa, M.W. and Bashir, N. (2013a). Status of renewable energy consumption and developmental challenges in Sub-Sahara Africa. *Renewable and Sustainable Energy Reviews*, 27: 453-463.
- Mohammed, Y.S., Mokhtar, A.S., Bashir, N. and Saidur, R. (2013b). An overview of agricultural biomass for decentralized rural energy in Ghana. *Renewable and Sustainable Energy Reviews*, 20: 15-22.
- Morton, T.A., Rabinovich, A., Marshall, D. and Bretschneider, P. (2011). The future that may (or may not) come: How framing changes responses to uncertainty in climate change communications. *Global Environmental Change*, 21: 103-109.
- Mulder, P. and Tembe, J. (2008). Rural electrification in an imperfect world: A case study from Mozambique. *Energy Policy*, 36(8): 2785-2794.
- Müller, S., Brown, A. and Ölz, S. (2011). *Renewable Energy: Policy Considerations for Deploying Renewables*. International Energy Agency Information Paper.
- NAMA database (2015). NAMA data search. [http://www.nama-database.org/index.php/Main\\_Page](http://www.nama-database.org/index.php/Main_Page). Last accessed 20.09.2015.
- Nautiyal, H. and Varun, (2012). Progress in renewable energy under clean development mechanism in India. *Renewable and Sustainable Energy Reviews*, 16: 2913-2919.
- Niederberger, A. and Saner, R. (2005). Exploring the relationship between FDI flows and CDM potential. *Transnational Corporations*, 14(1): 1-40.
- Norton Roseful Bright (2013). Investing in the African electricity sector – Ghana – ten things to know- <http://www.nortonrosefulbright.com/files/investing-in-power-in-ghana-100588.pdf>. Last accessed 06.04.2014.
- NREA (New & Renewable Energy Authority) (2014). About the New and Renewable Energy Authority. <http://www.nrea.gov.eg/english1.html>. Last accessed 09.05.2014.
- Nyasa Times (2014). Malawi losing 30% of budget money to corruption. <http://www.nyasatimes.com/2013/07/13/malawi-losing-30-of-budget-money-to-corruption/comment-page-1/#comments>. Last accessed 03.06.2014.
- Nyirenda, S.C. (2011). *Financing of Adaptation to Climate Change: An Analysis of Projects to be Funded under The Least Developed Countries Fund*. Masters Thesis. University of Leeds. School of Earth and Environment.
- OECC (Overseas Environmental Cooperation Center, Japan) (2015). *NAMA Guide Book. Manual for practitioners working with mitigation actions*. 2<sup>nd</sup> Edition. Japan.
- OECD (The Organisation for Economic Co-operation and Development) (2012). *Strategic Environmental Assessment in Development Practice: A Review of Recent Experience* OECD Publishing. <http://dx.doi.org/10.1787/9789264166745-en>. Last accessed 9.02.2014.
- OFID (OPEC Fund for International Development) (2010). OFID Pamphlet Series 39, *Energy Poverty in Africa*. Proceedings of a Workshop held by OFID in Abuja, Nigeria June 8-10, 2008. [http://www.ofid.org/LinkClick.aspx?fileticket=xNKy\\_XeYw7g%3D&tabid=109](http://www.ofid.org/LinkClick.aspx?fileticket=xNKy_XeYw7g%3D&tabid=109). Last accessed 13.04.2013.
- Ohimain, E.I. (2013). Can the Nigerian biofuel policy and incentives (2007) transform Nigeria into a biofuel economy? *Energy Policy*, 54: 352-359.
- Okello, C., Pindozi, S., Faugno, S. and Boccia, L. (2013). Development of bioenergy technologies in Uganda: A review of progress. *Renewable and Sustainable Energy Review*, 18: 55-63.
- O'Reilly, S. and Young, E.W. (2015). *MREAP (Malawi Renewable Energy Acceleration Programme): Policy Options to Support Energy for Development*. University of Strathclyde. <https://www.strath.ac.uk/eee/energymalawi/mreap/mreapdocumentation/>. Last accessed 10.10.2015.
- Otieno, H. and Awange J.L. (2006). *Energy Resources in East Africa: Opportunities and Challenges*. Springer-Verlag Berlin Heidelberg.
- Ottinger, R., Roinson, N., Tafur, V., (Eds.) (2005). *Compendium of sustainable energy laws*. Cambridge University Press.
- Owen, M., Van Der Plas, R. and Sepp, S. (2013). Can there be energy policy in Sub-Saharan Africa without biomass? *Energy for Sustainable Development*, 17(2): 146-152.
- Parthan, B., Osterkorn, M, Kennedy, M., Hoskyns, S., Bazilian, M. and Monga, P. (2010). Lessons for low-carbon energy transition: Experience from the Renewable Energy and Energy Efficiency Partnership (REEEP), *Energy for Sustainable Development*, 14: 83-93.

- Patlitzianas, K.D., Doukas, H. and Psarras, J. (2006). Designing an appropriate ESCOs' environment in the Mediterranean. *Management of Environmental Quality: An International Journal*, 17: 538-554.
- Pearson, B. (2007). Market failure: why the Clean Development Mechanism won't promote clean development. *Journal of Cleaner Production*, 15: 247-252.
- Pegels, A. (2010). Renewable energy in South Africa: Potentials, barriers and options for support. *Energy Policy*, 38: 4945-4954.
- Perdan, S. and Azapagic, A. (2011). Carbon trading: Current schemes and future developments. *Energy Policy*, 39: 6040-6054.
- Perdan, S., (2011) Introduction. In: Azapagic, A. and Perdan, S. (Eds.), *Sustainable development in practice: case studies for engineers and scientists*. 2<sup>nd</sup> Edition, Wiley Blackwells. pp. 5-6.
- Phillips, J. and Newell, P. (2013). The governance of clean energy in India: The clean development mechanism (CDM) and domestic energy politics. *Energy Policy*, 59: 654-662.
- PMR (Partnership for Market Readiness) (2013). Recent Development of The Joint Crediting Mechanism (JCM)/Bilateral Offset Credit Mechanism (BOCM). <https://www.thepmr.org/system/files/documents/JCM.pdf>. Last accessed 01.06.2014.
- Polit, D.F. and Beck, C.T. (2010). Generalization in quantitative and qualitative research: Myths and strategies. *International Journal of Nursing Studies*, 47:1451–1458.
- Porter, D. (2012). Renewable Energy Policy and Incentives. *Comprehensive Renewable Energy*, Volume 1, 1-4. doi:10.1016/B978-0-08-087872-0.00901-X.
- PPGC (Pacific Power Generation Corporation) (2015). PPD for the Small Hydropower Programme in Colombia Programme of Activity. PPGC, Washington. pp. 2. [https://cdm.unfccc.int/ProgrammeOfActivities/poa\\_db/2GE3B1I5AZQ9LVK6XJ4CMS7NWDR8TH/view](https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/2GE3B1I5AZQ9LVK6XJ4CMS7NWDR8TH/view). Last accessed 12.09.2017.
- Raosoft (2015). Sample size calculator. <http://www.raosoft.com/samplesize.html>. Last accessed 24.04.2014.
- Ranjit, L.R. and O'Sullivan, K. (2002). *A Sourcebook for Poverty Reduction Strategies vol. 2. The World Bank*, Washington, DC.
- RDB (Rwanda Development Board) (2012). *Energy: The Opportunity in Rwanda*. RDB. Kigali.
- Research Methods Knowledge Base (2013). Measurement. <http://www.socialresearchmethods.net/kb/index.php>. Last accessed 28.02. 2013.
- Rickerson, W., Hanley, C., Laurent, C. and Greacen, C. (2013). Implementing a global fund for feed-in tariffs in developing countries: A case study of Tanzania. *Renewable Energy*, 49: 29-32.
- Rogge, K. S., Schneider, M. and Hoffmann V.H. (2011). The innovation impact of the EU Emission Trading System – Findings of company case studies in the German power sector. *Ecological Economics*, 70: 513-523.
- Rong, F. (2010). Understanding developing country stances on post-2012 climate change negotiations: Comparative analysis of Brazil, China, India, Mexico, and South Africa. *Energy Policy*, 38: 4582-4591.
- Roy, J., Ghosh, D., Ghosh, A. and Dasgupta, S. (2013). Fiscal instruments: crucial role in financing low carbon transition in energy systems. *Current Opinion in Environmental Sustainability*, 5: 261-269.
- SADC (2010). *Southern African Development Community Regional Energy Access Strategy and Action Plan: SADC Energy Programme*. SADC Secretariat. pp. 26. [http://www.euei-pdf.org/sites/default/files/files/field\\_pblctn\\_file/EUEI%20PDF\\_SADC\\_Regional%20Energy%20Access%20Strategy\\_Mar%202010\\_EN.pdf](http://www.euei-pdf.org/sites/default/files/files/field_pblctn_file/EUEI%20PDF_SADC_Regional%20Energy%20Access%20Strategy_Mar%202010_EN.pdf). Last accessed 28.09.2013.
- Sanoh, A., Kocaman, A., Kocal, S., Sherpa, S. and Modi, V. (2014). The economics of clean energy resource development and grid interconnection in Africa. *Renewable Energy*, 62: 598-609.
- Sarkar, A. and Singh, J. (2010). Financing energy efficiency in developing countries-lessons learned and remaining challenges. *Energy Policy*, 38: 5560-5571.
- Schillebeeckx, S.J.D., Parikh, P., Bansal, R. and George, G. (2012). An integrated framework for rural electrification: Adopting a user-centric approach to business model development. *Energy Policy*, 48: 687-697.
- Schroeder, M. (2009). Utilizing the clean development mechanism for the deployment of renewable energies in China. *Applied Energy*, 86: 237-242.
- Schuman, S. and Lin, A. (2012). China's Renewable Energy Law and its impact on renewable power in China: Progress, challenges and recommendations for improving implementation. *Energy Policy*, 51: 89-109.
- Schut, M., Slingerland, M. and Locke, A. (2010). Biofuel developments in Mozambique: Update and analysis of policy, potential and reality. *Energy Policy* 38: 5151-5165.

- Scott, A. (2011). Focussing in on focus groups: Effective participative tools or cheap fixes for land use policy? *Land Use Policy*, 28: 684-694.
- Scrieciu, S.S., Barker, T. and Ackerman, F. (2013). Pushing the boundaries of climate economics: critical issues to consider in climate policy analysis. *Ecological Economics*, 85: 155-165.
- Sgurr Energy (2013). WEPP (Wind Energy Preparation Programme) 1: Initial feasibility study and nationwide constraints mapping. Sgurr Energy. Glasgow.  
<https://www.strath.ac.uk/eee/energymalawi/mreap/mreapdocumentation/>. Last accessed 10.10.2015.
- Sharma, S. and Desgain, D. (2013). Understanding the Concept of Nationally Appropriate Mitigation Action. UNEP Risø Centre, Copenhagen, Denmark.
- Shrimali, G. and Kniefel, J. (2011). Are government policies effective in promoting deployment of renewable electricity resources? *Energy Policy*, 39: 4726-4741.
- Silveira, S. and Khatiwada, D. (2010). Ethanol production and fuel substitution in Nepal-Opportunity to promote sustainable development and climate change mitigation. *Renewable and Sustainable Energy Reviews*, 14: 1644-1652.
- Simon, G.L., Bumpus, A.G. and Mann, P. (2012). Win-win scenarios at the climate-development interface: Challenges and opportunities for stove replacement programs through carbon finance. *Global Environmental Change*, 22: 275-287.
- Smith, J. B. (2001). A Summary of Climate Impact Assessments from US Country Studies Program. *Climate Change*, 50(1-2): 1-29.
- Stambouli, A.B. (2011). Promotion of renewable energies in Algeria: Strategies and perspectives. *Renewable and Sustainable Energy Reviews*, 15: 1169-1181.
- Stern, N., Dethier, J. and Rogers, F.H. (2005). *Growth and Empowerment: Making Development Happen*. (Munich Lectures in Economics), MIT Press.
- Stringer, L.C., Dyer, J.C., Reed, M.S., Dougill, A.G., Twyman, C. and Mkwambisi, D. (2009). Adaptations to climate change, drought and desertification: local insights to enhance policy in southern Africa. *Environmental Science and Policy*, 12: 748-765.
- Subbarao, S. and Lloyd, B. (2011). Can the Clean Development Mechanism (CDM) deliver? *Energy Policy*, 39: 1600-1611.
- Svenfelt, A., Engström, R. and Svane, Ö. (2011). Decreasing energy use in buildings by 50% by 2050 – A backcasting study using stakeholder groups. *Technological Forecasting & Social Change*, 78: 785-796.
- Taele, B.M., Mokhutsoane, L., Hapazari, I., Tlali, S.B. and Senatla, M. (2012). Grid electrification challenges, photovoltaic electrification progress and energy sustainability in Lesotho. *Renewable and Sustainable Energy Reviews*, 16: 973-980.
- Tan, X. (2013). China's overseas investment in the energy/resources sector: Its scale, drivers, challenges and implications. *Energy Economics*, 36: 750-758.
- TCCCR (Tyndall Centre for Climate Change Research) (2013). *European Climate Policies*.  
<http://www.tyndall.ac.uk/adamproject/european-climate-policy>. Last accessed 29.07.2013.
- Tenthani, C., Kaonga, C.C. and Kosamu, I.B.M. (2013). The Potential of Distributed Generation in Malawi. *International Journal of Renewable Energy Technology Research*, 2(1): 29 -32.
- Thomas, S., Dargusch, P., Harrison, S. and Herbohn, J. (2010). Why are there so few afforestation and reforestation Clean Development Mechanism projects? *Land Use Policy*, 27: 880-887.
- Tietenberg, T. and Lewis, L. (2010). *Environmental Economics & Policy*, 6<sup>th</sup> Edition. International Edition. Pearson.
- Timilsina, G.R., de Gouvello, C., Thioye, M. and Dayo, F.B. (2010). Clean Development Mechanism Potential and Challenges in Sub-Saharan Africa. *Mitig Adapt Strateg Glob Change*, 15: 93-111.
- Twidell, J. and Weir, A. (2006). *Renewable Energy Resources*, 2<sup>nd</sup> Edition. Taylor and Francis.
- Ürge-Vorsatz, D. and Herrero, S.T. (2012). Building synergies between climate change mitigation and energy poverty alleviation. *Energy Policy*, 49: 83-90.
- UNDATA (2014). *World statistics pocket book*. United Nations Statistics Division.  
<http://data.un.org/CountryProfile.aspx?crName=Malawi>. Last accessed 11.05.2014.
- UNDESA (United Nations Department of Economic and Social Affairs) (2014). LDC criteria.  
[http://www.un.org/en/development/desa/policy/cdp/ldc/ldc\\_criteria.shtml](http://www.un.org/en/development/desa/policy/cdp/ldc/ldc_criteria.shtml). Last accessed 11.05.2014
- UNDP (United Nations Development Programme) (2010). *The Third Arab Report on the Millennium Development Goals 2010 and The Impact of the Global Economic Crises*.  
<http://www.escwa.un.org/information/publications/edit/upload/edgd-10-3.pdf>. Last accessed 20.10.2012.

- UNDP (United Nations Development Programme) (2014). HDI Indicators by Country 2014. <https://data.undp.org/dataset/HDI-Indicators-By-Country-2014/5tuc-d2a9>. Last accessed 11.05.2014.
- UNDP (United Nations Development Programme) (2015). Funding Sources. <http://climatefinanceoptions.org/cfo/funding-sources>. Last accessed 17.10.2014.
- UNECA (United Nations Economic Commission for Africa) (2006). Sustainable Energy: A Framework for New and Renewable Energy in Southern Africa. UNECA, Lusaka. pp. 52. <http://repository.uneca.org/handle/10855/5650>. Last accessed 18.12.2013.
- UNECA (United Nations Economic Commission for Africa) (2007). Making Africa's Power Sector Sustainable: An Analysis of Power Sector Reforms in Africa. UNECA. Addis Ababa, Ethiopia. <http://repository.uneca.org/handle/10855/15059>. Last accessed 22.07.2013.
- UN-Energy (2005). The Energy Challenge for Achieving the Millennium Development Goals. [http://www.un-energy.org/sites/default/files/share/une/un-enrg\\_paper.pdf](http://www.un-energy.org/sites/default/files/share/une/un-enrg_paper.pdf). Last accessed 20.10.2012.
- UN-Energy/Africa (2007). Energy for Sustainable Development: Policy Options for Africa. UN - Energy /Africa publication to CSD15. [http://www.uneca.org/eca\\_resources/publications/unea-publication-tocsd15.pdf](http://www.uneca.org/eca_resources/publications/unea-publication-tocsd15.pdf). Last accessed 13.04.2014.
- UNEP RISØ (2013). Emissions Reduction Profile: Malawi. <http://www.acp-cd4cdm.org/media/366225/emissions-reduction-profile-malawi.pdf>. Last accessed 17.02.2014.
- UNFCCC (United Nations Framework Convention on Climate) (2002). Report of the Conference of the Parties on its Seventh Session: Marrakesh 29 October to 10 November 2001. pp. 7. Available from: [http://unfccc.int/national\\_reports/napa/items/2719.php](http://unfccc.int/national_reports/napa/items/2719.php). Last accessed 13.09.2017.
- UNFCCC (United Nations Framework Convention on Climate) (2011a). The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention: Decision 1/CP.16. pp. 17. [http://unfccc.int/meetings/cancun\\_nov\\_2010/session/6254/php/view/decisions.php#c](http://unfccc.int/meetings/cancun_nov_2010/session/6254/php/view/decisions.php#c). Last accessed 13.09.2017.
- UNFCCC (United Nations Framework Convention on Climate) (2011b). The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention: Decision 1/CP.16. pp. 3. [http://unfccc.int/meetings/cancun\\_nov\\_2010/session/6254/php/view/decisions.php#c](http://unfccc.int/meetings/cancun_nov_2010/session/6254/php/view/decisions.php#c). Last accessed 13.09.2017.
- UNFCCC (United Nations Framework Convention on Climate) (2011c). Report of the Adaptation Fund Board Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its sixth session, held in Cancun from 29 November to 10 December 2010. pp. 13. [http://unfccc.int/meetings/cancun\\_nov\\_2010/meeting/6266/php/view/decisions.php#c](http://unfccc.int/meetings/cancun_nov_2010/meeting/6266/php/view/decisions.php#c). Last accessed 13.09.2017.
- UNFCCC (United Nations Framework Convention on Climate Change) (2014a). Programme of Activities. <http://cdm.unfccc.int/ProgrammeOfActivities/index.html>. Last accessed 08.01.2014.
- UNFCCC (United Nations Framework Convention on Climate Change) (2014b). What is the CDM. <http://cdm.unfccc.int/>. Last accessed 20.10.2013.
- UNFCCC (United Nations Framework Convention on Climate Change) (2014c). CDM and POA project search. <http://cdm.unfccc.int/Projects/projsearch.html>. Last accessed 27.05.2014.
- UNSD (United Nations Statistics Division) (2015). Millennium Development Indicators: Country and Regional Progress Snapshots. <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Data/snapshots.htm>. Last accessed 26.10.2015.
- UNSDKP (United Nations Sustainable Development Knowledge Platform) (2014). Open Working Group proposal for Sustainable Development Goals. United Nations Department of Economic and Social Affairs. <http://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=1579&menu=130>. Last accessed 11.09.2014.
- Urmee, T., Harries, D. and Schlapfer, A. (2009). Issues related to rural electrification using renewable energy in developing countries of Asia and Pacific. *Renewable Energy*, 34: 354-357.
- van Alphen, K., Kunz, H.S. and Hekkert, M.P. (2008). Policy measures to promote the widespread utilisation of renewable energy technologies for electricity generation in the Maldives. *Renewable and Sustainable Energy Reviews*, 12: 1959-1973.



- van der Gaast, W., Begg, K. and Flamos, A. (2009). Promoting sustainable energy technology transfers to developing countries through the CDM. *Applied Energy*, 86: 230-236.
- Wambua, C. (2011). Laws and policies enabling the production of biofuels in Malawi. Policy innovation systems for clean energy security. Working brief No 4. <https://www.yumpu.com/en/document/view/34369758/laws-and-policies-enabling-the-production-of-biofuels-in-pisces>. Last accessed 15.01.2014.
- Wee, H., Yang, W., Chou, C. and Padilan, M.V. (2012). Renewable energy supply chains, performance, application barriers, and strategies for further development. *Renewable and Sustainable Energy Reviews*, 16: 5451-5465.
- Winkelman, A.G. and Moore, M.R. (2011). Explaining the differential distribution of Clean Development Mechanism projects across host countries. *Energy Policy*, 39: 1132-1143.
- World Bank (2011). Strategic Environmental Assessment in Policy and Sector Reform: Conceptual Model and Operational Guidance. The International Bank for Reconstruction and Development / The World Bank. pp. 4.
- World Bank (2014a). GINI index. <http://data.worldbank.org/indicator/SI.POV.GINI>. Last accessed 11.05.2014.
- World Bank (2014b). Doing Business 2013: Smarter Regulations for Small and Medium-Size Enterprises. Washington, DC: World Bank Group. DOI: 10.1596/978-0-8213-9615-5. <http://www.doingbusiness.org/data/exploreeconomies/malawi/~//media/giawb/doing%20business/documents/profiles/country/MWI.pdf?ver=2>. Last accessed 16.05.2014.
- World Bank (2013). Africa's Pulse: An analysis of issues shaping Africa's economic future, Volume 8.
- Wüstenhagen, R. and Menichetti, W. (2012). Strategic choices for renewable energy investment: Conceptual framework and opportunities for further research. *Energy Policy*, 40:1-10.
- Yadoo, A and Cruickshank H, (2012). The role for low carbon electrification technologies in poverty reduction and climate change strategies: A focus on renewable energy mini-grids with case studies in Nepal, Peru and Kenya. *Energy Policy*, 42: 591-602.
- Yeoh, P. (2008). Is carbon finance the answer to climate control? *International Journal of Law and Management*, 50: 189-206.
- Yin, R.K. (2003). Case study research: Design and methods. SAGE. Thousand Oaks.
- Yunna, W. and Quanzhi, C. (2010). The demonstration of additionality in small-scale hydropower CDM project. *Renewable Energy*, 36(10): 2663-2666.
- Zadek, S. (2011). Beyond climate finance: from accountability to productivity in addressing the climate challenge, *Climate Policy*, 11: 1058-1068.
- Zalengera, C., Blanchard, R. and Eames, P. (2012). Sustainable Livelihood Approach to Renewable Energy Technology Development- Experiences from Malawi. <http://www.ndr.mw:8080/xmlui/bitstream/handle/123456789/619/Sustainable%20Livelihood%20Approach%20to%20Renewable%20Energy%20Technology%20Development-%20Experiences%20from%20Malawi.pdf?sequence=1>. Last accessed 23.03.2014.
- Zalengera, C., Blanchard, R.E., Eames, P.C., Juma, A.M., Chitawo, M.L., Gondwe, K.T. (2014). Overview of the Malawi energy situation and A PESTLE analysis for sustainable development of renewable energy. *Renewable and Sustainable Energy Reviews*, 38: 335-347.
- Zerriffi, H. (2011). Innovative business models for the scale-up of energy access efforts for the poorest. *Current Opinion in Environmental Sustainability*, 3: 272-278.
- Zhang, X., Ruoshui, W., Molin, H. and Martinot, E. (2010). A study of the role played by renewable energies in China's sustainable energy supply. *Energy*, 35: 4392-4399.
- Zhao, Z., Zuo, J., Fan, L. and Zillante, G. (2011). Impacts of renewable energy regulations on the structure of power generation in China- A critical analysis. *Renewable Energy*, 36: 24-30.
- Zulu, L.C. (2010). The forbidden fuel: Charcoal, urban woodfuel demand and supply dynamics, community forest management and woodfuel policy in Malawi. *Energy Policy*, 38: 3717-3730.