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What steps should Mozambique take ensure its Good Green Energy Practices?

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Table of Key words and Acronyms

AIPEX	Agency for the Promotion of Investment and Exports
ARENE	Electricity Regulatory Authority
CBDR	Common but Differentiated Responsibilities
CNELEC	The National Electricity Council
COP	Conference of the Parties
EDM	Electricidade de Moçambique
EU	European Union
FDI	Foreign Direct Investment
FRELIMO	Frente de Libertação de Moçambique
FUNAE	The Energy Fund
GDP	Gross Domestic Product
GHGs	Greenhouse Gas Emissions
IDA	International Development Association
IFIs	International Financial Institutions
IMF	International Monetary Fund
IMF	International Monetary Fund
LCEP	Least Cost Electrification Plan
LMDC	Like Minded Developing Countries
LNG	Liquified Natural Gas
MIREME	Ministry of Mineral Resources and Energy
NDCs	Nationally Determined Contributions
NES	National Electrification Strategy
NG	Natural Gas
PDNER	New and Renewable Energy Development Policy
PPPs	Public-Private Partnerships
REA	Renewable Energy Atlas of Mozambique
RENAMO	Resistência Nacional Moçambicana
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SOEs	State Owned Enterprises
VAT	Value added tax
VNR	Voluntary National Report

Introduction

The year 2030 will delimit a critical moment in human history. It will serve as a checkpoint for which humanity may reflect on the steps it has taken towards an arguably first-of-its-kind global commitment to achieve a common good. The 17 goals serving as the pillars for the 2030 Agenda set the benchmark for the development of various aspects of human life. Amongst them are those aimed at global action in curbing climate change. The drive to achieve sustainability in the area that most proportionality impacts climate change highlights the importance of understanding how to establish a legal system that supports these global objectives. To achieve this global commitment is no simple task, as the diversity of the states that have joined together is immense, and the challenges plentiful. In the context of Mozambique, this dissertation aims to review the country's performance in achieving good green energy practice, looking to the challenges it faces in achieving the very same and how to mitigate these challenges.

The next decade could be one of the most important for Mozambique's development of their energy sector. Mozambique is expected to follow the trend of African growth said to be the largest in the world in the near future, in terms of economy, population and energy demand. Additionally, the significant reserves of natural gas recently discovered are said to make Mozambique, at the very least, triple its economic growth.[1] With economic growth comes the necessity for greater access to energy, meaning that a huge part of Mozambique's future is based on the development of its energy sector.

Mozambique is the chosen case-study because of its huge potential in renewable energies coupled with the aforementioned rise in energy demand and economic growth. The fact that Mozambique is an extremely poor, developing nation that has the potential, but lacks the domestic capacity to develop renewable energy, makes it an ideal case for other developing states to follow. While other states may choose to differ in the method of implementation, it is pertinent to highlight the importance of the legal and institutional framework, as well as of foreign direct investment to the future of energy sustainability.

[1] Bas van Beek JM, "The Curse of Natural Gas in Mozambique" (*Down To Earth Magazine* January 10, 2019) <https://downtoearthmagazine.nl/the-curse-of-natural-gas-in-mozambique/>

This thesis will be organized into an analysis of the current global commitments to combatting climate change, as well as a three part analysis of Mozambique's energy sector. We will explore the country's policy objectives as it pertains to green energy practices as well as the institutional and legal frameworks supporting these objectives. The aim will be to critically evaluate the incentives and protections offered that shape the investment environment of the development of renewable energy. Looking to identify and provide solutions to key challenges facing Mozambique's green energy future. Ultimately, this thesis will aim to answer: *What steps should Mozambique take ensure its Good Green Energy Practices?*

The first part will aim to answer the question of what is meant by good green energy practices. It will do so firstly by defining what is meant by climate change, before turning to the current global commitments at mitigating the issue, looking to some limitations in the application of climate change mitigation, particularly on developing states. The second part focuses specifically on the current state of Mozambique's institutional and investment legal frameworks. The goal is to highlight the legislative framework's limitations in achieving good green energy practices. The third part critically engages with three key challenges to Mozambique's achievement of good green energy practice. Namely (i) the Natural gas dilemma; (ii) FDI; and (iii) the institutional framework.

Conclusively, the thesis will argue that Mozambique's legal system has taken positive strides and is an overall good system to build on, but that the system still has gaps between policy and the legal framework that need to be filled. Furthermore, that the justifiable development of natural gas will provide a significant challenge in Mozambique's path to good green energy practice. This thesis will aim to provide recommendations on how Mozambique can work towards mitigating these challenges and closing legislative gaps through legal adaptations, to ensure good green energy practices.

Chapter 1 : Global Clean Energy Goals

To answer our research question, it is essential for us to establish an understanding of what we consider 'good green energy practice' and the criterion that countries must adhere to. To achieve this, we must explore the current global trends and commitments to climate change. We shall delve into the current international treaties that bind countries to these trends, beginning first with establishing a global definition of climate change, before moving to the efforts in mitigating this global issue.

1.1. A Global Definition of Climate Change

In 2015 at the United Nations Sustainable Development Summit, the UN general assembly adopted the '2030 Agenda', a global plan whose objective is to drive humanity forward through the development of several areas of life pivotal to human existence. The objective, separated into 17 individual goals known as the 'Sustainable Development Goals' or 'SDGs'. These goals were adopted with the mindset that ending poverty must go together with improving health and education, while revitalizing economic growth, and simultaneously reduce inequalities, tackling climate change and ensuring global land and sea protections[2]. A global effort that weighs the importance of each goal equally and aims to link the 17 goals together. The SDGs may still be subcategorized into different areas of development, such as economic development, social development, and the environment. Amongst those that form part of the environmental goals are most notably; SDG7 (Affordable and Clean Energy), and SDG13 (Climate Action).

We have witnessed and experienced the effects of the phenomenon known as 'climate change'. We understand this phenomenon to be the adverse effects of human activities causing events such as rising sea levels, extreme weather events, the destruction of landscapes and ultimately the cyclical effects the changes to our environment have on humans themselves[3]. In other words, our actions cause changes to our environment which is then reflected on the way we live and experience our lives.

[2] United Nations Department of Economic and Social Affairs, "The 17 Goals | Sustainable Development" (*United Nations*).

[3] United Nations, "Climate Action - United Nations Sustainable Development" (*United Nations*).

It can be argued that our climate changes naturally, however it has been proven that the human element is the most prominent factor of climate change.[4] Human activities produce greenhouse gases, namely carbon dioxide (CO^2) or methane gas, which when accumulated in the atmosphere, traps heat and ultimately changes the average temperature of our planet. The production of such gases is primarily a product of our sources of energy[5]; the burning of fossil fuels such as coal, oil and natural gas. As a result, the global temperature is predicted to rise to approximately 3.2 degrees Celsius by the end of the decade.[6]

The effects of climate change vary from impacts on human health, changes to our landscape (which impacts the production of food), extreme weather events, and greater human migration. As temperatures rise, the risks of extreme weather events, such as floods, droughts, and heat waves, will increase.[7] Consequently, these effects are creating a new category of refugees known as 'climate refugees', who are forced to relocate, in search of more favorable environmental conditions, in the hopes of guaranteeing food and environmental security. While these impacts are felt on a global level, it is important to highlight that the proportionality of these effects is not evenly distributed. Developing states are far more likely to experience the adverse effects of climate change than developed states. [8]

Mendelsohn, Dinar, and Williams provide supporting evidence to the claim that "poor countries will in fact bear the brunt of the net damages from climate change." The geographical location of poorer countries, and thus their naturally warmer climate, has proven to be a strong factor in determining the distribution of climate damages. When compared to wealthier countries, "will suffer little net effect from climate change and, in some scenarios, will actually get a small boost from warming."[9] The economic effects for developing states, who often rely on primary resources such as agriculture, will suffer immensely as export volumes diminish and thus the Gross Domestic Product ('GDP') of already poor states. The diminished GDP of developing states exasperates the situation further as mitigation for these effects becomes more

[4] European Commission, "Causes of Climate Change" (*Climate Action*).

[5] Ritchie H, Roser M and Rosado P, "Emissions by Sector" (Our World in DataMay 11, 2020).

[6] Gerald Meehl and others, 'Global Climate Projections Coordinating Lead Authors: Lead Authors' (2018).

[7] Clifford C, "Europe Will Count Natural Gas and Nuclear as Green Energy in Some Circumstances".

[8] European Parliament, "Policy Department Economic and Scientific Policy ... - European Parliament".

[9] Dinar A, Mandelsohn R and Williams L, "The Distributional Impact of Climate Change on Rich and Poor Countries. Environment and Development Economics".

challenging. Furthermore, poorer countries' contribution to climate change is minuscule in comparison to more developed countries.[10]

The African continent produces about one tenth of the greenhouse gas emissions ('GHGs') as the People's Republic of China and about half of the amount produced by the 27 European Union ('EU') countries.[11] Africa produces 1.33 billion metric tons ('Mt') of CO^2 emissions of the total 34.84 billion Mt produced on a global scale in 2020[12]. 62% of the global contribution of harmful GHGs originate from a handful of countries, namely China, the United States, the European Union 27, India and the Russian Federation. [13] Since the global energy recovery following the Covid-19 Pandemic, "China's CO^2 emissions increased by 750 Mt over the two-year period between 2019 and 2021. The emissions increase in China more than offset the aggregate decline in the rest of the world of 570 Mt between 2019 and 2021." [14]

What the picture above illustrates, is that a handful of global polluters in the global north contribute the vast majority of the GHG emissions and therefore to climate change, while simultaneously being those that, per GDP, bear the least damage. This brings us to an important question, who ought to act to mitigate climate change and what should the distribution be?

1.2 International Efforts in Climate Mitigation

We can define climate mitigation as "reducing climate change by reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat or transport) or enhancing the "sinks" that accumulate and store these gases (such as the oceans, forests and soil)."[15] The goal being to "stabilize greenhouse gas levels in a timeframe sufficient to allow ecosystems to

[10] Ritchie H, Roser M and Rosado P, "CO_2 and Greenhouse Gas Emissions" (*Our World in Data*May 11, 2020).

[11] Ritchie Et. Al.

[12] For reference, the year 2020 was selected as the most recent because of the global curb of emissions arising from Coronavirus pandemic. Arguably, the impact of the lockdowns proved the potential positive effects drastic change can contribute but was ultimately an uncommon and unexpected event.

[13] United States Environmental Protection Agency (*EPA*).

[14] IEA, "Global Energy Review: CO2 Emissions in 2021 – Analysis" (*IEA*).

[15] NASA, "Climate Change Adaptation and Mitigation" (*NASA*July 18, 2022).

adapt naturally to climate change, ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner"[16].

According to the data collected by Ritchie and Roser, the Energy sector is responsible for 73.2% of the world's GHG emissions.[17] The next largest contributor is the Agricultural, Forestry and Land Use sector. While a diversified approach to curbing GHG emissions is important, the data suggests that our Energy emissions are those that require the largest investment in alterations and mitigation. How can the Energy sector reduce it GHG emissions? One answer lies in 'Energy Efficiency', which is understood as how much energy we require to perform the same tasks.[18] Another answer would be in eliminating GHG emissions at the source, in other words the elimination of the burning of fossil fuels for more sustainable sources of energy.

Since the industrial revolution, the burning of fossil fuels has been the dominant form of energy sourcing. While energy efficiency will help curb the demand for energy and thus fossil fuels, it is arguably far more important to source energy from resources that produce little to no GHG. We can define these resources as "clean energy".[19] Clean energy resources that fulfil the criteria are notably, solar, wind, hydro, nuclear, bioenergy, and hydrogen. The technologies associated with these sources of energy are also known as "Renewable Energy", whereby the energy that is generated is from natural processes that are continuously replenished.[20] Therefore, in terms of climate mitigation, renewables, that never diminish and are the least harmful for the environment, are an extremely viable option to reduce GHG emissions and thus curb global warming and its adverse impacts. The question arises as to how the international community has gone about committing to the development of cleaner sources of energy?

As an evidently global issue, climate mitigation should be sought by all in the hopes of achieving lasting sustainable solutions to the climate emergency. Yet, as has been demonstrated

[16] IPCC, "Summary for Policymakers - Intergovernmental Panel on Climate Change".

[17] Ritchie Et. Al.

[18] Environmental and Energy Study Institute (EESI), "Energy Efficiency" (*EESI*).

[19] TWI Global, "What Is Clean Energy? How Does It Work? Why Is It so Important?" (*TWI*).

[20] United Nations, "What Is Renewable Energy?" (*United Nations*).

in this chapter, the cause and effect of climate change is felt disproportionately. This presents a significant challenge for states to determine the distribution of the mitigating actions that each country requires.

On the 4th of November 2016 the Paris Agreement ('the Agreement') came into force, where 196 UN member states became signatories and committed to significant reductions in GHG emissions with the goal of, as stated in Article 2 of the Agreement, to "limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels."[21] Perhaps the Agreement's greatest strength is that it acts as a legally binding document that is truly multilateral. The 196 signatories exemplify the global commitment to curbing climate change. However, considering the discussion regarding disproportionate climate mitigation, can we consider the Articles of the Agreement as fairly distributed amongst its signatories?

The negotiations carried out at the 21st Conference of the Parties ('COP 21') were predominantly led by debates between developed countries like the United States and the like-minded developing countries (LMDC). The LMDC held a powerful position in that they represented 50% of the world's population and 70% of the world's poor population. Arguably the most important debate had by the two polar powers, was the debate on differentiation, "with the principles of equity and common but differentiated responsibilities (CBDR) and respective capabilities"[22] of each of the parties. This was ultimately reflected in Article 2.2[23] of the Agreement and repeated throughout the Articles. With reference to mitigation of climate change, Article 4 of the Agreement reflects the CBDR principles through a binding commitment that all parties produce nationally determined contributions or NDCs that are achieved via domestic measures implemented by each member state.

The NDCs operate on a 5-year cycle, with each submission requiring the member state to pursue more ambitious national goals at the conclusion of each cycle and the publication of

[21] The Paris Agreement – Article 2.

[22] Raman M, "Climate Change Battles in Paris: An Analysis of the Paris COP21 and the Paris Agreement" (*The South Centre*).

[23] Article 2.2 of the Paris Agreement: "This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."

the next round of NDCs. The CBDR principle is reflected in the NDCs in that it was determined that developed countries should take the lead on climate mitigation actions. Developed states should implement "absolute economy-wide reduction targets, while developing countries should continue enhancing their mitigation efforts, and are encouraged to move toward economy-wide targets over time, in the light of different national circumstances."[24] The idea that respect for developing countries "national circumstances" must be maintained is paramount to determining fair distribution of action to be taken by the different states.

In this thesis, we aim to explore how the Agreement, considering the SDGs, is being applied in practice for developing states. Looking to the case of Mozambique, we will discuss the country's performance in transition to the use of renewable energy and the curbing of GHG emissions, by examining its legal and institutional framework for the energy sector, keeping in mind their global commitments to good green energy practice.

Chapter 2: Mozambique's Road to Its Commitments to Good Green Energy Practice

The Republic of Mozambique is a relatively young state that offers us a perfect opportunity to examine the application of the 2030 Agenda in the developing world. In reviewing its good green energy practice, we must first look to Mozambique's road to these practices, from independence to modern policy and law. By looking to Mozambique's past we may present a clear picture of some of the economic and legislative challenges the energy sector faces.

2.1 1970-1990

Mozambique's path to its modern-day energy and electrification policies has seen significant changes since achieving its sovereignty from Portugal[25] in 1975. Like other countries in the sub-Saharan region, Mozambique was a state-run, oil dependent nation. Influenced by the strong support of the Soviet Union, adopted a governing regime similar to that which several other newly independent African states had already implemented, a communist regime. This regime implied the nationalization of all sectors of the economy and

[24] The Paris Agreement – Article 4.

[25] UCA, "Portuguese Mozambique (1951-1975)" (*Political Science*).

place them under state-rule.[26] Private ownership of businesses and shares were nationalized, ushering in the domination of State-Owned Enterprises (SOEs). This included the nationalization of the energy sector. As a newly independent state, Mozambique was faced with the challenge of providing essential needs for the population, while also fighting a civil war[27] that broke out between the governing independence party FRELIMO and the Mozambican National Resistance (RENAMO).[28]

Non-traditional security risks like that of food, water, healthcare, and energy demands were all sources of political and economic turmoil. Mozambique took to answering the question of energy and electrification demands by ultimately limiting the amount of change made to the energy policies. This meant the country was to continue to rely heavily on the use of oil and its associated products to fuel energy demands. The dependence on oil was largely a result of the legacies of previously established policies made during colonial rule. Oil was a universal commodity and had been since its commercial rise during the Second World War. In addition, with the political and economic issues the government was facing, keeping the dependence on oil was unlikely to change soon. However, this mindset was to be short lived.

The evolution of Mozambique's energy sector was significantly defined by the events of the 1970s and 1980s. The oil crisis in the 1970s[29] made it abundantly clear how oil dependent countries are highly vulnerable to the risks of shocks and sudden changes in the supply of the fuel. The economic risks that became reality in the 1970s, coupled with the huge dependency on oil at the time contributed to the global financial crash. The crash was heavily felt in sub-Saharan countries with relatively weak economies, like that of Mozambique, in comparison to the more developed oil dependent countries. This in turn forced weaker economies into debt. Indebted countries were subjected to pursue other sources of finance. For Mozambique this was to seek help from International Financial Institutions (IFIs).

During the 1980s and into the 1990s the country borrowed from the World Bank and from the International Monetary Fund (IMF) in the hopes of alleviating the economic debt. During the period of the 1970s-1990s the increases in demand for power were often met with a

[26] Newitt MD, *A History of Mozambique* (Indiana University Press 1997) Page 552.

[27] Momodu S, "The Mozambican Civil War (1977-1992) "(January 10, 2020).

[28] Newitt- Page 570.

[29] Energy Education, "Oil Crisis of the 1970s" (*Oil crisis of the 1970s - Energy Education*).

lack of electrification to meet these demands. SOEs had subsequently incurred high costs with low operational efficiency to show for it. Fiscal woes were worsened by government subsidies to the SOEs. Furthermore, to avoid political unpopularity, the government held tariffs below cost-recovery levels, resulting in an even larger debt as tariffs failed to compensate for the subsidies given to the SOEs. By the 1990s the oil crisis coupled with the poor performance of SOEs, and their fiscal consequences had set the scene for a wave of market-oriented reforms.

Part of the drive towards electricity sector reform was the loan granting system developed by the IFIs. The early 1990s saw the World Bank and the IMF offering indebted countries conditional loans attached to structural adjustment requirements. The conditional loans were meant to encourage countries to move towards a western system of economy-wide liberalization, commercialization, and restructuring. Particularly, financing was being offered on the condition that states adopted the 'standard model' of reform that formed part of the structural adjustments programs strategy developed by IFIs.[30] As a result, many countries in the sub-Saharan region had committed to initiate reforms based on the 'standard model'. IFIs backed the 'standard model' because at the time it was believed to be the best form of establishing a sustainable power sector. The IFIs would provide immediate financial assistance for the tradeoff of a sustainable sector that could provide favorable conditions for sector growth.

2.2 The 'Standard Model' of Reform

Like other developing countries pressured into searching for alternate forms of finance during the 1990s, Mozambique took to adopting a loose set of reform rules that were coined as the 'standard model' of reform of the energy sector, in the hopes of securing loans from IFIs. Primarily, the reforms had several objectives that ultimately aimed to promote sustainability and market access. According to the African Development Bank, an African institution whose mission is to mobilize resources for the continent's economic and social development, the objectives were to increase sector efficiency, attract private investment, and improve the sustainability and viability of the electricity sector.[31] As a result, the standard model reform packages were designed to open the possibility of private, market-based investment and

[30] Welch C and Oringer J, "Structural Adjustment Programs" (*Institute for Policy Studies* May 7, 2014) .

[31] Association of Power Utilities of Africa and African Development Bank, "Revisiting Reforms in the Power Sector in Africa", Page 7.

commercial operation in state-owned utilities. With the introduction of private investment, the new model's goal was to ease the burden on the state and facilitate the development and operationality of the energy sector. Mozambique's approach was to adopt the Electricity Law of 1997,[32] which served to establish the legal framework to "vertical disintegration of the sector and the introduction of private investment and competition"[33] through concessions by the Government.

The standard model of reform is not without its potential challenges to Mozambique. The reform method is based on the goals set by IFIs. This means that Mozambique partly defers their own economic development planning to the international institutions. As a developing country, the negative impact of the standard reform system is that the country becomes subject to the will of the IFIs who are sourcing the funding Mozambique desperately needs. It is therefore possible to have conflicting development objectives between the IFIs and the Government that is essentially ignored by IFIs in a take-it or leave-it system. Either Mozambique complies with IFI instructions, or they risk losing international support. However, in weighing the options of full economic independence versus international involvement, it seems that Mozambique is left without a choice. The historical poor performance of the economy and in particular the electricity sector, governed by a vertically bundled system, has pushed Mozambique into the standard model, and the influences of international investment. The country stands to benefit far more from legal and structural change than to rely on an outdated economic system.

As stated above, the standard model was a loose set of reform rules, this meant that the means to reform was often adapted in various ways depending on the state. The adaptations however were not entirely open-ended and followed a broad structural approach known as the 'four pillars' of the standard model. The four pillars of the standard model were a necessity for any electricity supply industry to move from a vertically integrated utility to a liberalized power market. The four pillars that supported power market liberalization entailed a restructuring of the incumbent utility, creating an independent regulatory entity, introducing private sector ownership, and opening competition where relevant.[34]

[32] *'Electricity Law'* Law 21/1997 of 1st October.

[33] UNCTAD, "Investment Policy Review of Mozambique" (2012) Page 56.

[34] African Development Bank and Association of Power Utilities of Africa, Page 18.

The regulatory body should be an independent entity that is tasked with the oversight and decision making of the energy sector. The restructuring element consists of a movement along a spectrum towards a full vertical and horizontal unbundling of the power sector. A typical starting point in the 1990s was a vertically integrated national monopoly utility. The ideal objective of restructuring would be a fully restructured sector that is vertically and horizontally unbundled in the areas of power generation, transmission, and distribution. Creating multiple companies operating in parallel within the market. This process and subsequent market structure would serve to create a liberal competitive market. The depth of private sector participation is largely dependent upon the market structure and the legal rules applicable to investor protections.

Competition will be dependent on the number of participants within the market structure. Increasing participants will increase competition, subsequently promoting innovation and efficiency, while also lowering overall consumer costs. Initially, the success of these four pillars was assessed solely on the economic dimension of the power sector. This assessment has since developed to a performance evaluation based on security and quality of the energy supply, electrification, social inclusion, and environmental sustainability. The final outcomes of reform were changed to fit a new definition of ideal reform. Market liberalization coupled with more open competition would usher in efficiency of sector performance and 'cost recovery' investment incentives, including reasonable returns on investment and cost recovery in ongoing operations. Cost recovery incentives, with the help of efficiency in the sector could lead to least-cost investment in power generation, transmission, and distribution.

The modern ideal reform outcomes become an energy sector that is accessible, affordable, environmentally sustainable with security and quality of service. Theoretically, the standard model is an ideal means to transform the struggling power sector performances of developing countries like Mozambique. The significance to take from these reforms is the importance market liberalization makes to the performance of the power sector, more specifically how private investment greatly influences the ability to achieve these reformation goals. Where then does Mozambique's current legislative and institutional system stand in

relation to its energy sector and to the development of clean energy to improve its green practice?

Chapter 3: Mozambique's Current Energy Policies

Starting from those responsible for the energy sector, the chapter highlights all the relevant institutions tasked with policy building and the regulation of the energy sector. Identifying the responsibilities of each institution and how the legal framework structures and regulates the institutional system before examining the policies implemented by the previously mentioned institutions regarding the energy sector. To critically evaluate the legal framework, it is vital to understand the objectives of the institutions to compare to the actual laws in force to carry out those objectives. The chapter then explores the use of renewables and in particular solar energy as an essential aspect of energy policies and objectives going forward for Mozambique. Finally, the chapter examines the laws making up the investment legal framework to provide an accurate description of the current laws available that support the development of the renewable energy sector.

3.1 Important Sector Institutions

As a part of Mozambique's early attempts to follow the standard model of reform, the country not only took steps to unbundle the sector but to also establish new regulatory bodies tasked with taking charge of the development of the energy sector. The Ministry of Mineral Resources and Energy (MIREME),[35] established by Resolution 14/2015 of July 8, became the government entity that is responsible for planning of the energy strategy, overseeing policy making, the institutional and regulatory frameworks.[36] The Ministry's powers are as provided in Presidential Decree no. 11/2015 of 16 March. MIREME's specific role and responsibility in the sector include, the proposing and implementation of policy, promotion of an adequate legal and institutional framework, fostering the involvement of the private sector in the development of energy potential, promoting diversification of the energy mix, ensuring favorable conditions for investment and the sustainable development of electricity supply industry, proposing a legal framework for the development of new and renewable energy, promoting the use of new and

[35] MIREME, "Início" (*MIREME* April 22, 2022) .

[36] Associação Lusófona de Energias Renováveis, "Energias Renováveis Em Moçambique".

renewable energy, approving studies and projects for the exploitation and use of renewable energy, and license renewable energy activities and infrastructures.

The Electricity Law[37] of 1997 highlighted the need to establish an advisory and regulatory body to work alongside MIREME. The addition of a separate legal entity would open the possibility of safeguarding against government monopoly of the management of the energy sector. Initially, this role was undertaken by the National Electricity Council (CNELEC) but in May 2017 parliament promulgated Law 11/2017 determining the extinguishment of CNELEC and its replacement with a new institutional regulator known as the Electricity Regulatory Authority (ARENE).[38] The new public-law legal person was established to carry out the supervision, regulation, representation, control and sanctioning powers in relation to the production, transmission, distribution, and marketing of electricity.[39] The most significant aspects of ARENE's duties and areas of activities are the production, transmission, distribution and marketing of electricity generated by any energy source; protecting the rights and interests of consumers; and protecting the interests of the different players in the energy sector.

Post-independence in 1977, Decree-Law 38/77 of 27 August established the State-Owned Enterprise ('SOE') known as the '*Empresa Nacional de Electricidade'* that was tasked with the public operation of production, transmission, and distribution of electricity.[40] As part of the unbundling plan in the initial reforms, the SOE became *Electricidade de Moçambique E.P. (EDM)* through Decree 28/95 of 27 July. EDM took over all the prior responsibilities, making it the sole company in charge of electrification from the planning stage to the distribution methods. It was essentially a monopoly on electricity. In 2018, EDM launched their new strategy, wherein they highlight their fragility as an outdated operating model. The company remains the principal mechanism of the energy sector to carry out generation, transmission, and distribution of electricity, but highlights that the change needed to guarantee the success of the 2018-2028 strategy is the "substantial external investment" that is required.[41]

[37] *'Electricity Law'* Law 21/97 of 1st October *'as amended by'* Law 15/2011 of 10 August.

[38] *'ARENE Establishment'* Law 11/2017 of 1st October.

[39] ALER, Page 42.

[40] ALER, Pages 36-37.

[41] EDM '*EDM STRATEGY 2018 – 2028'* (*EDM - Electricidade de Moçambique,* 2018).

EDM reserves the power to lead overall project management but is subsequently opening access to the energy market.

While EDM acts as an electricity provider, the company's significance is evident in their role as principal development planner of national electrification. Although EDM is officially a company, in certain respects it acts as an institution. EDM, through its electrification plans, has the power to highlight the importance of the development of a particular kind of energy as the principal energy source for electrification. This means that EDM can significantly influence where the government takes steps to choose the source of energy and push in a direction for fossil fuels versus renewables.

The final institution that is influential on Mozambique's investment environment to highlight is the Energy Fund (FUNAE).[42] FUNAE "was created to promote the development, generation and use of several forms of energy at low cost to supply rural and urban areas inhabited by low-income households and to ensure a rational and sustainable management of energy resources."[43] FUNAE also acts as the main domestic financial source for any energy development projects. FUNAE works closely with EDM in the planning stage of energy development.

3.2 Policies and Goals

Overall, Mozambique's energy focus is already 79% centered around renewable energies, particularly Hydropower through the Cahora Bassa Dam. Despite this figure, the access to that energy rests at a lowly 44% in 2022.[44] Mozambique aims to rectify the issue of electricity access through a series of policy objectives. The Government of Mozambique, has since launched the *'Programa de Energia para Todos'* (National Energy for All Program or *ProEnergia*), with the aim of providing electricity to 10 million Mozambicans by 2024 and reaching an ambitious goal of 100% universal access by 2030.[45] The Energy for All program has identified a least cost electrification plan (LCEP), whose success will be dependent on the

[42] *'FUNAE Establishment'* Decree 24/97 of 22 July *'as amended by'* Decree 23/2002 of 16 October.

[43] ALER, Page 39.

[44] Energypedia, "Mozambique Energy Situation" (*energypedia*).

[45] EDM, "Projecto Energia Para Todos" (*EDM*).

"promotion of public-private investments in new infrastructures for power generation."[46] The 2030 plan analyzes geospatial and socioeconomic information on populations access to electricity to identify the most economically feasible (least cost) option to provide each consumer with access to electricity.[47] Identifying particularly the importance renewable energy will have to reach the 2030 electrification goals.

The Energy for All program stemmed from the National Electrification Strategy (NES).[48] The strategy focuses on diversification of electrification and increased energy access to low-income areas through a more densely interconnected grid via a system of mini grids.[49] The NES created the necessary environment for the launching of the renewable energy auction system or PROLER, which allows for the promotion of private sector participation in renewable energy projects in Mozambique, through a transparent and competitive public tender process.

The NES and Energy for All program were preceded by the Government approval, in 2018, of the Integrated Master Plan for Electrical Infrastructure 2018-2043.[50] The Integrated Master Plan defines the needs and the investment priorities for the development of the electricity system that will have to accompany the expected growth in demand over the next 25 years. The plan forecasts a growth on electricity demand in 2043 from 3908 GWh to 35444 GWh and a growth in maximum installed capacity from 655 MW to 5950 MW. With a close cooperation with FUNAE, EDM plans to increase the number of electrified households from 1.3 million in 2017 to 4.6 million by 2043.[51] A key element of the Integrated Master Plan is that 20% of the national energy mix will derive from renewable energy as a low-cost solution in line with the 2030 plan.

Together with the Integrated Master Plan EDM developed and published the EDM Strategy 2018-2030. The EDM Strategy focuses on the need to integrate renewables with the national grid and, at the same time, develop commercial off-grid systems for remote areas[52]. The strategy solidifies EDM's position within the future of Mozambique's energy sector as its

[46] Proler, "Novas Energias".

[47] Dhruva Sahai, 'Renewable Energy-Based Geospatial Least-Cost Electrification Planning Context Why Geospatial Planning Can Be Particularly Effective for Electrification in Archipelagos Indonesia' (2013).

[48] MIREME, "Estratégia Nacional De Electrificação (ENE)" (October 26, 2017).

[49] MIREME, "Estratégia Nacional De Electrificação (ENE)" (October 26, 2017).

[50] EDM, "Integrated Master Plan 2018-2043" (*EDM*November 2018).

[51] EDM, "Integrated Master Plan 2018-2043" (*EDM*November 2018).

[52] EDM, Page 18.

principal institution in implementing energy projects and expanding the distribution of energy within the national gird and abroad. The strategy is built upon three key points; the contribution towards the acceleration of universal access; helping Mozambique to become a regional energy hub; and ensuring the development of a sustainable Mozambican workforce in the sector.

The policy plans and objectives that the major role players in Mozambique's energy sector have implemented all have an underlying theme. Universal access by 2030, in line with SDG7, in electricity will stem from a least cost investment. This is achievable though the development of Mozambique's renewable energy potential and the development of a hybrid solution of off grid and on grid systems that will provide access to that energy.

3.3 Renewable Energy as the Future

From 2011 to 2013, MIREME and FUNAE worked collaboratively to conduct a study on Mozambique's renewable energy potential. The study explored the potential of solar, hydro, wind, geothermal and maritime resources. Ultimately, the Renewable Energy Atlas of Mozambique (REA) was published as the leading reference to all renewable potential in the country.[53] The REA highlights in detail, the key areas for development in Mozambique's renewable energy sector. With the work done by FUNAE and MIREME, it is concluded that Mozambique's renewable energy potential rests at approximately 23,000 GW. The potential of solar energy far outperforms all other sources of renewable energy. The most abundant energy source is solar (23,000 GW) followed by hydro (19 GW), wind (5 GW), biomass (2 GW) and finally, geothermal (0.1 GW).

Despite the evident potential of solar power, Mozambique has advanced with the development of hydro-electric projects along with solar energy. Mozambique's current energy consumption and export is dominated by hydropower.[54] As a result, the country is investing in further development of this established renewable source of energy. Recently Mozambique has approved the Mphanda Nkuwa hydro-electric project in the province of Tete just 60kms from

[53] Ministerio de Energia, "Renewable Energy Atlas Mozambique".

[54] Andritz Group, "Mozambique - Power-up Growth" (*Hydropower in Mozambique - Hydro News Africa - ANDRITZ HYDRO*).

the Cahora Bassa Dam.[55] The project is expected to produce another 1,500 MW of electricity both for domestic consumption and for the much-needed export to the South African Power Pool.[56] The term 'much-needed' is used here as an indication of the strong economic potential Mozambique holds in the development of energy for export, solidifying Mozambique's position as an energy hub for the region, especially for renewable energy. Mozambique further aims to expand the generation capacity of Cahora Bassa by another 1,245 MW, as part of the country's clean energy plans to meet increasing electricity demand and their 2030 universal electrification goals.

While hydro-electric sources currently dominate the energy mix of Mozambique, the Government's Renewable Energy strategy reflects how Mozambique is reacting to the studies conducted on solar energy potential. Various projects have already been adopted as part of the Renewable Energy strategy. The strategy is split into small-scale and large-scale projects centered around the goals set by the *ProEnergia* program. "Small-scale solar projects were divided into four groups, according to size and type of use: (i) Pico Solar Systems (solar torches and batteries); (ii) Solar Home Systems; (iii) Solar Water Heating Systems; and (iv) Water Pumping Solar Systems".[57] The large-scale projects took the form of five solar energy plants; Metoro, Mocuba, Dondo, Chimuara, and Cuamba situated across the north and center of the country respectively.

The REA goes further and explores how Solar energy can greatly improve electrification grids and assist in reaching Mozambique's policy goals of universal access by 2030.

Most of the population lives in rural areas. At times houses can be separated by over a kilometer in some villages. The cost of constructing powerlines to each individual home in a rural village is not-cost effective, especially since prices for electricity must be held below the cost of distribution to compensate for the lower buying power of the rural population. Solar energy projects, like that of mini-grids, off-grid, or solar-home allow for the cost-effective

[55] African Development Bank Group, "Mozambique: African Development Bank to Serve as Advisor for Development of 1500 MW Mphanda Nkuwa Hydropower Project" (*African Development Bank - Building today, a better Africa tomorrow* May 26, 2022).

[56] SAPP, "About SAPP" (*About SAPP | Southern African Power Pool*).

[57] Ibid. Page 103.

distribution of electricity. These solar projects are cheaper to develop, can reach 'off-grid' villages, and provide electricity for every home connected to the solar energy output in its area of operations. This alleviates some pressure from EDM and the national grid, while simultaneously improving the energy access rate for the country. As a result, solar energy projects provide a substantial and cost-effective means for Mozambique to reach its universal access goal by 2030.

Alongside its vast potential, solar energy has both environmental and financial benefits to consumers and investors. Solar energy is cost efficient, reliable, and is growing rapidly.[58] Mozambique is likely to benefit from a leakage of positive social and environmental consequences, as solar uses less water, noise, air, and waste pollution in comparison to fossil fuels. Less environmental harm would help guarantee the security of access to clean water and the enjoyment of the environment. The subsequent healthcare implications of a sustainable environment would greatly benefit a population that struggles with access to healthcare services. To add to this, energy access is essential to economic development. Greater access to energy leads to the improvement of the quality of the education system and of essential services. This in turn facilitates the development of infrastructure throughout the country. Which will positively affect the growth of the industrial and agricultural sectors.

The benefits of solar energy to the specific case of Mozambique goes beyond those described in the preceding paragraph. What is arguably a more crucial development is the change in benefits that fall to investors, or to be more accurate, the increase in investor benefits. The development of solar technology has made the energy source more easily accessible and fiscally incentivizing. Solar has become a rapidly growing, low-cost investment that holds good long-term cash-flow at low costs and is a socially responsible investment.[59] The rapid changes to the industry has made solar energy a popular investment for both sides. The development of solar energy is Mozambique's best opportunity to pursue their electrification goals whilst complying with their commitment to SDG7 and SDG13.

What the REA as well as the current trends in terms of policy is concerned, is that Mozambique has invested heavily in the development of their vast renewable energy potential.

[58] New Energy Solar, '*Why solar'* (New Energy Solar, 2019).

[59] New Energy Solar, '*Investment opportunity*' (New Energy Solar, 2019).

From both an environmental and an economic standpoint, renewable energy is viewed as a key driver towards the long-term energy goals of the country.

From a legal standpoint, the government has developed and recently published two pieces of legislation aimed at providing a more enabling environment for the development of renewable energy potential in Mozambique. The first of which is the Regulation for Energy Access in Off-grid Areas[60] (Decree nº 93/2021 of the 10th of December). The Off-grid Regulation was adopted with the hopes of increasing transparency for the private sector in the implementation of Off-grid electrification projects, thus increasing attractiveness for private investment. The Off-grid Regulation highlights two key themes for Mozambique's renewable energy future. The first being Mozambique's determination to follow suit with their policy objectives in that facilitating the development of renewables should expedite the production of renewable energy for both domestic use and socio-economic development. The second theme highlighted here is that Mozambique recognizes the need to attract the private sector. Mozambique is creating an attractive investment environment for the private sector, highlighting their own institutional struggles to develop Off-grid projects without the involvement of the private sector.

The second legislative piece is the new Electricity Law (Law no 12/2022 of the 11th of July). The new Electricity Law is more of an update to the Electricity Law of 1997 which aims to "reflect the current social, technical and financial dynamics" of Mozambique as well as "to the objectives of sustainable development, energy transition consistent with the Country's reality and universal access to quality, efficient and reliable energy, taking advantage of all energy sources, with emphasis on renewable energy sources and the reduction of the use of fossil sources"[61]. There is once again an emphasis on enabling private sector involvement primarily by creating better conditions for private investors to enter the electricity market through concessions. The new Electricity Law has taken over as the principal source for the regulation of the power sector including all "activities related to production, distribution, transmission, consumption, and storage of electricity, export and import."[62] The new Electricity Law is a positive step made by Mozambique in that the law is acting as an enabling instrument

[60] '*Regulation for Off-grid Areas'* Decree nº 93/2021 of the 10th of December.

[61] '*Electricity Law'* Law no 12/2022 of the 11th of July.

[62] Energypedia, "Policy Framework and Energy Access Strategies in Mozambique" (*energypedia*).

to apply policy. That is of investing and furthering renewables, creating a transparent and more attractive legal environment, to develop energy projects, thus assisting in achieving the 2030 universal access goal.

3.4 Mozambique's objectives in light of the Sustainable Development Goals

In 2020 Mozambique published its first and only Voluntary National Report ('VNR') to date. The purpose of such a report is to "present a snapshot of where the country stands in the implementation of the Sustainable Development Goals"[63] However, more than a simple snapshot the VNR is providing an in-depth perspective on Mozambique's performance and priorities regarding the SDGs. As such the report is well-documented and provides an extremely accurate picture as to Mozambique's adherence to the 2030 agenda and serves as a strong source for our analysis on the country's green energy practices. In reviewing the document, it becomes paramount to highlight the reporting made on SDG7 and SDG13 SDG goals.

The VNR touches upon the previously mentioned '*ProEnergia*' plan and the subsequent benefits, particularly in reliving the dependence on harmful sources of energy (coal and firewood) for everyday activities of the population. What is key in Mozambique's performance index with relation to SDG7, is that Mozambique "contributes strongly to the goal of renewable energy participation in the global energy matrix, being one of the largest producers of renewable energy in the SADC region."[64] Mozambique seems to be making encouraging steps in terms of policy and renewable energy generation.

Regarding Mozambique's performance as it relates to SDG13, in other words its contributions to climate change, Mozambique's contributions are relatively insignificant. According to the United Nations Development Programme, Mozambique currently contributes 0.22% of the world's total GHG emissions.[65] "Low levels of industrialization results in low levels of greenhouse gas emissions from the industry, transport and energy sector."[66] Mozambique's impacts are not toward climate change but rather from climate change. The

[63] United Nations, "VNR Report - Mozambique".

[64] VNR Report - Mozambique, page 46.

[65] "Mozambique" (*UNDP Climate Promise*).

[66] VNR Report – Mozambique, page 58.

country is ranked as the 154th highest of total of 181 countries, as well as 3rd amongst African countries, at-risk to suffer from the effects of climate change.

In recent years, Mozambique has been hit by climate-related hazards such as droughts, floods and particularly by cyclones. Measuring just from 2019 to 2022 four cyclones hit landfall in Mozambique, Idai in March 2019; Kenneth in April 2019; Eloise in January 2021 and, most recently; Gombe in March 2022.[67] As a result, Mozambique has placed significant importance to climate mitigation and adaptation over prevention. The Mozambican Government has implemented various climate mitigation plans and policies. Most notably, the National Strategy for Climate Change Adaptation and Mitigation (2013- 2025); Disaster Risk Reduction Master Plan (2017 - 2030); and the Action Plan for Gender, Environment and Climate Change.

What the SDG7 and SDG13 trends have illustrated is not only is Mozambique an exceptionally minor contributor to GHG emissions it is also a leading producer in renewable energy for the SADC region and has plans to expand the production of renewables for local and international consumption. However, it should be noted that it is still unclear if the country will achieve universal access to electricity by 2030, and that electricity will stem solely from renewable sources.

From a social standpoint, it has also become evident that society has highlighted that the SDGs related to economic development are the priority. Civil society takes the view that "Quality Health", "Quality Education", "Drinking Water and Sanitation", "Ending Poverty", "Ending Hunger", "Peace, Justice and Effective Institutions" and "Decent Work and Economic Growth" are the SDGs with potentially more dynamic and multiplier effects in the current context of Mozambique."[68] This opens the door to an interesting discussion of potential justifications for the development of environmentally harmful energy practices in order to meet the economic and social demands for development in the other SDGs. With current developments of natural gas as a potential source of energy there is likely to cause conflict with Mozambique's green energy practice.

[67] UNHCR, "Mozambique: Protection Cluster - Factsheet on Climate Related Displacement - April 2022 - Mozambique" (May 4, 2022)

[68] VNR Report – Mozambique, Page 18.

Overall, the signs are positive, with minor contributions to GHG emissions along with the potential for renewable energy, the policy objectives to implement mini-grid and off-grid solar projects, and the potential to become the renewable energy hub for the southern African region, has positioned Mozambique perfectly to take increasingly encouraging steps towards good green energy practice. However, this thesis argues that Mozambique is faced with three key challenges in its path to good green energy practice.

Chapter 4: Addressing the challenges to Mozambique's Good Green Energy Practice

The key challenges facing Mozambique's good green energy practice have been touched upon throughout the thesis. While there certainly are other challenges, here this thesis identifies what we believe are the most prominent challenges and what steps Mozambique ought to take to ensure good green energy practice.

The first challenge Mozambique faces is regarding natural gas ('NG') and the opportunity it provides for the country to benefit from its development economically. The issue concerning NG is the seemingly unjustifiable notion that Mozambique must not develop natural gas, thus slowing potential economic growth and development, so that there are no potentially harmful impacts on the environment.

The second challenge being that Mozambique as a relatively poor developing state, is significantly dependent on external financing or foreign direct investment ('FDI') for the development of renewable energy. Mozambique's legislation needs to be enabling and investor friendly to allow FDI to thrive and subsequently renewable investment projects.

The third being, to support the investment environment, it is imperative that the institutional system that overlooks the energy sector is unhampering to the development of renewable energy. This introduces as a final key challenge to Mozambique's path to good green energy practice is its current institutional framework. Like that of investment, the institutional framework must provide a supportive system on which the development of renewable energy can flourish.

4.1 The Natural Gas Dilemma

4.1.1 Current Natural Gas Markets

Perhaps one of the most impactful situations of the 21st century occurred on the 24th of February 2022, when the Russian Federation invaded the Ukraine, sending shockwaves throughout the world and on the global energy markets. Russia's invasion of the Ukraine led to a global response to curb Russian economic power through sanctions, including on the use of Russian natural gas exports, particularly to its most valued trade partner, the EU. In a swift response to war in Europe the EU published the RePowerEU plan, which aims to mitigate the political tension caused by the conflict.[69] Part of the objectives of the RePowerEU is to diversify the sources of import of NG to reduce European dependency on Russian gas.

The Russo-Ukraine war came shortly after the economic recovery from the global pandemic of COVID-19. As global economies looked to bounce back as pandemic restrictions loosened it was quickly felt that energy supply was below the resurging energy demand. Several factors contributed to a global energy supply crunch, which when coupled with the effects of the Russian invasion, created a perfect storm for the rise of electricity price amongst NG importers, especially the EU. This presents Mozambique with a great opportunity to fulfil the gap created by the global supply crunch and answer the EU's call for new sources of NG. However, is NG too risky an investment when considering the global drive toward renewable energies and the ultimate phasing out of fossil fuels?

A key issue surrounding NG became evident when the EU Parliament supported the EU commission's proposal to label Natural Gas and Nuclear energy as "green". The principle being that NG is used as a transition energy towards renewables since NG is a less harmful fossil fuel than coal or crude oil. This opens the NG markets to countless possibilities over the medium-term as the demand for gas should rise as countries attempt to phase out coal and take steps towards renewables. However, this new sustainable investment legislation proposed by the EU has been met with significant criticism, arguing that the new legislation is prolonging the life of fossil fuels when the world should be looking to prioritize renewable energy only.

[69] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2021/241 as regards REPowerEU chapters in recovery and resilience plans and amending Regulation (EU) 2021/1060 , Regulation (EU) 2021/2115, Directive 2003/87/EC and Decision (EU) 2015/1814 2022.

What the passing of the European legislation has created is an incredible amount of uncertainty for the global market and particularly for Mozambique. The world's largest importer of NG has taken steps to include, albeit in a somewhat limited sense, NG in the EU Taxonomy, sending signals to the world that the idea of using NG as a transition energy is a reality. However, it is unclear how in practice the new legislation will be met and whether NG will take center stage as the transition energy in the medium-term. According to McKinsey's Global Gas Outlook report, NG is demand is set to rise until the year 2050, growing by 3.4% per year to 2035 and 0.5% to 2050 with "more than 200 million metric tons of new capacity required by 2050."[70] This should bring some ease to Mozambique's commitment to NG if this expected demand rise until 2050 is maintained.

4.1.2 Mozambique's Natural Gas Potential and Plans

The first discovery of NG in Mozambique came in 1961 in Inhambane province, which in 2004 saw the first commercial development in the Mozambique – South Africa Temane Central Facility and Pande gas lines. Sasol, an energy company from South Africa, in collaboration with the Mozambican government spearheaded the only NG projects in the country.[71] The overall production and export of Mozambican gas was a relatively small part of the country's Gross Domestic Product ('GDP'), with a value of 1.4 billion USD, as it was often pegged that the export of coal would be the center for the development for Mozambique's economy. However, in 2014 Mozambique experienced a rapid expansion of its natural gas reserves following a discovery in areas 1 and 4 of the Rovuma Basin raising the reserves to one hundred trillion cubic feet (tcf).[72] This places Mozambique as the holder of the 14th largest natural gas reserves globally and third on the African continent. As a result of these discoveries Mozambique bore witness to massive investments to explore, develop and export NG.

Most notably, in Area 1, the French energy company Total aims to build up to six Liquified Natural Gas ('LNG') plants, with the first two already surpassing a final investment decision in 2019 worth 23 billion USD. In Area 4, the Coral Sul floating LNG project which is expected to rake in approximately 19 billion USD in government revenues over the next 25 years. In terms of valuation as it pertains to Mozambique's GDP it is clear the economic value

[70] McKinsey, 'Global Gas Outlook to 2050' (2021).

[71] Arsenio Mabote, 'Natural Gas Development in Mozambique'.

[72] US Energy Information Administration, 'International - U.S. Energy Information Administration (EIA)' (*www.eia.gov* July 2020).

these projects have. Mozambique's GDP currently stands at 14 billion USD, with public debt to that GDP standing at 128%[73]. It is expected that the "easing of the public debt burden over the longer term is solely dependent on LNG-generated revenues. If the revenues start flowing, the debt to GDP burden is projected to fall to 60.2 percent of GDP in 2029."[74]

The LNG projects are also an excellent opportunity for the development of national businesses in areas related to NG exploration. This includes training programs for young Mozambicans as well as "the installation for LNG (onshore), the construction and installation of sub-aquatic systems (offshore) and the construction of the Afungi aerodrome, and more business opportunities in the areas of information technology services, transport, health, catering and security."[75] These projects alone are set to propel Mozambique to a major NG exporter and serve as an opportunity for the country to greatly increase its GDP.

Mozambique has solidified its commitment to NG production as was evident at the 26th Conference of the Parties ('COP 26'). The declarations made by prime minister Carlos Agostinho Rosario are that Mozambique aims to prioritize "an energy transition program based on a diversified matrix, with cleaner and more environmentally friendly sources," and "reaching 62% of the contribution of renewable energies in the national energy matrix by 2030". However, Mr. Rosario also argues that "Mozambique prefers an energy transition to cleaner and more environmentally friendly energies that is gradual and phased, in order to minimize the impact on the process of economic development in our country".

According to the Natural Gas Master Plan published by the Mozambican Government, several areas of the Mozambican economy were highlighted as significantly underdeveloped, primarily the agricultural sector. when processed, "natural gas provides important raw materials for agro-industrial development, including the production of liquid fuels, petrochemicals and electricity."[76] The use of NG domestically is expected to substitute the import of petroleum products that the Mozambican economy is so heavily dependent on. This in fact is evident in the Petroleum Law's article 35 whereas 25% of the production of all petroleum and gas

[73] Trading Economics, 'Mozambique Government Debt to GDP | 1999-2019 Data | 2020-2021 Forecast | Historical' (*tradingeconomics.com*).

[74] John Muchira, 'Mozambique Is Walking an LNG Tightrope' (*www.worldfinance.com*17 August 2021).

[75] Pedro Ferreira, 'Oil and Gas in Mozambique: Opportunities for Busines' (*Cowork Lab*11 January 2022).

[76] Republic of Mozambique, 'Natural Gas Master Plan' (INP 2014).

production is reserved for the national market.[77] Not only will this benefit the Mozambican economy be reducing the reliance on imports and increasing agricultural productivity, but the global environmental impacts of reducing the dependence on more harmful petroleum products contributes to SDG13 and the reduction of GHG emissions.

4.1.3 The Challenge for Mozambique's Green Energy Practice

What we have illustrated thus far is that Mozambique has an unpresented opportunity to benefit from the development and export of NG. Becoming a NG exporter with projects valued at more than Mozambique's current GDP should propel said GDP to new heights. As a result, Mozambique can potentially benefit from the increase by reinvesting in socio-economic development, thus taking substantial steps towards meeting the SDGs. Yet, NG is a GHG emitting source of energy and to commit to its development is to consciously decide to take steps away from reducing the emissions of GHGs globally. The challenge posed for Mozambique is to not purse the development of NG and the subsequent economic and development benefits to pursue renewable sources of energy to solve all of Mozambique's energy and electrification demand issues.

This is perhaps the most significant challenge for Mozambique going forward as it seems that Mozambique is dedicated to utilizing NG as the transition energy towards good green energy practice. What we must consider however, is if Mozambique is justified within the scope of the SDGs to use NG as the transition energy?

The principle of a "gradual and phased transition" is one that has seemingly been adopted on a global scale. With some uncertainty the world's largest NG importer, the EU, has passed legislation confirming this principle. While this uncertainty exists regarding the future of NG, the Mozambican Government stands at a crossroads.

The Mozambican economy sits on a powder keg poised to revitalize the economy, increasing GDP, domestic development projects, education opportunities, reducing public debt, and assist in meeting the growing electricity demand. Furthermore, with Mozambique contributing 0.22% of the worlds GHG emissions it was identified that Mozambique seems to

[77] '*Petroleum Law'* Law no 21/2014 of 18 August, Article 35. 1

prioritize the SDGs related to economic and social development over the environment. This however does not mean that Mozambique has ignored SDGs 7 and 13. It is evident from Mozambique's policy objectives and recent legislation that the country is taking steps towards the development of renewable energy as both a short-term and long-term goal alongside the development of NG to contribute to the national energy mix.

Mozambique is a poor developing state that contributes a minuscule amount of the world's GHG emissions and is presented with an enormous opportunity to pull itself from one of the poorest countries in the world to an economic renaissance. On whether Mozambique is justified in pursing the development of NG, this thesis argues that Mozambique is justified in doing just that. Mozambique's long-term objectives are centered more around the development of its vast potential of renewables, and while maintaining a relatively small contribution to GHG emissions the country has opted to focus on SDGs related to economic and social development by investing in NG. While these are justifiable reasons to develop NG, this thesis further argues that NG remains a challenge to good green energy practice.

The ideal scenario would be for Mozambique to fully pursue the development of renewable energies. NG is a direct challenge to this because it will to an extent prolong the use of fossil fuels, albeit at a reduced level compared to coal. It is a challenge because it is an opportunity the Mozambican Government cannot ignore in its pursuit of the 17 SDGs. Therefore, it is essential to question until what point is NG meant to be used as a transition energy and what can Mozambique do to ensure that the country moves towards good green energy practice?

The principal danger regarding NG being that Mozambique's justification as a transition energy towards renewables fades as NG becomes a dominant source of energy domestically for Mozambique rather than renewable energy. The principle of a "energy transition" is justifiable when considering Mozambique's position regarding the Paris Agreement and their NDCs. However, as Mozambique begins to reap the rewards of the productions of NG over the next 25 years the country must be wary of becoming solely reliant on NG. A reliance on NG could mean policy objectives regarding renewables are not met and the energy mix becomes less diversified and more reliant on the fossil fuel producing energy source. Going back to the uncertainty surrounding NGs future, it might be that now a global supply crunch for energy is making the resource more economically incentivizing. At the same time, the global importers

of NG are determined to phase out fossil fuels and support the development of renewables gradually. This is to say that Mozambique must be wary of relying on NG as a long-term solution and rather capitalize on its current market value to support the development of long-term renewable energy goals as well as the development of other sectors of the Mozambican economy.

The National Gas Master Plan seems to tackle many of the issues surrounding NG and its impacts on the environment. Clearly defined policy objectives regarding domestic use, local development based on gas revenues, training and environmental protection are in place. Yet the master plan lacks any reference to the long-term phasing out of NG or contingencies for the high risk of global market prices of gas[78]. This gives the impression that Mozambique is 'all-in' on the production of NG without clearly identifying contingency plans if the development of NG is to fail. It is therefore highly recommended that Mozambique does not lose sight of renewable energy as the country's future. The Natural Gas Master Plan should be revised to include the phasing out and offsetting of NG. The country must be prepared to meet the declarations made by Carlos Agostinho de Rosario at COP26, of 62% of the energy matrix stemming from renewables by 2030, so that the Master Plan represents not a long-term plan but a transition from coal to renewables.

4.2 Foreign Direct Investment

4.2.1 The Investment Protection Framework

Mozambique's legal framework for investment is centered around three legal diplomas. Namely, the 'Investment Law'[79], the subsequent 'Regulations of the Investment Law'[80], and the Tax Benefits Code[81]. The Investment Law provides the legal basis for all investments, regardless of origin. This encompasses all guarantees and protections benefiting investors. The overarching law applies across all sectors of the economy, excluding petroleum products exploration and mining, but including the energy sector. However, due to the importance of the

[78] Republic of Mozambique, 'Natural Gas Master Plan' (INP 2014), page 22.

[79] *'Investment Law'* Law 3/93, of 24 June.

[80] *'Regulations of the Investment Law'* Decree 43/2009 of 21 August.

[81] '*Tax Benefits Code'* Law 4/2009 of 12th of January.

energy sector and of renewables, laws that substantiate the Investment Law were passed to help facilitate a more attractive investment environment.

Mozambique adopted a legal strategy that sought to couple the incentivization of the establishment of 'Public-Private Partnerships' (PPPs) and concessions for private sector participation in the energy sector. The laws governing PPPs are the Law 15/2011 of 10 August; Decree no 16/2012 of 4 July (PPP regulation - Large scale); Decree no 69/2013 of 20 December (PPP regulation - Small scale); Law 10/2003 of 11 April (promotion of competition).[82] While currently no laws exist governing PPPs relating to renewables, the New and Renewable Energy Development Policy (PDENR) infers interest in filling the legislative gap.[83] The legislation will assist PDENR in achieving its goals of using renewables to meet energy and sustainable development demands in Mozambique.

The second arm to the legal strategy falls under the licensing of renewable energy projects.[84] In accordance with the new Electricity Law, the state runs all electrical projects. However, the participation of the private sector is clearly allowed through a concession regime. Article 9 of the Electricity Law provides that production, transport, distribution, and trading of electricity by public or private entities is subject to a concession. "Concession contracts are used by public authorities to deliver services or construct infrastructure. Concessions involve a contractual arrangement between a public authority and an economic operator (the concession holder). The latter provides services or carries out works and is remunerated by being permitted to exploit the work or service". [85] Furthermore, 2.2a of the PPP law defines energy projects as a public private partnership. This means that all private sector involvement in electrical project development, including the development of renewable energy, requires state approval through concessions.[86]

[82] ALER, Pages 59-60.

[83] Resolution 62/2009 of 14 October.

[84] *'Electricity Law'* Law 12/2022 of the 11th of July.

[85] European Commission, 'Concession Contracts - Partnerships between the Public Sector and a Private Company' (*Mercato interno, industria, imprenditoria e PMI - European Commission*5 July 2016).

[86] '*Electricity Law'* Law 21/97 of 1st October – Article 16.

4.2.2 The Importance of FDI to Mozambique

Historically, Mozambique has had a generally positive interaction with FDI. The political and economic struggles described above highlighted some of the principal factors driving Mozambique towards seeking foreign investment as a steady source of finance. Mozambique's attempts at a vertically integrated system of control across its sectors led the country to debts it could not sustain on its own. Since the trend of reforms during the 1980s-1990s, Mozambique had seen successes in transitioning from a centrally planned economy to a more open market economy, attracting a considerable amount of FDI as a result. Mozambique serves as a model success story in it's almost unrivalled ability to attract such a heavy flow of FDI in such a short period of time as a less economically developed country coming out of a civil war. Mozambique was receiving $32 million in the early 1990s after its earliest economic reforms in the 1980s, but having that inflow increased fivefold to $179 million per annum from 1995-1999.

The next decade saw a slower pace increase in the first half of about $258 million per annum but then more than doubling that figure in the second half to $890 million by 2009.[87] Recently, Mozambique's inflow of FDI was greatly affected by political issues, mainly focused on corruption,[88] which in turn led the country into a financial crisis by the end of the first half of the decade. These issues shocked investor confidence and drove the FDI inflows down 20% in 2016 from 2015. Despite the financial crisis however, investor confidence remains in the country, with multiple large investments by Italian multinational Eni and US ExxonMobil by October 2016,[89] and later by TotalEnergies in 2019.[90]

FDI has become a crucial part in the development of most if not all of Mozambique's economic sectors. This is especially true of its energy sector. The country's relatively poor ability to independently develop its energy sector was evident during the financial crash of the 1970s and highlighted how influential FDI has become when foreign investment inflows

[87] UNCTAD, Page 15.

[88] Ballard Barclay, 'Mozambique's Dramatic Economic Reversal' (*www.worldfinance.com*11 July 2018) <https://www.worldfinance.com/special-reports/the-mozambique-debt-crisis> accessed 5 February 2022.

[89] Associação Lusófona de Energias Renováveis (ALER), "Energias Renováveis Em Moçambique".

[90] TotalEnergies, 'Total Closes the Acquisition of Anadarko's Shareholding in Mozambique LNG' (*TotalEnergies.com* 30 September 2019).

dropped causing the financial crash of the 2010s. The lack of national capacity to achieve least-cost investment, together with the large number of potential benefits Mozambique would receive, justifies the need to create an attractive investment environment that is driven by foreign investments. Foreign investments that would make up the least-cost investments the sector needs to achieve its renewable energy goals.

4.2.3 The Investment Legal Framework

From the perspective of the participation of the private sector, Mozambique possesses a base legal framework that covers most investments including that of the energy.[91] Overall, this wide overarching framework has done well to coincide with the goals set out by the 1st and 3rd pillars of the standard model of reform, where a restructuring of the incumbent utility and an introduction to private ownership is necessary respectively. The liberalization of the power sector initiated in 1997, allowed for third parties from the private sector to enter the power generation, transmission, and distribution markets. The 1997 Electricity Law opened the energy sector up to the possibility of FDI involvement, which simultaneously allowed for private sector participation and acted as a vertical unbundling of the system dominated by SOEs. This has served to provide investors with basic guarantees surrounding their involvement within the energy sector and establishes the ground-level of the sector's investment environment. Therefore, it can be said that Mozambique has done well in its initial steps of market liberalization and investor involvement. However, while the 1997 Electricity Law provides for a strong basis for investor protection, it was arguably too limited for the rapidly growing and important renewable energy sector.

It was evident that for Mozambique to attract the required level of private sector financing, greater guarantees to investors needed to be made so that their investments will be reasonably protected against non-market risks. This meant having a clear legal and regulatory framework protecting investors and providing guarantees or other mechanisms that safeguard investments in the event of changes to the regulatory framework.[92] The Government took steps in 2009 to revise the sectoral legislation.

[91] *'Investment Law'* Law 3/93 of 24th of June.

[92] ALER, Page 67.

In 2011 the Government of Mozambique adopted the PPP Law. This was a first step towards the introduction of legal safeguards for investments that the legislative framework so desperately needed. Article 16 implemented guarantees by government "protecting against non-market and legislative risks".[93] The PPP Law highlighted Mozambique's ability to self-reflect, realize, and take steps toward a more enabling investment environment. However, the PPP Law was merely the first step, as it is evident that the Articles fall short of regulating renewable investments in particular.

From 2011 until 2022 there was a substantial gap where the legislation failed to account for renewable projects. This meant that for this period, investment incentivization towards renewables was lacking as it was legally treated in the same light as all other PPP projects. The adoption of the new Electricity Law as well as the Regulation for Off-Grid Energy sought to precisely change this issue. As discussed in chapter 3, the new legislation acts as a clear indication of Mozambique taking the necessary steps to close the legislative gap regarding attracting private sector involvement for renewables. Ultimately benefiting the renewable energy sector, as investors can now expect increased attention to detail as an indicator that Mozambique looks to promote the development of renewables. Greater protections for investors in renewables will help create a more enabling investment environment. In the long-term, this should help Mozambique achieve their goals set out by the policies for the end of the decade.

In terms of investments generally, investors can also rely on the Investment Law as a source of investor protection. The Investment law serves to add another protective layer to the investment environment, which in turn boosts investor confidence. However, like the 1997 Electricity Law, the Investment law is somewhat outdated for the modern realities Mozambique currently experiences. As a result, Mozambique has recently approved the revision of the Investment Law.[94] While it is unclear what alterations are set to be made for the Investment law, the approval for revision clearly indicates Mozambique's pro-active stance on creating a more enabling investment environment. The revision of the Investment Law should facilitate

[93] '*PPP Law*' Law no 15/2011 of 10 August – Article 16.

[94] MRA Advogados, 'SÉRVULO - MRA Advogados Consortium Selected to Review the Investment Law of Mozambique, News and Events, News' (*Sérvulo & Associados – Law firm, Portugal*30 March 2022).

the process of investing in Mozambique, making investments in general more attractive. This should spill over into the energy sector and in particular renewable energy.

Moreover, The Investment Law's Regulations[95] and the Tax Benefits Code[96] grants a set of benefits to private, foreign, and national investments. These include, among others, deductions from taxable amounts in the scope of corporate income tax and exemptions from custom duties on imports. The tax deductions serve as incentives to potential investors whose profits would benefit. It is a clear indication of how the Mozambican Government is prioritizing investment in development over tax revenue from investment. To be eligible for the guarantees and incentives provided for in the above-mentioned legislation, an approval by the competent government authority is required, namely the Agency for the Promotion of Investment and Exports (APIEX).[97] Tax deductions illustrate to investors that the Government is willing to provide ample benefits. It is also significant to note that the tax deductions do not discriminate on nationality, meaning domestic investment or reinvestment by domestic firms is desired. However, a gap still exists within the investor protection framework. The Investment Law, its regulations and the Tax Benefits Code are simply insufficient in depth to deal with the vitality of the development of renewable energy.

The question must be asked; as it was established that Solar Energy is the most prominent source of renewables in Mozambique, are regulations, incentives, and quality control measures in place in relation to investments in solar energy and solar products? Part of the policy implementation plan for solar energy involves a combination of a least-cost implementation and the application of solar home, mini-grid and off-grid networks for solar energy distribution. The electrification reality is that there is very low density in certain areas that make the extension of the national grid very costly. The solar home, mini-grid and off-grid projects offer a more cost-effective solution to rural electrification.

Up until the implementation of the Regulation for Energy Access in Off-Gird Areas, Mozambique had no specific legislation relating to these projects. This meant that an investor wants to develop a home system program or a mini grid or an off-grid project it must follow

[95] *'Regulations of the Investment Law'* Decree 43/2009 of 21 August.

[96] '*Tax Benefits Code'* Law 4/2009 of 12th of January.

[97] AIPEX, 'APIEX - Invest in Mozambique- APIEX' (*Invest in Mozambique- APIEX*).

the same process as that for a concession of significant generation capacity. As a result, these projects are not attractive nor feasible for investors. Meaning the responsibility for the development of the projects falls directly to the government, which as previously discussed, lacks the domestic capital to carry out the implementation. The Regulation for Energy Access in Off-Gird Areas is a recent piece of legislation that shifts this position. It illustrates how Mozambique has progressed in seeking to fill legislative gaps to avoid the issues discussed above.

From a tax perspective, there are no special fiscal incentives regarding solar products. The Tax Benefits Code exempts importation duties from any goods that are classified as class "K" goods[98] in the Customs Duties Tariff Book.[99] An ideal scenario would be that solar products, like other energy products, fall under class "K" and are eligible for exemptions on duties and value added tax (VAT). This would improve the investment environment for solar energy and incentivize investment in the sector. However, in practice, solar panels are not included in the class "K" listing and cannot be exempted from VAT and duties. This is a significant step backwards for the development of solar energy. Arguably, import duties at the start of a project, levied over the most significant element of the project, is a deterrent to investment. The inconsistency between policy and practice could ultimately lead investors to look at Mozambique's other potential energy sources, such as the large reserves of natural gas.

4.3 The Institutional Challenge

4.3.1 The Institutional Legal Framework

The unclear relationship and role of each of the institutions governing the energy sector can be identified as one of the challenges facing Mozambique in its path to reach universal access by 2030. The NES has highlighted the limitations to the electrification objectives on an institutional level.[100] Particularly, in how there is an insufficiency of institutional organization within the process of planning and implementation of projects. We agree with the systemic concerns expressed by the NES. These include the lack of comprehensive and coordinated

[98] Autoridade Tributaria de Moçambique, 'Customs Tariff / Home - Autoridade Tributária de Moçambique' (*www.at.gov.mz*).

[99] World Trade Organization (WTO), 'WTO | Trade Policy Review - Mozambique 2017' (*www.wto.org* 29 March 2017). Page 50.

[100] MIREME, "Estratégia Nacional De Eletrificação (ENE) "(October 26, 2017). Pages 28-29

planning: there is no organization responsible for the planning process or planning procedure; Lack of criteria to prioritize electrification projects; absence of a framework for determining and coordinating the scope of EDM and FUNAE intervention. The system was built to have MIREME as the central figure without having to orchestrate the majority of the projects. This has resulted in efficiency issues, which in turn will significantly compromise the investment in solar energy and subsequently Mozambique's 2030 electrification goals.

The NES was built on the recommendations made by the World Bank, as the IFI spearheaded the standard model reforms. The proposed project is supported by the World Bank, with funding primarily coming from the International Development Association (IDA) and a multi-donor trust fund supported from a group of development partners; USD 66 million comes from the trust fund, while USD 60 million comes from the IDA. It is expected that this project will streamline and pave the way for an additional USD 240 million in on and off-grid electrification projects in Mozambique.[101] On a domestic level, the NES will be implemented by EDM and FUNAE, but was drawn from MIREME's policy development priorities. The large number of deferrals with regard to planification and implementation of the policy has created inconsistencies and delays within the implementation process. MIREME's auxiliary position requires more inter-agency cooperation that would increase delays in the projects and the dangers of miscommunication amongst the institutions. If this issue remains unchanged, the lack of clarity in project implementation would be detrimental to the investment environment. This would then compromise the NES and its corresponding policies.

Overall, the content and planification of the NES is in line with best practice and provides a sufficient way forward for solar energy development. However, the lack of an active and central role of MIREME, under which the policy for Universal Access to Electricity is promoted, provides a gap on the strategic nature of the implementation of this policy. Therefore, while policy directives are the first step, it is recommended that MIREME should develop a deeper involvement in the planning, implementation, and monitoring of these projects.

[101] The World Bank, "INTERNATIONAL DEVELOPMENT ASSOCIATION PROJECT APPRAISAL DOCUMENT ON A PROPOSED GRANT IN THE AMOUNT OF SDR 58.6 MILLION (US$82.0 MILLION EQUIVALENT) AND A GRANT FROM THE MOZAMBIQUE ENERGY FOR ALL MULTI-DONOR TRUST FUND IN THE AMOUNT OF US$66 MILLION TO THE REPUBLIC OF MOZAMBIQUE FOR THE MOZAMBIQUE ENERGY FOR ALL (ProEnergia) PROJECT" (March 7, 2019).

Taking this recommendation into consideration, MIREME's increased involvement should be met with an improvement in its cooperation mechanisms. MIREME could potentially improve its external cooperation through an inter-ministerial working group on renewable energy.[102] The group would be tasked with coordinating sector policy and implementation plans through the sharing of information amongst the institutions party to the policies and plans. Furthermore, a section on consultation could be established where civil society and the private sector entities could voice concerns, share information, receive updates as well as advice on investment in solar energy and the renewables sector.

Information sharing and policy implementation efficiency can be further improved by applying a multi-tier framework evaluative system. The system was developed by the Global Tracking Framework of the Sustainable Energy for All policy and focuses on defining success through a tiered approach based on attributes of energy access, such as legality, affordability, and reliability.[103] This monitoring and evaluation process judge's successes based on the separate stages and components of the overall project, using objective and reliable indicators. This includes indicators such as the number of households with provided access to electricity, the length of distribution lines constructed or rehabilitated throughout the electricity grid, and the number of enterprises provided with access to electricity services.

MIREMEs central position could theoretically have the advantage of limiting the negative effects of FDI. MIREME's position, coupled with the legal requirements set on investors to gain access to the energy sector through concessions, protects domestic companies from the crowding out effect. As part of the 4th pillar of the standard model, it is essential that Mozambique promotes competition where possible. If investors had a free reign over the energy sector this could be detrimental to domestic firms, who are partly dependent on FDI, as investors could simply take over the sector, bypassing domestic firms all-together. But since investors are required to go through institutional checks to have access granted to the sector, this ultimately limits the ability of investors to control the working conditions and crowd out domestic firms. It could be argued that MIREME's position would lower investment and thus competition because of the additional concessions' requirements. We argue the contrary, that

[102] ALER, Page 66.

[103] World Bank, Pages 24-25.

in fact, the concessions are beneficial to competition in the sense that investors compete for access to a huge emerging energy market in the region. Who stands to benefit the most are Mozambicans who will be offered better protections to wages, working conditions, and job security, as concessions would require that investment is done in cooperation with domestic firms. As a clear example Article 33 1.b of Law 15/2011 of 10 August, specifically promotes the need to include Mozambican entities in the share capital of the entity developing a project. [104]

In taking this recommendation it is important to highlight that the top position held by MIREME in the institutional hierarchy has the potential to negatively affect overall levels of FDI. As a government institution that leads the planification and supervision of the sector, a compromised investment environment is a realistic threat because of the lack of independence of the governing institutions to the local government. If MIREME grows its role in the implementation process of the proposed projects, then further government monopolization could contrastingly scare investors than attract them. The benefits of an independent institution include a lower chance of bias or corruption in dispute resolution between the state and investors. Greater institutional independence would create a more attractive investment environment. However, it must be stressed that Mozambique has considered this limitation and has already taken adequate steps to erase the issue.

As discussed in chapter 3, the 2nd pillar, as part of the objectives of the standard model of reform, entails the implementation of an independent regulator. Mozambique has carried out this objective through the establishment of ARENE. ARENE was created, by Law - for the purposes of proposing new policies and legislation in energy matters and promoting "free competition" in energy services. This will involve taking measures against anti-competitive practices, and against abuses of dominant position in the sector.[105] As a result of the new regulator, investor protection is more likely to be carried out efficiently and effectively, as the supervisory institution would use its powers to guarantee a safer environment from unlawful expropriation or government interference of investment assets. FDI greatly benefits from the establishment of ARENE. As an independent supervisory body ARENE would serve as the

[104] *'PPP Law'* Law 15/2011 of 10 August.

[105] *'ARENE Establishment'* Law 11/2017 of 1st October.

primary mitigator between party disputes and ensure that all stages of the investment process are carried out without abuse from either side. This would ultimately give investors more confidence in the investment environment, thus increasing investment in the sector. Furthermore, Mozambique can keep its concession-based system, that provides greater domestic firm protection while simultaneously guaranteeing independent supervision of the sector.

The newly adopted Electricity Law and supportive Regulation for Energy in Off-Grid Areas seems to have adopted this very approach. The Regulation clearly indicates ARENE as the supervisory authority tasked with managing concessions for such projects prior to ministry approval. This will help streamline the process and increase investment attractiveness. The Regulation should provide a more suitable environment for the development of such technologies and assist Mozambique in reaching its 2030 electrification goals.

As discussed in the sub-chapter above, it was established by the Regulation and Electricity Law that ARENE will take over as the primary supervisor for all off-grid energy investment projects, thus illustrating how Mozambique is correctly utilizing a supervisory authority and conforming to the 2nd pillar of the standard model of reform. Mozambique has already taken steps to tackle this gap and implement a viable solution, creating a clearer role within institutions, therefore promoting efficiency, transparency, and security in the sector.

As was previously discussed, EDM's position as the sole utility of Mozambique in the energy sector, along with several enabling laws has placed EDM in a quasi-functioning role. EDM acts as the country's electricity provider, must also takes on the role of planification and is able to influence Government policy on what areas of the energy sector to develop. This presents an opportunity for confusion within policy making as it is possible for EDM to influence policy decisions that will ultimately benefit the company's survival. This strengthens the need for MIREME to take on a more pro-active role in the planification stage as this should lower overlapping responsibilities. It becomes less likely to have institutional confusion if responsibility lines are Cleary indicated. EDM should prioritize the implementation of policy established by MIREME.

Another key issue regarding EDM is their current lack of financial security. "EDM has been operating at a loss for the past several years. This is largely due to electricity tariffs not being cost-reflective. This situation is compounded by the requirement to purchase electricity

from independent power projects (IPPs) and foreign sources. EDM subsidises tariffs to poor residential consumers, a strategy that has been deemed unsustainable."[106] EDM's monopoly on power distribution combined with an unsustainable financial model generates great investor risk, as it seems that the offtake for investment in Mozambique is unreliable. In other words, investor confidence is shaken if the only power purchaser domestically (EDM) cannot buy power from the investors. This highlights the need for further Government offtake guarantees for investors. The PPP Law does not provide for these guarantees, apart from non-financially viable strategic or special socio-economic PPPs.[107] This is an extremely limited guarantee, and it is therefore recommended that Government look to adapt the PPP Law to broaden the scope of financial guarantees to compensate investors for the questionable financial position of the Government run EDM.

Conclusions and Recommendations

This dissertation has aimed to provide an analysis on Mozambique's path to good green energy practice. It sought to establish a criterion for what we can consider as good green energy practice, finding that reducing GHG emissions from the energy sector by developing renewable energy is the optimal path to good green energy practice. It further aimed to engage directly with the key challenges that Mozambique will face in its path to this objective. Mozambique was chosen as the case-study for this dissertation as it is an excellent example of the effects the global objectives of GHG emissions reductions can have on the developing world. Tackling the issue of the principle of equity in climate action between the developed and developing states. The substantial potential for the development of renewable energy that Mozambique possesses places it in a position to potentially influence the way in which many developing countries approach the development of renewable energy. Mozambique has modern policies and regulations adopted to fully explore the need to attract foreign investment in the development of the energy sector and ultimately to reach its universal electrification goal by 2030.

We first looked to the global efforts regarding climate action with the objective of establishing a definition of what is meant of good green energy practice within the scope of the 2030 Agenda. It was determined that the energy sector was by far the largest contributor to global GHG emissions, highlighting the importance of GHG reductions in the sector. Despite

[106] UNDP, 'Energy and the Poor Mozambique' (UNDP 2020).

[107] *'PPP Law'* Law 15/2011 of 10 August - Article 20

the potential of reducing emissions via energy efficiency, altering our source of energy is an extremely powerful tool to curbing emissions. Looking to the SDGs and the Paris Agreement, we concluded that good green energy practice is the pursuance and development of renewable energy to lower GHG emissions on a domestic and global scale.

Mozambique´s road to its current energy legal framework can be separated in two clear timelines. The first, from its independence in 1975 up to the world economic crisis in the 1980´s and its change from the Communist regime to an open-market economy. During this period, Mozambique was heavily dependent on oil and had adopted a state-owned framework where all services, including energy, were dependent exclusively on the State. With the 1980s world economic crises and the realization of the need to source financial means to provide energy, together with its change of political regime, Mozambique adopted the standard model of reform.

We then turned to Mozambique's current institutional and legal framework supporting the energy sector, as well as an analysis on Mozambique's current policy objectives. It was important to highlight what Mozambique's policy goals intend for its energy future. Finding that Mozambique has placed significant importance on the development of renewables. This was supported by the adoption of the New Electricity Law and the Regulation for Off-grid Energy which aimed at enabling a more attractive development environment for renewable energy.

While it is clearly arguable that the challenges facing Mozambique's energy future are numerous, this thesis prioritized addressing what we believe to be three key challenges whose issues either encompass or supersede the others. The challenges were: The natural gas dilemma; FDI; and Mozambique's institutional framework.

On the challenge of NG, we looked to the current energy markets and the relatively steady rise of demand for NG until the year 2050. We established that current political tensions have shocked energy markets, creating a 'perfect storm' for Mozambique to fill a demand gap in the global energy market. The opportunity to fill NG demand is further bolstered by the potential national economic and development opportunities for Mozambique. Mozambique's Natural Gas Master Plan clarified the country's intention to proceed with the development of NG both for economic and sustainable development objectives. This led us to argue that it is simply unjustifiable, considering the SDGs as a whole, for Mozambique not to pursue the development of NG.

That said, it is specifically for this reason that NG presents perhaps the most significant challenge to the future of renewables in Mozambique. It was recommended that the Natural Gas Master Plan must be adapted to reflect the declarations of Prime Minister Rosario that NG is meant to be used as a transition energy from coal to renewables. Guarantees need to be made that Mozambique looks to either offset or phase out the negative GHG effects of the development and use of NG.

Regarding investment protection the current legal framework does well to provide a base set of protections towards investments in general which encompasses renewables and solar energy. To add to this, some steps have been taken to develop the legislation towards renewables, primarily through the new Electricity Law and the Off-grid Regulation. However, there are large gaps in the legal framework. To achieve the electrification goals, set out in policies, the government needs to improve the investment environment particularly towards solar energy. Yet, the legal framework offers no special protections towards solar energy projects and products. This has significant negative impacts to investment as investors don't see solar energy as a viable investment strategy. This means that the responsibility to develop solar energy falls on the Government, which does not have the domestic capacity to do so. The legal framework has not developed enough to match the potential and development needs of solar energy.

It is recommended that an update to the legal framework to include solar energy products within the class "K" listings to offer more incentives and protections to investors. Furthermore, a standard for quality control of solar products be established to coincide with energy policy objectives.

On an institutional level, the key institutions to the sector were MIREME, ARENE, EDM and FUNAE. The structure of the institutional framework had developed a hierarchy with MIREME in command. EDM and FUNAE act in correspondence with MIREME on the planification and implementation of development projects in the energy sector. This is a source of instability in the planification stage, causing concern for policy decisions. The institutional structure had limited MIREME's involvement and had developed a system that was prone to delays and communication errors in the implementation process. This was significantly detrimental to the investment environment.

With EDMs financial struggles, the potentially harmful impacts on investor confidence will be detrimental to Mozambique's good green energy practice. It was therefore recommended that the PPP Law be revised to expand the reach of Government guarantees for off taking the production of energy by investors.

It is further recommended that MIREME should develop a deeper involvement in the planning, implementation, and monitoring of solar energy projects while improving the institutional cooperation mechanisms. Cooperation could be improved through the adoption of a legal requirement to submit multi-tier reports that increase the efficiency of communication of project successes. Increased efficiency in measuring success will facilitate the ability to isolate and adapt to implementation issues as they arise. It should be stressed that the increased involvement of MIREME could negatively affect the investment environment, because the sector would be more heavily scrutinized by a state institution. However, the adoption of ARENE with the purpose of regulating the institutions, particularly MIREME, would counteract the dangers of greater state involvement in the sector. Therefore, it can be said that on an institutional level, Mozambique has taken steps in the right direction to eliminate potential limitations to investment. There are issues with efficiency that can be resolved via legal adaptation of the institutional framework.

Mozambique has an adequate enabling legal framework for the objectives they have set for 2030, but it can improve in many aspects. If the highlighted challenges are addressed, then Mozambique will be in a strong position to potentially limit the challenges to good green energy practice. The recommendations provided in this thesis are possible answers to the question of how to address these challenges, and thus improve the investment environment, to sustain the development of a vital energy source for the future of the country.

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