Complexities in regulation and financing of renewable energy projects in South Africa: An enquiry using a stakeholder analysis

23691647

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Abstract

Starting from the observation that stakeholders in the renewable energy sector represent multiple interests, each exhibiting formal and informal power to varying degree, the study explored the stakeholder understandings of renewable energy in South Africa, and what that meant for policy and practice. To engage in the qualitative exploration, semi-structured interviews were conducted on a purposively selected sample of thirteen participants who represented independent power producers, households, regulators and financiers. Also utilised were secondary sources of data from research reports, news publications and other online sources such as interviews available publicly on YouTube.

The study drew an understanding of how stakeholders view renewable energy regulation and finance and how they hoped the same could be regulated and funded going forward. By and large, there was a sense that regulation was lacking in quality, in clarity and in consistency. These sentiments were dominant among participants even though sympathy for the government's position was expressed in some instances. Finance was understood to be well-structured although innovation on finance models was noticeably weak. Two dominant models were utilised by funders leaving room for more innovation to be attempted.

Given the dynamic nature of the sector, the study's theoretical contribution was in the form of a renewable stakeholder. Renewable stakeholder denotes stakeholder participation which is not fixed but continuously responsive to changes in the environment. With regular changes of regulations, of technology, of stakeholder interests and even of political appointments as was the case during the study, renewable stakeholders also adjust or reposition themselves. In this way, their understanding of the sector and the technology is not fixed and they continue to remain vibrant in the sector. In demonstrating flexibility and movement, the study augments to stakeholder theory's portrayal of stakeholders; instead of fixed objects with fixed interests in fixed sets of relations, the stakeholders in the study presented here demonstrate flexibility and, in some senses, malleability.

Keywords: Stakeholder theory, renewable energy, renewable stakeholder, finance, regulation.

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Philosophy in Corporate Strategy at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Student Number: 23691647

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Key Acronyms

CSIR – Council for Scientific and Industrial Research

DBSA – Development Bank of Southern Africa

DFFE – Department of Forestry, Fisheries and the Environment

DFI – Development Finance Institution

DMRE – Department of Mineral Resources and Energy

DOE – Department of Energy

DTIC – Department of Trade Industry and Competition

EPC – Engineering, Procurement and Construction

ESKOM – Electricity Supply Commission

FDI – Foreign Direct Investment

IDC – Industrial Development Corporation

IFC – International Finance Corporation

IRENA – International Renewable Energy Agency

IPP – Independent Power Producer

NERSA - National Energy Regulator of South Africa

PIC – Public Investment Corporation

PV – Photovoltaic

RE – Renewable Energy

REIPPPP – Renewable Energy Independent Power Producer Procurement Programme

RETEC - Renewable Energy Technical Evaluation Committee

SAPVIA – South African Photovoltaic Industry Association

SARB – South African Reserve Bank

SARS – South African Revenue Service

SAWEA – South African Wind Energy Association

SITA – State Information Technology Agency

Chapter 1: Introduction and Research Focus – Identifying the Key Concepts

> "*You can build a power station with embedded generation; there is no limit. We have removed the cap altogether. People may want to portray us as hostile to renewables, but policy announcements we are making point in a different direction. Embedded generation has no limit; we have allowed municipalities to develop their own energy. While there's no flood of applications to do that, policy has allowed it*", Gwede Mantashe[1] (October 12, 2022).

The words of South Africa's Minister of Mineral Resources and Energy suggest that the government has a policy that is proactive, inclusive, and open to participation by many independent power providers. These utterances also suggest that there is coherence across various rungs of renewable energy governance including within government itself. While ostensibly true for a political actor, the utterances mask the dynamic plays which transpire within the sector and broader implications these dynamics have for understanding the true stakes and stakeholder positions. This dissertation is primarily concerned with the stakeholder dynamics which utterances such as the minister's suggest. It formulates a concept renewable stakeholders, to suggest a stakeholder arrangement which is always shifting and changing, lurching, and balking within the renewable energy sector in South Africa.

Renewable stakeholders comprise of government (in its three tiers: National, Provincial and Local), regulatory bodies, independent power producers, financiers, international investors, households, industrial and commercial users, and institutions in the form of acts and policies (Martin & Rice, 2012a; Pillay, 2010; Ruggiero et al., 2014). Generally, these pursue various end goals (Freeman et al., 2021) despite also pressing for renewable energy usage. They also have different perspectives of who the key actors are in the sector as studies elsewhere have revealed (Hiatt & Carlos, 2019; MacArthur, 2016). In exploring the renewable energy sector in South Africa, we get a sense of what stakeholders are pursuing, contesting, winning, and losing. Through the renewable stakeholder concept, we get a sense of how the stakeholders continually shift to renew their positions in the arena and in some instances make progress. We must however set up our study before delving into the empirical work obtained. A starting point is therefore to consider background about renewable energy to set the study into motion.

[1] Interview with Gwede Mantashe https://www.youtube.com/watch?v=sAv9rTlVuQs&list=PPSV

1.1 Background to the problem

Renewable energy is a widely recognised concept and set of technologies in an age where sustainable development and climate change are issues of theoretical and practical concern (Olabi & Abdelkareem, 2022) all over the world. Oddly, while sustainable development and climate change are embraced in national policies across much of the world, renewable energy does not occupy a similar pedestal. It is an appendage of sorts. This is a challenge both in developed and even more so, in some developing countries. Much of Africa constitutes the developing world. It is therefore a geopolitical area where the scope for engaging renewable energy remains wide.

Although not a perfect match, private sector participation can play an important role in financing renewable energy infrastructure (Ebrahim, 2018; Georgieva & Adrian, 2022). In Africa, there are various bottlenecks in implementing Public Private Partnerships with the most common issue highlighted in current literature being institutional quality (Osei-Kyei and Chan, 2016; Chikaza and Simatele 2021; Chileshe et al. 2020). Institutional frames consider both the rules and organisations and therefore hint at multiple stakeholders. In South Africa, Murombo (2015) discusses regulation and law of renewable energy. While useful, it is largely a discussion around the legal framework with passing interest in how relations among stakeholders play out within the regulatory framework but also beyond it. It is this dimension that the proposal seeks to address. Writing from a different perspective, Ouedraogo (2019) notes from his literature review that Africa is encumbered by a litany of challenges in its quest to adopt renewable energy. Some of the challenges include poor institutional framework and high costs of capital.

While the findings summed up above are indicative of a practical and policy challenge, there remain concerns worth pursuing even in conceptual and theoretical frames. Even more interesting is the suggestion by Ergun et al. (2019) that countries with high human development indices as well as high gross domestic products have low reception of renewable energy compared to those on the lowly end. This is especially interesting for this study as South Africa forms a primary interest. On the demand side, the factors determining consumption levels in the larger countries are identified as economic growth, share of urban population and human capital development (Akintande et al., 2020). Such scholarship sets an interesting backdrop to the study because it attends to the supply and demand sides of the energy architecture. This is relevant but as will be presented in a later section. The economic lens does not capture a broad picture which includes all relevant actors. Again, such aspects are attended to later. For now, a continuation with the background to the South African context suffices.

South Africa is both a peculiar and an interesting case in Africa. The economy has until recently been a stellar performer, occupying a position as the continent's largest by GDP (Oshodi, 2016). In addition, it has embraced renewable energy as an area of investment. However, it faces crippling power crises which in simple terms are indicative of low supply targeting huge demand. In this sense, renewable energy is a boon, at least in theory. Unfortunately, renewable energy is yet to contribute extensively to the national grid due to 'technical, financial, policy and environmental challenges' (Akinbami et al., 2021). A possible explanation for this is the relationship between energy (both renewable and non-renewable) and growth as well as research and development.

1.2 Theoretical relevance

There are two perspectives from which the study finds justification: theoretical and practical. The theoretical relevance highlights how the study is important to explore as a form of theoretical contribution while a section on the business relevance spotlights why the study is necessary to engage in practical terms. We start with the theoretical dimension.

1.2.1 Renewable energy as a field of enquiry

Renewable energy encompasses a range of technologies which include solar (PV, concentrated and thermal), wind (onshore and offshore), hydroelectric, marine renewable energy, bio-energies and geothermal energy (Elie et al., 2021a). This appears self-evident, if not natural, because renewable energy is an often-used term in the everyday. Yet, renewable energy is a concept with disputed meanings. According to Harjanne & Korhonen (2019), renewable energy is a problematic concept because of "sustainability, incoherence, policy impacts, bait-and switch tactics and generally misleading nature". In detailing these anomalies, the authors suggest that among other shortcomings, renewables are not necessarily sustainable, renewables are very different, policy outcomes vary even when deployed similarly, and the term itself is an oxymoron as energy is not renewed. Güney (2019) contests the criticism on sustainability by showing that renewable energy makes a positive contribution to sustainability where sustainability is understood as adjusted net savings. This is however an equally contestable claim because it is income-oriented and therefore ignores other aspects such as environmental impacts and effects on people's cultures.

Besides the conceptual, there is a moral debate to be engaged. Approaching the subject as one around energy justice, Levenda et al. (2021) demonstrate the moral conundrums emanating from various technologies which all constitute the renewable energy class. 'Who benefits from what technology to which party's detriment' is a set of questions whose implications they reveal. Again, the outcomes are variable even where a technology is supposedly renewable and by corollary, sustainable. The study presented here notes the complexities in renewable energy but also takes heed of the graver complexities that come with alternatives such as fossil fuel. Moreover, the broad perspective that Levenda et al. (2021) adopt is avoided as it encompasses some technologies which do not appear consistent with the widely accepted definition from the International Energy Agency.

Evidently from the extant literature, renewable energy has garnered some immense interest. To get a glimpse into the interest over renewable energy in general but also in Africa in particular, it is vital that the conceptual arguments are tied to practical/lived complexities. Africa is undergoing an energy transition from fossil fuels to renewable energy. Mutezo & Mulopo (2021) explore this transition using circular economy principles. Circular economy signals a shift to how firms are structured as business models (Lüdeke-Freund et al., 2019), ushering transitions in business sustainability (Geissdoerfer et al., 2017). The energy transition that is alluded to in the literature is neither peculiar to Africa nor consistent across the continent. In other words, the pace and consistency are varied. While analysis of the transition using circular economy lens is useful for structural analysis, it however glosses over interactions between actors in the structure. As such, a more actor-oriented approach is needed which can be adopted through a stakeholder analysis. Besides the abstract approaches to renewable energy, there are climatic justifications for considering the nexus between finance and regulation in renewable energy (Hailemariam et al., 2022). Traditional fossil fuels are deemed to pose grave implications on sustainable development and so new approaches to finance, policy-making and legal framing are required.

To address the pressing demands for more energy, energy justice, and energy equity, interventions of various kinds appear to be a choice approach from policymakers. "An enabling policy and regulatory frameworks will need to be adjusted"(Gielen et al., 2019, 38) in order for effective adoption and implementation of renewable energy to transpire across a raft of areas. This hints at demands on regulation and financing. As such, the study engages these dimensions initially paying attention to the conceptual aspects of renewable energy regulation and renewable energy financing, and then attending to the practical aspects.

1.2.2 Financing renewables

In much of the scholarship, financing of renewable energy is attended to through various models (Jebaraj & Iniyan, 2006; Mazzucato & Semieniuk, 2018; Sweerts et al., 2019; Tsai et al., 2017) or from the perspective of numerous actors. Often these perspectives highlight the challenges and opportunities that respective actors or specific models encounter. While useful, the study suggests that such approaches shed little light on the systemic ties which draw actors in the finance arena together. Some exceptions to this criticism exist (Martinez & Komendantova, 2020; Nasr et al., 2020) but even then, attention is largely in advanced countries which are largely the centres of technological advancement and capital. The query then is, what about in developing countries? With relatively better financial institutions on the African continent as well as the potential for more accessible quality data, South Africa becomes a useful place to start. Beyond a more incisive exploration of financing renewable energy in developing countries, the study used stakeholder theory as its theoretical lens. In doing so and with respect to financing, the study's novelty is in engaging a systemic, actor-oriented focus of renewable energy which recognises actors in a sector and not attached through ties with one organisation as much of stakeholder analyses do as a departure point (Brugha, 2000; Freeman et al., 2010, 2021; Valentinov et al., 2019). Such a turn augments to the little scholarship that has embraced stakeholder analyses in renewable energy (Hafner et al., 2020; Marcon Nora et al., 2023; Martin & Rice, 2012b) but fallen short of detailing the combined role of finance and regulation.

1.2.3 Regulation

Regulation of renewable energy forms an important dimension to the sector's growth and enforcement of standards. In engaging the regulation as a pillar of the study, there is recognition of its diverse role and form. As Gao et al. (2022) note in a paper attending to the Chinese experience, regulatory environments can be heterogenous and therefore yield variable outcomes in energy efficiency and policy. Although the paper is on green development and attendant green energy efficiency, it magnifies the salience of regulation in affecting energy policy, processes, and outcomes.

Besides the practical justifications for exploring regulation of renewable energy, there are theoretical gaps between energy models and energy policy which need to be addressed (Savvidis et al., 2019). These gaps apply to energy in general and renewable energy too in particular. Moreover, they are identified as problems relating to governance (Stritzke et al., 2021), a system (Agyekum et al., 2021), or global shocks such as COVID (Amir & Khan, 2022). The study's approach casts a more precise lens on actors in the system, experienced

challenges which disentangle the broader concept of governance and issues that exist in the mundane and not just when global events prove disruptive.

1.3 Business Relevance for the Research Topic

The study is neither concerned with stakeholder theory for the theory's own sake nor with the theory as an instrument in a broad area such as environmental policymaking. Rather, stakeholder theory is harnessed as a lens in renewable energy with particular focus on the sector's financing and regulation.

South Africa is at an important stage in its development and future energy needs to meet the economic development demands in an affordable clean manner. Based on openly available business publications, Sub-Saharan Africa is lagging meeting the critical sustainable energy development goals such as clean, affordable, and universal access to energy. It's for these reasons that businesses and government institutions need to collaborate and define mechanisms to allow investment into alternative energy solutions.

The corporate sector is an area where competition, regulation (in its broad sense) and finance converge (Weigelt & Shittu, 2016). For renewable energy, this implies that there are vast possibilities for growth if finance and regulation are sufficiently availed (Abolhosseini & Heshmati, 2014; W. Liu et al., 2023). Conversely, a failure to package regulations well or build an appropriate financing architecture might pose grave consequences for corporates, communities, and clients. As such, there are financial, social, sustainability interests which are implied in pursuing an enquiry into financing and regulation of renewable energy.

On a global scale, renewable energy is a constituent of the climate change agenda. The effects of climate change have become more evident in recent years as highlighted by the 2022 United Nations Climate Change Conference also referred to as COP27. There have been extreme weather events, increasing temperatures, and water scarcity has become a global issue (United Nations Economic Commission for Africa, 2021). Although there has been growing global concerns about this phenomenon, the decision makers, the public and the private sectors have made limited progress in registering mitigation and adaptation measures (United Nations Economic Commission for Africa, 2021).

1.4 Research problem and research aims

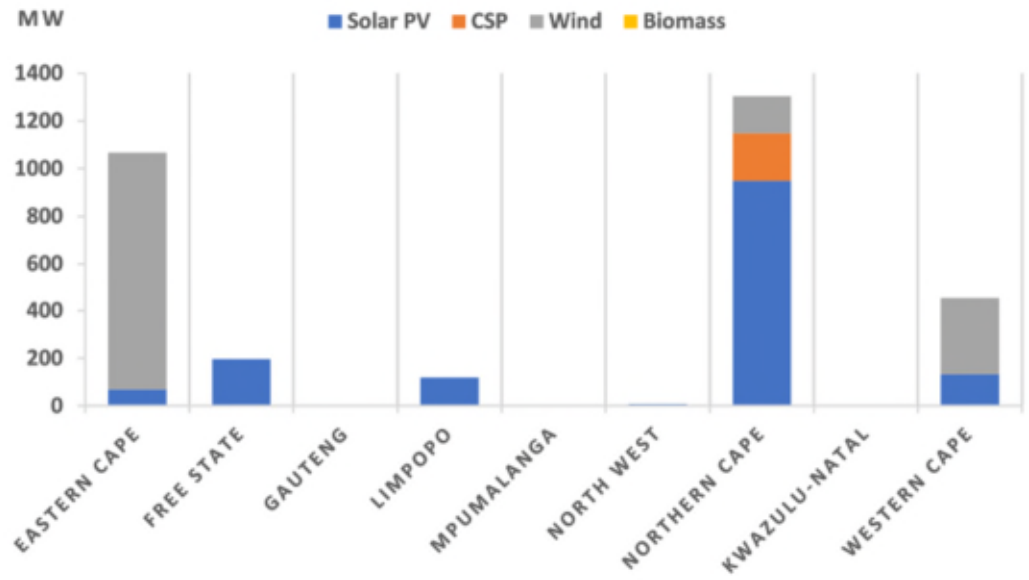
Although researchers have addressed the economic (Wang, Dong, et al., 2022), moral (Levenda et al., 2021) and policy (Aykut, 2019; Wall et al., 2019) complexities in renewable

energy scholarship, very little ‘energy’ has been expended to explore the conception and implementation from multi-stakeholders’ perspectives. To engage the research problem in depth, research questions have been formulated (see Chapter 3), narrowing attention to stakeholders’ perspectives in light of regulation and financing of renewable energy.

1.5 Research context/setting

Identifying the conceptual and practical motivations clarifies some aspects of the study but does not fully address why South Africa is the primary site of interest. Although this is a matter that will be engaged in detail in the methodology section, a brief note is made here. South Africa faces an unprecedented energy crisis in its post-apartheid dispensation. Some of the areas which researchers have attended to include future prospects, potential for rural inclusion and environmental implications. Oyewo et al. (2019) for example develop a model which forecasts into the future until 2050; they suggest that the best-case scenario suggests that cost factors will remain as they were at the time of their study while a worst-case outcome hints at markedly grave cost implications. Rooting their focus in the present, Iorember et al. (2021) are drawn towards environmental concerns with interest at structural level. They recognise that renewable energy is desirable, but it poses environmental possibilities in both positive and negative sense. The aforementioned scholars largely focus on broad scopes and yet Winkler et al. (2017) adopt a more geo-specific focus by considering rural areas through an Integrated Renewable Energy Potential Assessment. Their focus shows that rural areas are part of the renewable energy matrix, a perspective which is particularly germane for the current study as it highlights a broad perspective of stakeholders in the field. However, one glaring lacuna pertains to regulation. This is evident in studies such as the one by Naicker & Thopil (2019) where among factors considered in SA, regulation is neglected while finance is ensconced in a broad factor which they identify as economic. The suggestion is not that there is complete neglect as Murombo (2015) has demonstrated. Rather, the question of regulation stems from the micropolitics which have already plagued non-renewable energy in some parts of South Africa where access to, provision of and rights around energy constitute areas of racialised, historicised, and commercialised contest. In a word, energy regulation is important for South Africa in the now and in future. As Figure 1 below reveals, South Africa’s renewable electricity generation is skewed and this is a situation which regulators can attend to for change.

Figure 1: South Africa's electricity generation in TWh by different technologies



Source: (Akinbami et al., 2021)

By 2016, renewable energy capacity had increased fourfold with the main forms of renewable energy being biomass, wind, and solar. These comparatively new forms of energy in South Africa have been especially enabled by the government's policy primarily articulated in the Renewable Independent Power Producer Procurement Programme (REI4P). Moreover, according to one researcher, tax breaks and feed-in tariffs have been added as incentives for independent producers of renewable energy (Khare et al., 2023) with a recent budget statement allowing for households to procure solar panels and receive tax incentives of up to a specified limit. Yet, even as the policy shift facilitates more independent production of alternative energy, the question of energy justice looms large especially among non-state and non-commercial critics such as researchers and non-governmental organizations. Mirzania et al. (2023) comment that socio-political constraints worsen energy vulnerability just as socio-technical and techno-economic factors 'exacerbate distributive injustice'.

Equally useful in the South African context are the political movements that transpired in ministries which directly affect renewable energy. Our treatment of these issues now allows us to gain a grasp of some of the complexities which are alluded to at a later stage by the study participants. Having appointed a new minister of energy in March 2023, the president of the Republic of South Africa ushered in a new office which was empowered under Section 34 (1) and (2) of the Electricity Regulation Act[2] to enable private generation of electricity. The significance of such a move at least in the media and public domain was that the new

[2] Mantashe loses some of his powers in transfer to Ramokgopa (ewn.co.za)

Ministry of Electricity would pursue an agenda that a previous ministry – Ministry of Mineral Resources and Energy– had been sluggish over[3]. To quell criticisms levelled against himself, the Minister of Mineral Resources and Energy, Mr Gwede Mantashe made public statements indicating confidence[4] in the appointment of a new minister of energy despite earlier statements caricaturing the new appointee[5]. The same minister was alleged to have dared his principal, the president to fire him[6], when it became apparent that a new ministry would be formed resulting in loss of control over aspects of electricity generation and control. However, although charged with generation of new energy, it became apparent that one of the key areas in which both portfolios intersected and stood to clash was around treatment of the energy crisis which manifest on what was publicly understood as "load-shedding". Load shedding was and continues to be deliberate and routine practise wherein the electricity distributor, ESKOM, cuts off supply to specific areas of the grid for specified periods of time in an effort to manage the demand that consumers place on the electricity grid. The time period under which electricity is cut off/interrupted varies depending on the designated level of load shedding. Areas that are cut off from the grid during the period of load shedding are typically forewarned so that they decide before the interruption.

While the political jousting has certainly been gripping, a more interesting area has been the focus on some aspects of the new minister of electricity's powers.

- *That new generation capacity is needed to ensure the continued uninterrupted supply of electricity;*
- *The types of energy sources from which electricity must be generated, and the percentages of electricity that must be generated from such sources;*
- *That electricity thus produced may only be sold to the persons or in the manner set out in such notice;*
- *That electricity thus produced must be purchased by the persons set out in such notice*[7]*.*

As we will later discover, the minister appears to have begun enforcing some of these powers with mixed implications for other actors in the field. Solar and wind energy in

[3] South Africa Energy Minister Accused of Hindering Green Transition (voanews.com)
[4] WATCH | Mantashe says electricity minister is 'capable'; power ships 'not ruled out' | Business (news24.com)
[5] Mantashe doubles down on characterisation of Electricity Minister as 'project manager' (engineeringnews.co.za)
[6] Mantashe dares Ramaphosa to fire him - The Mail & Guardian (mg.co.za)
[7] Ramaphosa gives electricity minister new powers, elbows Mantashe out - The Mail & Guardian (mg.co.za)

particular have been impacted as supporting policies emerge. However, there are also a raft of challenges which persist. Again, the political contests as well as the regulatory frameworks continue to stifle some aspects of renewable energy generation and distribution. Such is the context within South Africa. Perhaps as an indication of its nascence, much of the focus is on producers and regulators, leaving households who bear the brunt of the electricity woes to occupy peripheral positions in the discourse. Their absence will be key in our making sense of renewable stakeholder ship in empirical sections of the dissertation.

Equally useful to recognize in a discussion of the context is the arrangement and activity within the renewable energy sector. In other words how is the renewable energies sector structured. Briefly renewable energy in South Africa is strategically oriented via an integrated resource plan which the government develops. The integrated resource plan is then used to determine how much renewable energy would be generated for a specific period, who the independent power producers will be, what the regulatory framework looks like, and what the intended goals are. The various actors or stakeholders as we identify them in this dissertation know well in advance what the government aspires for and what is required of them. With particular focus on independent power producers the government issues out tenders in a competitive bidding process. Interested applicants submit their applications in what are identified as bid windows. So far in South Africa there have been more than five bid windows each attaining different levels of success and each encumbered by numerous challenges of a regulatory and financial nature. It is within these bid windows that stakeholder contests challenges and complementarities are manifest. These dynamics play out from the point of strategy formulation in the integrated resource plan to the tendering process project implementation and distribution of electricity or energy. Various stakeholders are involved and their positions within South Africa that is yet understudied. Given the economic social political and technological implications of how this entire enterprise is structured the value of conducting a study that accounts for the stakeholder engagements cannot be underscored. It is in this context that this study is injected into the scholarly debates around renewable energy, its meanings and the outcomes for stakeholders.

1.6 Definition of key terms/constructs

Regulation – It is important to further clarify the formal definition of regulation that the study adopts. While interest is primarily on South Africa, the study is also aware and sensitive to the reach of international law as part of regulation in the renewable energy sector. In other words, international law is also salient in renewable energy regulation where conventions

and declarations specifically situated within the area are presented (Bruce, 2013a). Hence where a discussion of South Africa's connectedness with global stakeholders is addressed, international law and international regulation agencies are also incorporated.

Finance – Following IRENA (2023), finance in renewable energy is considered as investments or financial resources availed to private, public or hybrid corporates for renewable energy projects. The financial resources considered are channelled either from or via financial institutions which may be local, multilateral, or international in private, public or hybrid entities.

Renewable Energy – While the initial definition drawn from United Nations is that "Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed"[8], the study will refine this to focus on solar and wind energy in South Africa.

1.7 Outline of the document

The chapter has introduced the study's agenda. It has highlighted the research gaps and justifications for taking up the research. The following chapters build towards an empirical understanding of the questions. The next Chapter will engage the literature on renewable energy. In a word, it highlights what is known about renewable energy and also what remains obscure or unknown. Having outlined the study agenda and engaged the literature to explore gaps for research, Chapter 3 then intervenes by presenting the research questions that the study tackled. These questions form the basis for the exploration that constituted the remainder of the thesis, starting with what methodology would be employed. Chapter 4 presents this research methodology, highlighting the qualitative orientation, justification for such an orientation and instruments deployed to extract data from the specified field. The field will be articulated, detailing how it has been identified and by what logic it fits for the study. Ethical dimensions will also be elaborated to demonstrate the sensitivity with which the researcher will treat data. Chapter 5 presents the research results or findings. In other words, it presents what the data showed in response to the questions. Chapter 6 will be an analytical discussion of research findings. The binding thread in the study forms the basis of the chapter, developing arguments which complement and contest the available scholarship. Chapter 7 offers conclusions and recommendations. A reflexive section will also be included to connect the study's initial goals with the actual outcomes.

[8] https://www.un.org/en/climatechange/what-is-renewable-energy

Chapter 2: Literature review

2.1 Introduction

Chapter 1 laid the platform of the study, setting an agenda and establishing the key research questions. The current chapter builds on this base through engaging the literatures on renewable energy as a concept, set of technologies and as a practice. It attends to a selective reading of two areas which the study engages and explores: financing of renewable energy projects and regulation of the same. In attending to these two, the section engages the conceptual strands which have been discussed in the recent scholarship. Moreover, in engaging concepts, the section probes conceptual gaps in anticipation of highlighting the study's theoretical point of entry and contribution. In addition, the chapter also addresses the research question on who the stakeholders are in renewable energy and how they interplay with regulation, financing, and implementation. This is done through considering stakeholder theory as a lens through which we can later understand empirical data. As the chapter will reveal, the literature has so far attended to stakeholder perspectives in disparate fields, seldom engaging the multiple areas of connection in finance, regulation, and implementation. It is this gap that the study engages in later chapters both empirically as well as theoretically through deploying the concept of renewable stakeholders. To pre-empt the discussion on stakeholders, in discussing stakeholders, the chapter acknowledges their diversity in form which is also coupled with other areas of divergence that the researcher is attentive to. According to Colvin et al (2020) the diversities reflect in organisational structure, profit orientation, missions, institutionalisation, spatial reach representation, social niche and epistemic authority. With this in mind, the chapter delves into the conceptualisation of stakeholder theory, and renewable energy regulation and financing.

2.2 Stakeholder theory

Emerging from studies of business strategy and corporate governance, stakeholder theory has come to be a useful approach which helps to debunk the fallacy that entities exist as self-interested silos with fleeting ties to others (Freeman et al., 2010). In this sense, a corporate entity would only be concerned with meeting the interests of its principals, that is, shareholders. Over time, "proponents of stakeholder theory appealed to normative claims and the role of cooperation and shared values in improving performance" (Freeman et al., 2021). Such shifts meant recognition of business as much more complex and turbulent, implying that many other actors are vital for sustenance of the value chain. As a result, there has been a shift towards a theory which values many other entities besides shareholders.

This is best summed up by Freudenreich et al. (2020) who note that “relationships form the basis for a functioning value creation network”. The concept of value creation is noteworthy as it hints at various stakeholders presenting some useful offering to the environment. In a divisive terrain which is loosely portrayed in the public media as pitting sustainable energy against fossil fuels, relationships matter. But, there remain questions about the worth of value contributed by stakeholders. In other words, while parties may agree that they offer some form of value, there remain moral and power contests over who offers the more valuable value to an ecosystem. As such, although insightful, the concept of value creation also leaves some potential gaps in understanding how stakeholders relate. To then gain a grasp of stakeholder perspectives more robustly, we might need to flag its formulation and trace its evolution.

The theoretical development of what is now identified as stakeholder theory starts in the 1970s. The historical trajectory is peripheral to this section’s focus. However, what is worth noting is that a number of approaches to stakeholder theory have developed culminating in a typology of models that researchers have variably used. Writing on stakeholder theory in environmental arena, Orr (2014) notes that models can deploy public policy lens, can be interest-based or can be considered as reflectors of power. The study finds interest-based as well as power-oriented analyses interesting because they have potential to highlight by whom and how renewable energy as a sector is regulated, financed and practiced in an area. Such approaches put emphasis on questions of who is dominant and who stands to lose the most. Given that the stakeholder approach emerged from arguably a power arrangement which ignored actors who were not shareholders, the persistence of power incongruencies is important to recognise as it draws attention to the variable positions that stakeholders themselves occupy. In this sense, approaches which deploy more nuanced conceptual analyses even among stakeholder approaches are needed.

Nuance is adopted by Mihailova et al. (2022, 159) who consider establishment of "positive energy districts" which are putatively sustainable entities. Their concept hints at multi-stakeholder engagement which manifests in various places. Importantly, their concept is formulated in a study that is specifically concerned with the energy sector. However, despite its value, the concept falls short in some respects because in focusing on micro connections, it does not draw out the direct linkages between stakeholders at a macro level. This lacuna is important to engage because macro level decisions and interactions have a bearing on various communities in the energy ecosystem. Regulations for example affect how communities/districts interact or whether they can interact at all. Given the shortcoming of a micro lens, it is encouraging that researchers elsewhere have engaged the macro-level interactions of stakeholders. In this area and while focusing on energy policy in Germany and

France, Aykut (2019) discusses models as essential tools which help clarify how energy policy and regulatory frameworks are formulated. Models are presented as useful for explaining interplays at a large scale. The models themselves change over time as debates continue to shift priorities and visions. Resultantly, the policy environment and architecture are revealed to be complex over time, revealing a field of “predictive policy assemblages”. The concept of predictive policy assemblages hints at the competing socio-political and environmental interests which shape future policy. This rich and broad exploration of the policy environment is useful for demonstrating how policy is tied to social, political, and environmental factors and by extension, various stakeholder groups at a big scale. The current study leans on such a perspective while also invoking the position of financial role players who are increasingly pivotal in the practical delivery of renewable energy technologies and applications across the globe. The importance of finance cannot be understated considering that funding in various countries stems from actors of various kind across the private, public, and blended sectors.

The utility of deploying stakeholder analysis is that it traces those who are involved at every stage of decision making in the production of technology, distribution, and consumption of renewable energy. In this way, it enables the study to gain a grasp of the question:

When self-reported among stakeholders, which stakeholders are identified as most important in renewable energy conception and implementation in South Africa?

2.1.1 But why stakeholder theory?

For researchers, stakeholder theory can be deployed together with other theoretical frames to yield innovative studies and insights. Longhofer & Winchester, (2016) deploy a multi-attribute utility theory to evaluate the energy transition scenarios noting stakeholders as vital in the process. Milčiuvienė et al. (2019) invoke energy justice theory in considering the fluidity of roles where consumers also become producers. In such enquiries, the fusion of stakeholder theory into the analysis enriches perspectives as multiple actors are considered. This is not to suggest that stakeholder theory cannot be deployed alone. In fact, the study presented here employed stakeholder theory as the binding thread tying together regulation and finance of renewable energy.

Stakeholder theory is broad but is not explicitly concerned with value positions and questions of fairness; rather, it is concerned with representation of multiple groups in energy processes. To gain a grasp of the justice and value-orientation among renewable energy scholars, we can turn to energy justice theory. Briefly, energy justice theory “evaluates (a) where injustices emerge, (b) which affected sections of society are ignored, and (c) which processes exist for

their remediation in order to (i) reveal, and (ii) reduce such injustices" (Jenkins et al., 2017). Understood in this manner, energy justice embraces stakeholders as a central element as they are the objects of justice. However, multiple interests culminate in outcomes where some stakeholders do not emerge as winners while others do. Justice is seldom universal, Mejía-Montero et al. (2023) allude to this discrepancy in their work which embraces intersectionality as a central concept. Groups are heterogenous and therefore become engaged in if not embroiled in – power contests. Individual and collective justice concerns pit micro and macro entities against one another. As such, energy justice conceptions enrich stakeholder analyses through highlighting the moral concerns/interests of stakeholders. Added to these contributions is the recognition that stakeholder theory offers "descriptive accuracy, instrumental power, and normative validity" (Donaldson & Preston, 1995, 65). Such features are incisive as they open up possibilities to consider what different stakeholders value in a social, economic and political arrangement. Moreover, they tease out what is or should be acceptable to as norms within the arrangement(s).

2.1.2 A critique of the theory

Before turning to another conceptual area, the study recognises that stakeholder theory is not exempted from criticism. Ramoglou et al. (2021) for example argue that stakeholder theory can be edified by considering actors beyond the economic or market. In their perspective a more strategic way of thinking about the actors involved beyond economic terms will yield more value. While this might be a valid argument, it is ironic that their argument is situated within scholarship on firms and therefore within economic frames. How their proposition can be implemented in firms is therefore uncertain. What is certain, however, is the salience of regulation in renewable energy. It is this area that we now consider.

2.3 Regulation

One of the research questions is designed to explore abstract meanings of regulation in South Africa. This section teases out these aspects. Renewable energy regulation constitutes a sparsely attended arena in the scholarship. In making this claim, the point is not that there is a dearth of analysis using country and project case studies. These are available in abundance (Al-Shetwi et al., 2020; Balakrishnan et al., 2020; Bilgen et al., 2008; Ciarreta et al., 2020; M. O. A. González et al., 2017; He et al., 2016a; Martin & Rice, 2012b; Milčiuvienė et al., 2019; Winkler et al., 2017; Zhao et al., 2022a). However, conceptually, the research output is relatively little. The few scholars who have engaged the conceptual

motivations for renewable energy regulation include Jenner et al. (2012) whose focus is state-level regulation. They consider prior scholarship which embraced renewable portfolio standards to account for why states adopt renewable energy regulation. They then argue that private and public interests play a vital role in regulation adoption. The focus is clearly on adoption of regulation which is commendable but forms one dimension to the regulation matter. One might ask, what about enforcement or even formulation of regulation. Or alternatively, what about regulation via non-state, informal or even transnational actors who might have a stake in the energy sectors of states. Moreover, what of regulation that is either formulated at multilateral level or that which pertains to local municipalities? So then, "*What abstract and practical meanings does renewable energy take in both regulatory frameworks and as an area for finance investments/capital allocation?*"

The regulatory environment interfaces with both finance and the cultural setting in which it is cast. As West et al. (2010) suggest, cultural factors are salient in how people receive and understand renewable energy in specific contexts. In other words, incorporating regulation into analyses of renewable energy sectors allows for an exploration of multi-connected ties which go beyond energy legislation and policy. Equally tied to this are valid justifications for exploring regulation in renewable energy, economy, and finance. For example, the advent of renewable energy has been followed by evidence of increased price volatility of energy which has resulted in a need for "stable regulatory policies [to] reduce volatility" in Spain (Ciarreta et al., 2020). Regulation is therefore instituted to address interests which go beyond legislation and adherence to standards. It has socio-cultural and economic implications.

Adding to the above-stated usefulness is a reading of regulation's importance because it ensures adherence to both local and international standards and protocols. As Güney (2019) notes, renewable energy is a vital cog in the sustainable development agenda. Embracing it therefore implies that an operational and regulatory framework ought to exist to guide the various stakeholders in the arena. The normative value of incorporating regulation complements practical worth which has been addressed by scholars detailed in the subsections below.

The study does not uncritically engage and adopt regulation. Rather it is sensitive to cautions by Bellantuono (2017) and Wang et al. (2022) who state that regulatory stability and processes which are retrospective and formulaic are inadequate in entrenching renewable energy into economies. In other words, regulation which seeks to redress identified challenges in retrospect as well as to derive clear set of outcomes in a sector that remains very dynamic, are regulations which will most likely face numerous encumberments. Rather than adopting a rigid approach to regulation, the same scholars recommend that substantive

regulations and changes which are not just national, but which incorporate transnational ties are adopted. This study agrees and embraces a wider scope of regulation to incorporate local, national and international regulations in an effort to ensure that -where applicable-, both rigid and flexible frameworks are considered in the South African context.

As stated towards the end of Chapter 1, regulation encompasses legislation and policy, conventions, and declarations in renewable energy. The specific prevailing frameworks will be presented in sections below. For now, it is useful to note that in other jurisdictions such as parts of the European Union, some of the policies identified are inclusive of:

- Energy-efficiency standards
- Feed-in-tariffs
- Energy performance certification schemes (Lu et al., 2020)

The study adopts this broad conception of regulation, in addition to the perspectives that will now be discussed from the literature.

2.3.1 The broad conceptual issues in regulation

As stated in Chapter 1 with respect to Ghana's experience, there are gaps between policy and application of regulation in renewable energy. The implication is that what ought to be and how it is codified in policy and regulation are issues which do not always align. Misalignments form the basis for a study by Koponen & Le Net (2021) which explores decision making in renewable energy investments. Their study suggests that territorial focus misses intersubjective ties which are variably important for investment decisions as well as for operations. They then develop a decision-making framework to guide in investment decisions, but this applies within a specified regulatory environment. Importantly for the study presented here, their work hints at the embeddedness of regulation and finance in renewable energy. However, their focus is on decision-making whereas the study considers an actor-oriented analysis.

Adopting a different perspective from decision-making models, Sanderink & Nasiritousi (2020) consider two close-linked concepts: institutional interaction and effectiveness. Their interest lies in how institutions relate and how such relations converge to yield effectiveness. Perhaps unsurprisingly for an institutional approach, the outputs are normative, suggesting that good institutions have the potential for yielding effective renewable energy adoption. While their study relies on analysis of stakeholder ties, it is too broad in discussing institutions which can be interlinked and all-encompassing along a value chain. The study suggests that a more nuanced scope which identifies finance and regulation might be more

incisive and fruitful. For example, in a study that explored macro level institutions, Frutos-Bencze et al. (2019) suggest that monetary policy plays a key role in the adoption of renewable energy. Elsewhere, Wall et al. (2019) argue that policy interventions have a marked bearing in attracting foreign direct investment (FDI) to renewable energy. Other elements include Feed in Tariffs (FIT) followed by Fiscal Measures (FM), such as tax incentives and Renewable Portfolio Standards (RPS). While not all financing is sourced from FDI, it is interesting that finance and the regulatory environment (broadly conceived as policy and law and enforcement) are intertwined.

It would appear that the role institutional quality in private institution participation in infrastructural development has received particular attention in literature studies (Taguchi and Sunouchi 2019; Ruiz Diaz, 2020; Gupta and Verma, 2020). However, not much is known about the renewable energy sector on the African escarpment. In South Africa where data and studies are relatively more accessible, scholars such as Adebayo et al. (2023) have engaged the debates on environmental impacts. They show that “financial development and environmental-related technologies lessen CO2 emissions while economic progress intensifies CO2 emissions”. Such insights are invaluable but also reinforce the suggestion of a dearth of scrutiny on institutional studies in the sector. Moreover, beyond Africa, studies of renewable energy seldom attend to the role of stakeholders within an institutional framework.

Regulation of the sector is not only of interest due to theoretical matters but has practical importance as well. It adds value to renewable energy planning practice especially when complemented by analytical frames which consider the various stakeholders engaged (A. González & Connell, 2022). In addition, the architecture of the sector continues to change such that new forms of relationships emerge. Consider for example, the changes that transpire when “energy consumers also become producers, a new energy market player” (Milčiuvienė et al. (2019). Under such circumstances, the meanings of seller and buyer become blurred in a rigid legal framework. This complicates the identities of stakeholders and therefore demands the deployment of appropriate conceptual lens to consider which actors are involved and how they function in the ecosystem. For this reason, we deploy stakeholder theory which is the lens positioned in this work.

2.3.2 The regulation of actors

Regulation targets numerous areas. In this section, the regulatory approach that is considered is one where focus is on any of the numerous actors in renewable energy regulation. For example, the EU regulatory and policy framework with respect to prosumers

(Inês et al., 2020) and what they identify as “energy citizenship”. This approach recognizes that the renewable energy sector has adopted increasing complexity such that producers and consumers in the European Union are not always clearly defined. The widely encompassing group demonstrates fluid positions that parties occupy in the sector. One can be both a producer and a consumer or occupy these positions at various points in time. Regulation of such dynamic actors is therefore necessary. Importantly, in zoning in on the regulatory attention on actors, the review connects regulation to the stakeholder theory which will form the study’s conceptual spine. Actors attended to can be producers, consumers, regulatory agencies, policymakers, international funders, local funders, public and private sector entities, pressure groups and much more. Their interests do not always coalesce into a harmonious collective; neither do they always diverge in interests. As such, an actor-oriented engagement with regulation poses immense potential for exploring the interests, contests, negotiations and agendas of stakeholders in terms of regulation. As the discussion below will demonstrate, a multi-stakeholder approach has yet to be thoroughly attended to especially in South Africa’s case. Moreover, for many studies that will be detailed, discussions often attend to a small selection of stakeholders and often, without engaging their concerns in a rigorous manner.

With a serious if not existential challenge around energy in South Africa, attention has focused on the regulation of the supply side of renewable energy. Noting that there is scarcity of energy in many parts of South Africa, Baruah & Enweremadu (2019) propose a decentralized renewable energy program which will ostensibly avail clean energy to households in all provinces except for Gauteng and KwaZulu Natal. Their focus is on manure and solar radiation as renewable energy options. A decentralized approach sets the tone for some form of transition away from a centralized model to one which is much more inclusive. It is yet to be proven on a wide scale though. What has been proven in a different context is regulation’s importance for renewable energy transition and how this has is tied to finance and environmental controls (W. Liu et al., 2023). Renewable energy transition results in a shift from established models to an architecture where more renewable technologies and actors contribute more to energy production and consumption. Regulation of such processes of change is an important feature that is often initially state-led. We get a sense of this from the Chinese experience.

Still on the regulation of producers, places such as the United States of America have adopted technical regulations to ensure grid stability in areas where renewable energy is increasingly contributing to the established grid (Al-Shetwi et al., 2020). The focus here is on regulation in a market-based system. This is therefore a feature which would appear to apply

to some countries but not in others, depending on social and economic policy (to contrast, see: Lu et al. (2020).

He et al. (2016) conduct an audit of the Chinese regulatory context and subsequent proposals of possible directions to take for a better regulatory architecture. Among some of the areas where China has been largely concerned with regulating in renewable energy are economic regulation as well as limiting the scope for market adjustment. Their study is meticulous for demonstrating the various ways in which China has approached regulation and the areas which remain open to reconsideration and/or adoption. Some of the regulatory approaches cover, energy law, energy pricing, cost sharing, measures for supervision and administration of power. Furthermore, they highlight the systemic nature of ties which brings together economic, social, and antitrust regulations and how regulations have been developed in a phased approach. Phases included government-support, transitional and market-driven phases. Within the South African context, the study will pay focused attention to "*What roles stakeholders play in the regulation and financing of renewable energy projects in South Africa?*"

2.3.3 Regulating for the environment

Unsurprisingly, interest in regulation of renewable energy also revolves around its environmental impacts. A study by Zhao et al. (2022) has considered how regulation affects green economic growth, which is premised on adoption of clean, sustainable energy solutions. In the study, the research methodology was qualitative, attending to "fuzzy scores" to measure regulation. Yet, a qualitative examination also poses immense potential for generating new knowledge around renewable energy regulation. Regulations which address environmental concerns tend to incorporate other legislations in enforcement. Hence, while focus might primarily be on renewable energy, when the environment is concerned, to comprehend fully what the law states, sections of the renewable energy statute will have to be read together with sections of an environmental or climate-oriented statutes. Agencies involved might also be much more diverse to reflect the statutes, policies and institutions involved.

A factor that influences the extent of impacts on the environment is the technology used. Drawing from a study of the Organisation for Economic Cooperation and Development (OECD) countries Bashir et al. (2022) suggest that more cohesion between regulations and technologies is required to promote renewables energy industries. They also consider the role of taxes in moderating effects. However, the dimensions attended to are insufficient as regional industrial centres can bear positive economic yields while damaging the

environment (Márton et al., 2022). In this light, there is a need for more strategic focus at greening the economy through public and private measures which encompass regulation and legislation.

In considering environmental regulation, some countries have adopted a multisectoral approach. In Egypt for example, numerous ministries have been drawn into a multi-focal group which attends to water, energy, and food. Evidently, conception of what constitutes the environment can be very broad and therefore imply focus in multiple directions. This breadth is discernible in the scholarship that has preferred to approach renewable energy either from a climate change angle or via the sustainable development discourse (Albert, 2022; Doğan et al., 2021).

2.3.4 Considering regulation of finance and for economic growth

Capital and finance are widely researched in the renewable energies scholarship. It is hardly surprising then that regulation of finance also features in the academy. Cheng et al. (2023) recognize the interconnection between regulation and finance in the examination of ties between "green finance regulation on renewable energy utilization at the firm level". In casting their lens in this direction, they magnify the regulation of finance and not necessarily technology or operations. Such focus is consistent with the social, political, and environmental concerns of the globe today. In an era where climate change, green economy, and Environmental and Social Governance (ESG) are central to policies, processes, and activities of many organisations, where funding comes from and is allocated to are matters of wide interest.

Economic growth allows for the increased uptake of renewable energy generation and investment (Adedoyin et al., 2021a). This suggests a dialectic relationship where both growth and renewable energy feed off and thrive off one another. Given such ties and with finance propelling economic activity through investment, the relevance of considering finance in the study becomes more evident.

2.3.5 The literature on regulation in South Africa

So then, what is the state of knowledge of renewable energy regulation in South Africa? As a starting point, we recognize that although Naicker & Thopil (2019) observe that regulations are among the key factors to consider in decision making of which renewable energy technology to adopt, they nonetheless do not incorporate it in their analysis when discussing South Africa's possibilities. Making formal decisions around what technologies to adopt entails considering the factors explored by Naicker as well as regulation. This is a perspective adopted by Murombo (2015) in his PhD thesis. What is clear from Murombo (2015)'s study is that there is a rich background to regulation of renewable energy in South

Africa which implicates a vast array of actors. While some of the actors are engaged with some level of complexity, there remain many others which were neglected and which in the passage of time have emerged as new entrants.

For Matsuo & Schmidt (2019), devising a regulatory framework alone is inadequate. Instead, the policy priorities employed have a bearing on the trade-offs that are taken between (1) minimizing cost of renewable energy and (2) potentially costly adoption of renewable technology. The policies adopted in South Africa and in Mexico suggest a direct connection to how adopting renewable energy can result in dependence on foreign value chains and capital. In this sense, the policy framework (which is crafted within the confines of regulations) reveals strong ties to both technology adoption and access to capital. The matter of dependence on foreign capital ties to this study's engagement of financing. However, it is not clear whether regulations adopted are also dependent on influences from foreign entities. A further review of South Africa's institutionalization of regulations might clarify this and will be attended to later on.

While regulation is pertinent for suppliers of energy in the production of renewable energy, Salari et al. (2021) adopt a broader scope which conceives of regulation as important in shaping consumption. Focusing their attention within the USA, they highlight that energy consumption may be affected by state regulations. Importantly, in attending to a single country, they highlight the variable regulatory features from state to state. Also focusing on a single country, Jain & Jain (2017) argue that public procurement and implementation of renewable energy in South Africa is primarily through government and the energy regulator. This contrasts with the American approach which has opened up avenues for many players to contribute to the grid. The study explores the South African context to understand how regulation has contributed to this state of affairs.

Writing on China, Wang, et al., (2022) highlight the importance of regulation which attends to anti-corruption. Without turning the section into yet another justification of the research, it suffices to note that anti-corruption regulations are an aspect which would be of interest in South Africa where energy production and supply has become a contested ethical and political terrain.

2.3.6 Criticism of regulation

In closing the section on regulation, the study flags some of the concerns that have been raised on implementing regulation. Formulating regulations is on its own insufficient in devising a framework that is useful for all actors in renewable energy. As Obeng-Darko (2019) and Gboney (2009) discuss through the Ghana experience, regulation requires

sufficient legislation which is enforced by appropriate regulatory agencies. As a result, it is important that as many dimensions as possible are considered in regulation and even beyond. Also drawing insights from Ghana's Act formulated in Ghana to "provide regulatory framework and monetary incentives to boost private sector investment and promote the use of renewable energy in efficient and sustainable manner" (Aboagye et al., 2021a). Importantly, they highlight the chasm between codified regulation and policy frames. In other words, when attending to regulations, it is not the rules and codes alone that matter but also how they are framed for specific goals and ends in policy. The Ghanaian case demonstrates that although regulations exist in the Renewable Energy Act, operationalizing them to meet specific targets is likely to be unsuccessful. In the European Union, similar arguments have been made by Häbel & Hakala (2021) with the added recognition that renewable energy policy coherence remains elusive especially when considered with respect to sustainability.

From these analyses, it is evident that while regulation is useful, it is not useful in and of itself but requires support from various agencies. In addition, it requires close connection to policy in order for the codified and formalised to be meaningful in practice. This is an area which brings together policy and practice through the question, "*What policy and practical implications do the meanings have for deploying renewable energy in South Africa's urban and rural areas?*" An area where this chapter has already hinted some ties with regulation is finance. It is a timely fact that we consider this aspect as it likely offers support to regulation and vice versa.

2.4 Financing

Having considered regulation as an important pillar in renewable energy diffusion, we now turn to financing. If regulation in renewable energy is scantily attended to, then finance fares even worse by comparison. Resultantly, the study recognises that it is important to think about financing conditions for stakeholders in renewable energy. Thinking around finance conditions is relevant because renewable energy is still in its nascent stage of adoption in many countries. Appropriate circumstances for its adoption are likely to be a point of interest. In engaging the thinking on financing, two prominent streams emerge: conditions for finance as well as models of financing. Possibly because of multiple interests and the diverse nature of funding agents, there are many conditions which can be deemed ideal for entering the renewable energy sector. In considering finance conditions, Höfer & Madlener (2020) suggest that macroeconomic conditions and experience effects are vital conditions in accounting for cost and sustainability of renewable energy technologies. The scholars contribute to knowledge on the drivers of financing change (monetary policy changes, technology deployment, growing renewable energy technology markets and maturity in a competitive investor community). They present a normative framework for what would be

ideal for adoption of renewable energy. While useful, their scholarship is constrained by methodological issues which limit generalizability. Context matters and so conditions which work in Europe might not be sufficient in other parts of the globe.

The literature identifies a host of models and techniques which have been deployed in providing finance for renewable energy (Fleta-Asín & Muñoz, 2021). A rich point of departure in considering some of the types is a snapshot provided by some researchers. In a review of literature spanning between 1992 and 2018, Elie et al. (2021) they attend to finance of renewable energy through a typology of market and non-market financing instruments. The types identified are:

- ✓ public support policies in European countries via feed-in tariffs (FIT)
- ✓ finance via private financial investors
- ✓ public support policies in Anglo-American countries (Renewable Energy Certificate (REC) and Renewable Portfolio Standard (RPS))
- ✓ finance via non-financial investors: individuals/households
- ✓ solar public support policies
- ✓ the assessment of RE investment opportunities by private investors
- ✓ the impact of public or private finance on RE deployment and other economic variables
- ✓ clean development mechanism (CDM)

To these types are added creative instruments and approaches which include harnessing blockchain (Gawusu et al., 2022) and resorting to green bonds. Green bonds have been deployed in the Association of Southeast Asian Nations (ASEAN) countries as instruments produced by the regional bloc for raising finance which targets clean forms of energy (Azhgaliyeva et al., 2020a). The world of finance meets sustainable development in pursuit of energy distribution and equity. Bonds are a specific instrument in financial markets. The green bonds approach can be understood as a constituent of an even broader theoretical and increasingly practical field of green financing. Green financing entails financial instruments that are environment and climate sensitive and designed to ensure that funding is directed to areas where climate mitigatory technologies are in use. In the literature, some of the concepts that are tied to green financing include green bonds, green growth, environmental performance, environmental regulation and sustainable finance (Sharma et al., 2022). The anticipated yield of engaging green finance is green economic growth whose potential has been considered in the European Union by Dzwigol et al. (2023); they however suggest that green growth transpires in a nonlinear pattern. Attaining funds is therefore not a guarantee of attaining clean energy nor green growth.

Equally interesting in the field of financing of renewable energy is the methodological innovation deployed. For example, Le et al. (2020) deploy a “two-step system generalized method of moments (GMM)” in investigating the role of finance in renewable energy deployment. Their approach considers the experience of 55 countries to identify the various contributions that financiers make to renewable energy. Although revealing in terms of multi-stage contributions of finance, the perspective provided is narrow because finance alone does not determine the adoption of technology. There is more to the process of technology adoption than funding. It is for this reason that the study pursues regulation as an ancillary cog in the nexus.

With respect to emergent innovative financing models, Hochberg & Poudineh (2018) discuss a renewable auction design as potentially useful for raising funds for renewable energy. This forms a markedly different approach compared to the market based approaches in renewable energy consumption as well as pricing which tap into Foreign Direct Investment (Tan & Uprasen, 2022; Trujillo-Baute et al., 2018). In the latter two studies, while the approach is helpful in grasping funding through markets, deploying quantitative methods results in a partial picture of the developments in the sector. A qualitative approach complements the scholarship by highlighting developments in the sector and detailing how phenomena change.

Practical value of engaging finance of renewable energy stems from the diverse nature of actors. As already stated, this partly justifies why the study engages stakeholder analysis. Within the finance domain, there is evidence of a rethink in how renewable energy is approached as Butu et al., (2021) demonstrate with respect to small-scale renewable energy financing. This then offers a challenge to banks to either reform, rethink models or progressively lose out on supporting renewable energy players as happened in Poland (Daszyńska-Żygadło et al., 2021). A key challenge that adds a layer of complexity is the concept of grid parity which is attaining a state where the cost of renewable energy production matches that of “traditional” energy costs on the grid (Beck, 2014). Grid parity can be an inhibiting factor in how renewable energy is financed because it suggests possible viability or lack of it.

2.5 Conclusions

The chapter has detailed renewable energy as a concept and practiced area. It has highlighted that within the area, finance and regulation are important. Regulation matters because there are gaps between models and policy, actors are adopting a janusian identity and legal instruments cannot keep up with the dynamism. Finance matters because of climate and environmental concerns, and models keep bearing the brunt of a sector in flux.

While the literature has attended to aspects of these issues, in some instances through stakeholder theory, the salience of institutions – in terms of regulation and finance- and their entanglement with other stakeholders remains scantily addressed.

With respect to the chosen empirical site, the section has noted that literature has paid attention to South Africa's regulatory framework as well as hinted at financing of renewable energy. However, these literatures have approached these intertwined dimensions separately. The study merged the two as intricately tied just as stakeholders within them are. As such, theorising of the multi-actor terrain is as yet underappreciated. The stakeholders of interest in the study are multilateral, public and private financial institutions, financial regulators, energy regulators, renewable energy firms, consumers of renewable energy, "prosumers" (Milčiuvienė et al., 2019) in renewable energy.

Chapter 3: Research questions

3.1 Introduction

The preceding chapters have discussed an introduction of the subject with specific focus on the renewable energy sector as well as the stakeholders within it. Chapter one provided an introduction, setting the stage for what the study engages. Chapter two then expanded the discussion in conceptual and empirical directions. The conceptual directions that we engaged attempted to make sense of what stakeholder theory proposes and what are the key debates within stakeholder theory. It then invoked renewable energy scholarship into the discussion to highlight how stakeholder theory intersects with renewable energy as a field of inquiry. Building on these two chapters the current chapter engages the key research questions in light of the conceptual discussions and the empirical papers that exist so far. In addition, the chapter situates the questions of this study within the broader discussions and highlights how the questions add value both conceptually and empirically. The following sections will highlight the overarching question and sub questions which will guide the detailing and thinking around the study.

3.2 The research questions

The main research question that the study engages is: How are renewable energy projects understood, implemented, financed, and regulated by stakeholders in South Africa?

Ancillary questions which deepen the study's agenda are:

1) When self-reported among stakeholders, which stakeholders are identified as most important in renewable energy conception and implementation in South Africa?

Although stakeholder analyses have been conducted for renewable energy participants in South Africa (Pillay, 2010) and beyond the scope of this study (Daszyńska-Żygadło et al., 2021; Höfer & Madlener, 2020; Maqbool et al., 2022), the study adopted the basics of consulting a stakeholder analysis according to Jepsen & Eskerod (2009). The study approached this question by seeking an understanding of who the key stakeholders were through stakeholders' own lens as opposed to through an assessment of what the sector revealed. In this way, it explored who is recognised and who is not, who is deemed indispensable and who is less central; Introducing the idea of importance complicates the analysis because it entails a political and ethical process which researcher becomes entwined in. Other researchers identify additional steps which must be conducted in a

stakeholder analysis such as characterization of power and mapping out relationships. These are the first issues attended to in the stakeholder analysis here.

2) What are the typical financing models used in the renewable energy sector in South Africa?

Studies have attended to financing of renewable energy in various jurisdictions (Azhgaliyeva et al., 2020a; Mazzucato & Semieniuk, 2018) but little has been documented in the South African experience. Moreover, even where financing has been hinted at as did (Abate, 2022; Xu et al., 2020), the finance models and their application have as yet received little attention with the result that financing has not been sufficiently examined on its own merit and in light of regulation of the field.

3) What roles do stakeholders play in the financing and regulation of renewable energy in South Africa?

This question is useful for identifying the regulatory performances of stakeholders within the renewable energy sector. Specifically, the question is interested in the rules performed with regards to regulation and financing which are the two key dimensions of interest in the study. Brugha (2000) adds that because of its growth from management studies stakeholder theory is versatile which is both a strength and a weakness. It is a strength that stakeholder theory can be applied in various studies across disciplines, as demonstrated here. It is, however, a weakness because it is open to misapplication in identifying stakeholders. For this reason, the current study approaches the question of roles of stakeholders from the perspective of stakeholders themselves. An attempt is made to be as inclusive as possible while also ensuring that the study does not include everyone as a stakeholder.

4) What abstract policy and practical meanings does renewable energy take in regulation and as an area for finance?

This question is deployed to engage the abstract meanings and practical meanings offering renewable energy from a regulatory perspective as well as from financiers. Approaching renewable energy as an abstract concept was adopted to establish the idealised notion of renewable energy in South Africa. Already, it has been established that stakeholders have been identified in South Africa's sector but how they think about, envision, and imagine renewable energy are areas which remain unexplored. The

literature review has already indicated gaps pertaining to finance and regulation scholarship in the global majority. What researchers and policymakers envision as individual entities is known (Fortuin, 2022; Jain & Jain, 2017a; Winkler et al., 2017) but a broader, sectorial, perspective remains undocumented. The question allows us to also consider the variations in conceptualization of renewable energy from a geopolitical perspective.

In engaging such questions, the gaps between renewable energy theory and policy are highlighted as they manifest across multiple stakeholders. In addition, the meanings attached to renewable energy are considered from multiple lens just as are the policy and practical issues around its financing and regulation.

The literature review has identified ways in which renewable energy is conceived. While the focus is on wide sectoral conceptions, there are more nuanced perspectives to be considered with respect to multiple understandings at project level. The two are intertwined dimensions which require further scrutiny. Equally important is a breakdown of the many dimensions through which stakeholders understand renewable energy. Hence a focus on financing and regulation were adopted. The question proceeds to probe into implementation of renewable energy projects in South Africa. Stakeholder theory is useful in exploring these various avenues because of the involvement of different actors in the thinking around renewable energy at policy level and in reading regulations. Additionally, there are multiple actors involved when projects are implemented, and assessments made of whether there is any progress or not.

3.3 Conclusions

Building on the work from previous chapters, the current chapter has outlined the research questions first from a broad position and then via supporting questions which will help to unpack the wider question. With the questions clearly articulated, the next chapter details how the study went about seeking answers to the questions in a scientific manner.

Chapter 4: Research Methodology

4.1 Introduction

Having detailed the literature in Chapter 2, the present chapter presents a research agenda and roadmap that the study has employed. The chapter outlines the philosophical grounding in which the study is based, how the study was operationalised and what concerns were considered in conducting fieldwork. In addressing the concerns, the chapter emplaces the researcher's positionality to address the question of understanding who the stakeholders are in the study. This is done via a discussion of positionality and as part of reflexivity. In addition, attention is paid to the research methods that the study will utilise, highlighting the scientific mode of selection as well as justifications.

Although research methods are readily identifiable through some features, there remains scope for deploying some innovation and creativity so as to fully answer complex questions. Lê & Schmid (2022) consider some of the innovative approaches that scholars apply in studies of organisations. They assert that innovation largely manifests around some or all three of the following: data generation, data analysis and presentation of findings. In data generation for example, Roulet et al. (2017) suggest that instead of overt participant observation, covert participant observation can yield immense value in some studies. What such approaches then demonstrate is that innovation is not stumbled upon nor haphazardly done; rather, it is based on some principles. In the current study, the researcher strove to engage the generation of data in a creative way, initially considered through data triangulation methods (detailed below). The methods are part of what scholars have identified as a research design. This in turn is formulated within the philosophical frames of a research paradigm. It is therefore important to detail each aspect in the following sections as this lays the scientific basis for how the research was conducted.

4.1 Research paradigm

A research paradigm is a worldview that is held by a community or a "network of basic, metaphysical assumptions underlying an area of academic enquiry" (Su, 2018). The common types are positivism, subjectivism, and constructivism. Because the stakeholder insights do not represent an absolute, infallible truth or knowledge, the study avoids positivism and adopts a subjectivist paradigm instead. Moreover, given that the study explores questions around how stakeholders relate as well as practical and policy matters in renewable energy finance and regulation, the study is qualitative in nature. That is to say, it largely draws on qualitative data in discussing the issues. Quantitative studies are largely concerned with

numeric matters and tend to be the focus among positivist researchers. Qualitative study on the other hand is interested with questions around experience, meaning and perception of participants. They therefore tend to be subjectivist. This study deployed qualitative approach because it is concerned with questions of who is involved in what processes within the renewable energy sector. The finer questions regarding interactions of stakeholders also explored why stakeholders hold the perspectives that they do. As such, these questions were better answered through qualitative methods. Ordinarily, a justification must be presented for not adopting quantitative research. The primary reason is that quantitative studies do not concern themselves with the detail required to explain how and why some phenomena occur in detail. Instead, they are largely concerned with establishing associations, drawing inferences as well as establishing causality by empirical means. The current study explores roles of stakeholders and therefore goes beyond just identifying who is involved but what they do and how the interactions converge.

Having oriented our gaze towards the pursuit of knowledge that the study engages, it is also important to consider how this knowledge is sought after in a meticulous manner. The structure in which data are collected and knowledge ostensibly formed is the next section's focus.

4.2 Research design

Research design is "a conceptual structure within which research would be conducted" (Pandey & Pandey, 2015). It is a clear presentation detailing how the study will approach the research field, the research participants, the data from the field and the meanings derived from the data. The following subsections outline these issues in an itemised manner.

4.2.1 Research setting

The research setting refers to the specific place where actual data will be collected. The study was situated in Gauteng Province, which is the Republic of South Africa's economic hub, making it a vital centre of capital, business activity and therefore important for the renewable energy sector. Within this hub, focus was on the renewable sector with particular attention on solar and wind energy and the various stakeholders within. As such the study can be interpreted as a focusing on South Africa's renewable energy sector's stakeholder experiences and engagements. Important to emphasise that the location of firms involved in the study is in Gauteng even though some of them include firms from outside South Africa. As such, location is understood as the site in which firms and other entities operated.

4.2.2 Study Population

According to Mkhize & Radmore (2022), there were a total of 112 independent power producers in South Africa in 2022. In addition to these, there are no less than eight government departments involved in the formulation of policy as well as regulation.

On the demand side, the bulk of energy consumers are either households or industrial consumers (IEA, 2022). From these broad groups, a sample was formulated for a more manageable size to be engaged in the study.

4.2.2.1 Sampling

Due to resource limitations, the researcher did not envisage scouring over all of Gauteng province. Instead, the researcher anticipated that a purposive sampling approach would be appropriate to adopt to ensure a more manageable, yet scientifically rigorous study. The specific sampling frames are presented below.

There were no less than eight government departments involved either directly or indirectly in the regulation of renewable energy. The study engaged participants from a few of these departments as well as local municipalities. These constituted the sampling of regulators in the renewable energy sector within Gauteng. From a total of 17 commercial banks, and 3 development finance institutions the study gained access to two bankers who participated in the semi-structured interviews. Bearing in mind the above listed sample frame, the research aspired to use a non-probability-based sampling technique, namely, a purposive sampling. The study recognised that sample sizes depend in part on the scope of the study. For example, Hennink & Kaiser (2022) affirm that between 9 and 17 participants are a sufficient number during interviews. In agreement with Shaheen et al. (2019), the study noted that a small sample size as suggested by Hennink & Kaiser (2022) depends on the size of the population to start with. Such a number was unlikely to be sufficient in a study that considered actors within a province as broad as Gauteng. So then, the sample size that was deemed sufficient and representative is one that reflected data saturation. The realised sample size comprised of 13 key informants, all of whom were interviewed and represented banks, independent power producers, households, and municipality officials.

The study focused on Gauteng-based, purposively selected firms in the renewable energy sector, two persons who represented regulators (the government and the respective ministry) as well as one financier which each represent government, local private sector, and a transnational/multinational entity. The rationale behind selection of the firms is that each would represent a private sector firm whose ownership structure comprised of various interests. The participants stated had initially been anticipated to include regulators who would have been purposively selected to represent the main policymaker in South Africa as

well as the specific line ministry which crafts and monitors adherence to regulations. Financiers would also have been selected on the basis of their ownership form which is either state, private or hybrid. The fourth group that was anticipated to make up the study sample were individual consumers and industrial consumers as well as a research institute or pressure group. There is very little variance between the planned and what was eventually attained in this regard.

A layout of the sample groups and sizes is presented below.

Table 1: Sample Groups and size

Sample Class	Sample Group	Sector	Sample Size
Producers	Private	Solar and Wind	6
Regulators	Mineral Resources and Energy		1
	Municipality		1
Financiers	Local Private	Bank	1
	Government		0
	Trans/multinational		2
Consumers	Individual/domestic consumer	Household	2

But, why this sample size? Why not smaller or bigger? Furthermore, why not apply other sampling techniques? The study has already indicated its qualitative orientation. The sampling frames that are consistent with qualitative study are adopted, that is, sampling frames which are non-probabilistic. Rahi (2017) identifies such sampling approaches as purposive, convenience, and snowballs as constitutive of qualitative research. In adopting a purposive sampling approach, the study adopts an approach which were consistent with the study's population and accessibility. The renewable energy sector is already defined and actors within it are known. Some are involved in regulation, finance, or both, as well as other activities. As such and given the study questions, only those actors involved in regulation and financing are considered in the study. Accessing such a sample would be difficult if random methods were used as actors fitting other criteria might have to be included.

The study recognised the complexity stemming from deriving sample sizes in qualitative research (Hedges & Bliss-Holtz, 2006; Sandelowski, 1995). Given that the study employed 'a non-positivistic epistemology' (Saunders & Townsend, 2018) in the sampling, a set number can hardly be deduced. Therefore, in stating a minimum, the study was guided by the rationale that an adequate sample size for data collection will only be discernible when 'data saturation' (Saunders et al., 2018) is attained. Consistent with saturation, Malterud et al.

(2016) propose the concept “information power” which they devise “to guide adequate sample size for qualitative studies”. Both concepts are subjective as they depend on the size of the study, the duration under which the study will be conducted, study context as well as research paradigm (Boddy, 2016). As a short-lived study, the researcher deemed saturation to have been attained when the responses from participants were either repetitive or no new materials with markedly different information could be extracted from the field.

4.2.3 Research instruments

Data were collected through semi-structured interviews whereby a list of issues and questions to be covered during the interview were prepared in advance. An interview guide was drafted and utilised in questioning participants who have largely comprised of key informants (see Annexure 1, 3 and 4), with the exception being domestic/household consumers (see Annexure 2). These sources were deployed as primary data. Secondary data was also collected from official documents, and reports from government departments such as policy papers, energy sector reports[9] as well as research institutes[10]. The justification for incorporating secondary data was that an additional qualitative instrument would allow for data reliability through triangulation. As one scholar notes, triangulation is “a research methods strategy that uses multiple data sources, researchers, theories, or research methods to ensure that the data, analysis, and conclusions of a research study are as comprehensive and accurate as possible”(Moon, 2019, 103).

Four interview guides were designed for each sample class (see Annexures 1, 2, 3 and 4) as identified in Table 1 above. The interview guides for financiers, consumers and producers were pre-tested on non-participating individuals who are actors within the respective energy sectors. For example, a representative of an independent power producer was approached to test the interview guide in the area of producers. This representative was deliberately chosen to not meet all of the sampling criteria (he was not from Gauteng). These tests were devised to check for clarity of questions and estimated duration of the interviews. A similar approach was deployed for consumers (1) and financiers (2), and the regulators sample group (2).

Although questions were not altered after conducting the pilot tests, the exercise itself was insightful especially for a novice researcher engaging fieldwork among people of different characters and dispositions. It was clear from the onset that securing an agreeable time would be challenging and so instead of face-to-face interviews, the researcher also embraced the possible use of digital platforms such as Microsoft teams, Zoom and even WhatsApp call. The platform of choice in the interviews eventually became Microsoft Teams

[9] Media & Publications | Department: Energy | REPUBLIC OF SOUTH AFRICA
[10] Energy Research Centre | CSIR

which all participants already had either installed on their phones or laptops or in some instances desktop computers at work. The adoption of this platform proved useful in circumventing a logistical nightmare which had threatened to be a major challenge especially in the pilot stage. In this sense, a key learning in the pilot was how to circumnavigate logistical issues which arise in the course of negotiating, securing, and conducting interviews. In addition, the pilot allowed the researcher to gain a sense of what an interview would feel like, how to establish rapports and for how long the session would last. It is here that interpersonal skills mattered in ensuring that one remained as neutral as possible. One participant could be very engaged and eager to contribute in detail while another participant could be disinterested, giving curt replies. The researcher learnt to be engaged without taking the interactions as personal affronts or endorsements. After the pilot studies, the main fieldwork began, encompassing data collection using pre-selected instruments.

4.2.4 Data collection methods

Data collection involves consideration of ethical issues when asking for permission, ensuring a good sampling strategy, suitable recording of information, responding appropriately to issues raised in the field and safe storage of data (Creswell & Poth, 2018). The study collected data from primary and secondary sources. The primary data were collected through semi-structured interviews directed at key informants in the private, and public sectors. Secondary data were then extracted from policy documents, regulations, white papers, green papers on energy and where possible, transcriptions of minutes from meetings or public interviews of key stakeholders. In the progress of the fieldwork, internet sources in the form of articles and announcements on social media became an additional area of collecting data. The logic behind employing a number of data collection tools is that individually, research methods can be flawed (Turner et al., 2017). As such, triangulation of methods is required to give the study more robustness and attend to concerns over the data reliability. In a paper which discusses the value of triangulation in organisational research, Gibson (2017) notes that triangulation “allows scholars to document consistency in findings using different means of obtaining those findings, increasing our confidence that those findings are not driven by a particular method or data source.” This quest for consistency is why semi-structured interviews, and desk research were embraced in this study.

In depth semi-structured interview is a process of data gathering from key people or informants who have a first-hand information or personal attitudes, beliefs and experiences pertaining to the topic that is being researched (DeJonckheere & Vaughn, 2019, 2).

It has already been noted that the study used semi-structured interviews of key informants as well as other study participants; these semi-structured interviews were largely conducted using Microsoft Teams and were resultantly recorded and the transcribed before processing.

With respect to data to be extracted from the interview guides, these were planned to be conducted either in person or for the participant's convenience, on virtual platforms such as Skype, Zoom or Microsoft Teams. The researcher was aware that due to time constraints, some of the key informants might not always be available for an interview and so arrangements were made for times and platforms where they could conveniently participate. One such participant only availed themselves while driving from work to their home while others took time off during work hours. Many more were however free enough to set aside part of their day –often in the evenings– and participate in the interviews. From these interviews, data were automatically recorded and transcribed verbatim on MS Teams for future cleaning and analysis.

4.2.5 Quality assurance

Following Moore et al. (2021) who suggest that data quality assurance precedes the data collection method, the study adopted strategies aimed at ensuring quality throughout the research process. Generally, data quality issues stem from collecting data, types of data analysed, and data analytics deployed. There are also possibilities of variation in quality depending on which platforms are used in research. Woodyatt et al. (2016) assert that in-person focus group discussion generate different quality data compared to online focus group discussions. Moreover, there are differences even between online platforms as some are more quality-driven while others fare poorly (Peer et al., 2021). Considering that the study identified virtual platforms as potent for conducting the semi-structured interviews, the level of detail covered between physical and virtual platforms was attended to. A useful way of ensuring quality management which was adopted from Moore et al.'s (2021) six-stage approach to quality data management was incorporated. The six steps include:

1. Qualitative Research Foundation and Research Design
2. Questionnaire Design and Data Collection
3. Screen and clean data
4. Usage of appropriate methods for the research task
5. Interpret the data to ensure a complete assessment of all perspectives
6. Communicate the process undertaken to ensure data quality at all levels of the research design, data analysis, and reporting of results.

In addition, to these approaches, the already stated sensitivity towards internal validity and external validity was adhered to and incorporated. Data triangulation was adopted for internal

validity (interview guide and desk research) while interpretations and analysis of findings were not generalised to ensure external validity.

4.2.6 Data analysis

Although largely useful in qualitative studies which rely on textual data, the study harnessed the analytical power of thematic analysis. According to Bengtsson (2016, 10) thematic analysis is presented and showed in words and themes, which makes it easy to draw meaning of the results. Thematic analysis was employed to interpret and analyse data. Nowell et al.'s (2017) decision trail was deployed as a guide in employing thematic analysis; they suggest that such a trail entail documenting codes, themes, and examples of where they appear in the data. In creating such a trail, the researcher finds it easier to present a discussion in a thematic manner.

To be clear, identifying and processing of themes was conducted using AtlasTi. Using this tool allowed for ease in data processing, its codification, and then development of themes. This process applied to both the desk research, and the semi-structured interviews. The process of identifying themes was guided by Welch et al.'s (2016) insights on development of concepts from case study research. Like themes, concepts can emerge from the data and become building blocks of theory formation. Although the study does not attempt to formulate a theory -at least in the formal sense-, it nonetheless attends to the themes which will emerge from the stakeholder engagements.

As already stated, secondary data constituted part of the study's instrumentation. Secondary data in the form of reports and online sources such as YouTube, news websites and organisation reports were analysed for thematic consistency. Consistent with data triangulation and secondary data analysis techniques (Johnston, 2014; Turner et al., 2017), the study used secondary data to complement the primary data. Consistent themes were analysed in both primary and secondary data with the research questions serving as guiding frames.

4.3 Researcher positionality and reflexivity

So far, the chapter has addressed the research design and methods that the study will employ. A central player in the study is the researcher himself. It is germane that his position and reflexivity is hinted at here. The researcher is employed in a company that is very active in renewable energy in South Africa and beyond. As such, the researcher is positioned to know some of the key actors regarding renewable energy financing and regulation in South Africa. The advantage is that the researcher can readily access some key stakeholders and also some secondary forms of data.

However, as the researcher soon realised upon commencing fieldwork in August 2023, there are potential challenges in the form of researcher's own bias as well as possible limitations with regards to the quality of data that known participants might share. In the latter case, detailing of participant reflexivity (Cassell et al., 2018) is made. However, prior to reflecting on engagements, a mention of biases is useful. Early on in the study, the anticipation was for participants to generate very new insights that demonstrated a level of sophistication and intimacy with the renewable energy sector. Without realising it, this was an inherent bias which militated against households. As the empirical chapters will also reveal, the general perspective of households was as receivers of a product, technology and users of rules. If understood as a power matrix, households were the least powerful. In this stage, the researcher acknowledges that he too had been dismissive of the potential contribution of households to a technically detailed subject area. Where others spoke of 'wheeling' and 'off takers', the households that were engaged at the beginning appeared completely detached from familiarity with regulations. After two interviews, the researcher then realised that his bias was setting him up to miss a key issue in what was unfolding. The silences and lack of familiarity were data in and of themselves. As such, more care and attention were deployed in the direction of subsequent engagements with households.

As had been laid out in the preliminary phases of the study, hedging against these concerns, the researcher had set out to adhere to the theoretical frames which do not bear the researcher's own biases. In addition, participants would be given self-administered questionnaires which are highly structured and then semi-structured interviews which will enable much more open discussions.

4.4 Research ethics

The researcher saved the data in files that bore no markers of the participant's identity. In addition to anonymity, the researcher ensured that storage of data was done in a secure place which third parties did not have access to for processing. Some of the places included Google Drive, on an external hard drive and on in a password protected folder on laptop. Other ethical concerns which the study took care to attend to were informed consent (see Appendix 5) prior to gathering data, as well as confidentially. Importantly, as an academic project at the Gordon Institute of Business Science, ethical clearance was obtained from the Institutional Ethical Review Committee. After attaining clearance, the researcher could then engage in fieldwork within the dictates of the ethics protocols.

4.5 Study limitations

There are logistical and methodological limitations which applied to the study. Logistically, the study is confined to less than one year of fieldwork and therefore implies limited time and

limited resources deployed into engaging the research questions. Only a few stakeholders could be accommodated in the study. Rashid et al. (2019) add that students engaged in business case studies encounter challenges which include clarity, selection, and operationalization of qualitative case study. The research methodology attended to clarifying who would participate and how the approach would be conducted as well as how the researcher would engage in the study. While these limitations were attended to, there however remained limitations which applied to the internal validity of the study.

More broadly, limitations apply to “internal and external validity; internal validity relating to limitations of the study design and its internal integrity, external validity relating to the outward generalisability of the reported results” (Greener, 2018, 567). With respect to external validity, the sampling technique adopted as well as the general research paradigm adopted imply that the qualitative study will not garner an accurate representative sample of the population.

4.6 Conclusions

The chapter has sketched the methodological issues which were addressed in the study. It situated the study as a qualitative enquiry into renewable energy in Gauteng province. A sample of actors was purposively selected as a starting point. This is then developed through recommendations as a snowball to create a sizeable sample from which data were extracted using semi structured interviews, questionnaires, and desk research. The study conducted data collection and storage with ethical concerns at the forefront. It is with the research structure outlined here that findings, discussions, and analyses are then conducted in the ensuing chapters. They form the remainder of this document’s focus.

Chapter 5: Research findings

5.1 Introduction

The chapter presents a snapshot of the key findings from two key data collection methods which were used in complementary fashion in answering the research questions stated in Chapter 1. The two methods are primary and desk research. The chapter starts with primary data and reveals the key insights from study participants who were recruited to contribute through semi-structured interviews. The key issues that were identified are presented following the research questions which were outlined in Chapter 1. In this way, the connections between what was meant to be covered (Chapter 1) and what was established (the current chapter) are made. After presenting findings from the primary research, we consider supplementary data from desk research, largely media statements, reports from other research work as well as statements and utterances of key figures such as ministers.

5.2 A brief sketch of the participants

A total of thirteen (13) semi-structured interviews held over a period of three weeks. The semi-structured interviews were conducted on the MS Teams platform and lasted between 25 minutes and just over an hour. A brief profile of the participants if provided below.

Table 5.1: A Description of participants

Participant	Position/Role	Years of service
D1	Head of Regulatory Affairs RE	Over 10 years
D2	Business Development Executive RE	Over 10 years
D3	Business Development Executive RE	Between 1 – 5 years
D4	Business Development Executive RE	Over 10 years
D5	International Business Executive RE	Over 10 years
D6	Global Manager RE	Over 10 years
D7	Head: Project and Export Finance	Over 10 years
D8	Chief Engineering Technician	Over 5 years
D9	Head: Treasury RE	Over 5 years
D10	Project Development Consultant	Over 10 years
D11	Asset Management, Budget and Reporting Manager	Over 5 years
D12	Director: Executive Projects	Over 20 years
D13	International Financial Controller	Over 5 years

Having collected data primarily through semi-structured interviews with key informants and other participants, data were entered into Atlas Ti web version for processing and analysis. An initial procedure on the data which had been classified into codes revealed the word list presented in the graphic below.

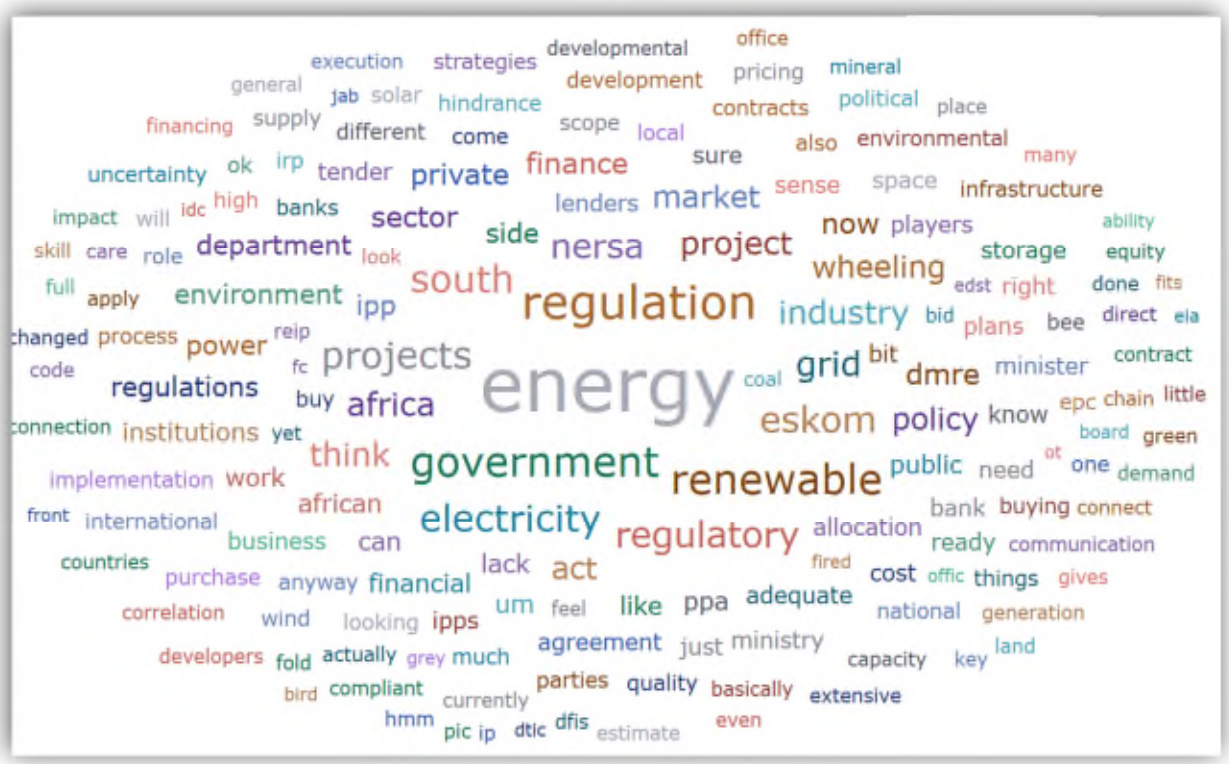


Figure 2: Word list from Atlas Ti showing prominent code words.

The word list in the figure above hint at some of the codes that were generated in the study.

Among the stakeholders cited by the participants are general South Africans, SAWEA, SAPVIA, World Bank, residential households, private sector, off takers, Original Equipment Manufacturers (OEMs), municipalities, independent power producers, medium and micro enterprises, local communities, manufacturers, lenders, government departments, IFCs, high energy users, Energy Council of South Africa, DFIs, Civil Aviation Authority, banks, community trusts, and the CSIR.

Codes identified included inertia, independent transmission, interest rates, lackadaisical in strategy and implementation, energy mix, energy storage, equity contribution, commercial and industrial market (C&I), black economic empowerment (BEE), clarity, consistency, unbundling, inadequate, infrastructure backlog, incentives, bankability, grassroots, barriers to entry, battery energy storage, wheeling framework, grid capacity constraints, tariff and contract flexibility, and the deregulation of generation license procedures among others.

After identifying the prominent codes that featured in the data, a process of grouping them ensued, again relying on Atlas Ti. The grouping was done to categorise codes into themes which would then form the principal basis from which an analytical discussion could follow. A total of ten code groups was produced, namely financial models, financiers, regulators, regulatory concerns, clients, regulation layers, stakeholders, the stakes, strides taken and value judgements. The idea was not to merely list these in the stakeholders as many prior studies have identified stakeholders in renewable energy (González & Connell, 2022). Rather than merely listing, the study sought to establish how the stakeholders related particularly around financing and regulation. This focus might explain why other key stakeholders from secondary data did not feature prominently in the feedback from participants. For example, the media was identified as a key stakeholder by only one of the study's interlocutors. Yet, the salience of the media was quite pronounced through its news coverage of renewable energy in South Africa. One area of concern that the media persistently covered was on the implications of adopting renewable energy in an economy whose energy bedrock is coal. Here, reference can be made to concerns expressed by the minister of mineral resources and energy, Gwede Mantashe[11], who while acknowledging the importance of transition to renewables, has also cast his weight behind labour unions such as National Union of Metalworkers (NUM) which has expressed concern[12] about potential job losses. Pointing this gap out between the study's primary data and secondary data spotlights the difference in stakeholder value between renewable energy in general and renewable energy as understood strictly through financial and regulation stakeholder ties.

In light of the focus around regulation and finance, a brief detailing of the thematic areas is necessary as they are tied to the study's main question as well as ancillary ones. In the data, these themes are sometimes intertwined as the graphic below shows after a network analysis of one interview transcript.

[11] Mantashe says renewable energy is ideal for South Africa - YouTube

[12] https://www.moneyweb.co.za/moneyweb-podcasts/moneyweb-midday/lions-share-of-renewable-energy-sector-must-go-to-eskom-numsa/

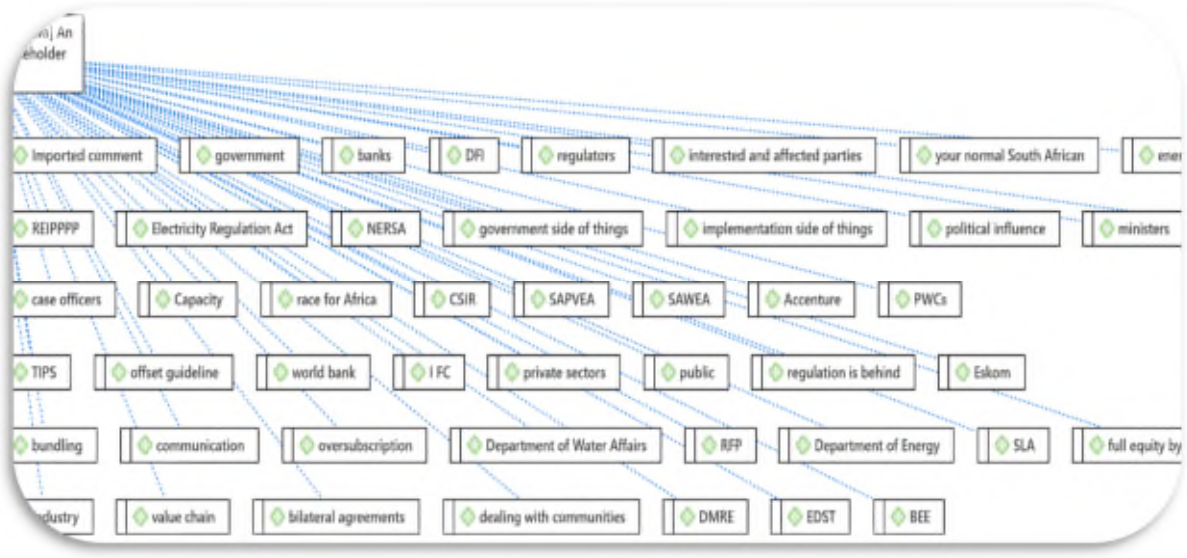


Figure 3: Example of key codes after analysis of an interview transcript

The figure above shows the key codes generated from one participant and how they were clustered in the process of forming themes. Such process then allowed the researcher to identify how consistencies and discrepancies manifest between interactions of the participants. To recap, the main research question was, "**How are renewable energy projects understood, implemented, financed, and regulated by stakeholders in South Africa?**" The data reveal the stakeholders that were identified by participants. It reveals the stakeholders who are especially relevant in the current conceptions of renewable energy adoption in South Africa. These various actors or stakeholders contest and converge over a myriad of issues which range from finance to regulation and other technical and special interest matters. A disconcerting position for the South African public is how peripheral they remain in the discourses around renewable energy. It appears that much of the discussions at present revolve around corporate-state relations/dynamics and once these are resolved, then the end-user may become a key stakeholder. In stating this, the study does not claim that findings indicate complete neglect. As the section on strides made will reveal in a later chapter, the market appears to be opening up to include smaller players. However, cost and barriers to entry remain debilitative in many respects. As such, the issues at stake constitute part of the wealth of data that the study presents.

5.3 Understanding renewables: a sector and process in constant transition

The renewable energy sector is relatively new as a constituent in the energy sector. Driven by a recognition to comply with global trends and standards as well as a more pressing energy crisis in the Republic of South Africa, the sector presents and was understood by

many participants to be in a process of becoming a constituent. It had not yet arrived at a point where complete maturity could be claimed despite having been officially adopted in policy since 2011. In occupying a state of becoming, renewable energy encountered changes and shifts which at the time of the study entailed change of ministry, changes regarding how the wheeling of electricity was to be done, and changes in the size of independent power producers that could generate energy for personal use. In the case of the latter, the resource plan drafted in 2019 identifies 14 municipal and private generators of electricity in South Africa. In addition to these small producers in the form of small firms in the households have also been allowed to generate their own electricity but not necessarily with the freedom to supply excess electricity to Eskom. The restrictions on supplying to Eskom, however, are noted by some participants in this study to be under review, with wheeling being one of the policy changes being adopted. A participant also detailed the imminent changes which were due once regulation allowed it. Their words were as follows:

> *So, currently, the regulations do allow for multiple off-takers, and you can make arrangements with, for example, Eskom to have multiple off-takers and multiple points of supply. What is being considered are changes that would go a step further, such as amendments to the Electricity Regulation Act that seek to open up the electricity market in South Africa to more competition and create a market with multiple participants.*

The participant went to detail the mechanisms by which the changes would operate. South Africa's renewable energy sector was shifting from one largely controlled by government via ESKOM in terms of generation, transmission and distribution to one which involved more actors who contributed to the national grid as independent producers but piggybacked on state infrastructure to distribute. The implication here is that independent producers would now be able to offload their surplus energy to interested buyers who would pay a market-based price. Not only would this be a shift away from the regulated distribution mechanism, but it would also be a shift from a state-guided pricing regime. Demand and supply would no longer be under the control of the state but shift into private hands. While this raft of imminent changes were welcomed by the participant, they are also worth appreciating against with the earlier-stated position of the Minister of Energy and Mineral Resources whose primary concern was on implications of changes on employment. This will be revisited in the discussions chapter but for now, it is worth flagging the positions of different actors on the matter of real and perceived/anticipated changes.

The participant's words echo Liu & Wei's (2016) observations on the adoption of market and non-market regulations. Moreover, the words are understood to suggest that there are

processes of change within the sector, processes which apply to a raft of actors. The narration deploys economic terms as supply and demand sides are identified. However, the actors involved are not only bound by economics but socio-political interests as well (an issue which emerges in later presentation of the political jousting at ministerial level). For now, it is important to recognise that the insights shared by the participant above pointed to a sector which was still progressing towards an ideal state of equilibrium. This had implications on how implementation of renewable energy projects was understood.

The implementation of renewable projects appeared to be understood as a very complex affair despite starting off with two principal stakeholders: government and investor or independent power producer. The complications arose as a result of the various layers of government involved, the various processes that these layers demanded, additional stakeholders getting involved either as forms of support in finance or as resource providers in the case of wind energy or even as pressure or interest groups.

One participant laid out the initial phase of implementation as follows:

> *So, to ensure the viability of a project, you initiate negotiations with the landowner to obtain an option for leasing or buying the land. Subsequently, you navigate through the process of acquiring numerous permits and securing consent and no-objection letters from a wide array of stakeholders, including various departments*.

Among the stakeholders listed were “government departments, landowners, telecommunication organisations, and the Civil Aviation”. The process then unfolds in series and also in sometimes overlapping phases. Which take anything between 18 and 24 months depending on the pace of progress and no objections from a processing department or stakeholder. In some cases, the delays are due to one stage serving as a prerequisite to get clearance in a later stage. As such, an applicant cannot proceed without feedback from one entity meaning that delays in the preceding stage will delay the process. Justifications for the study’s feasibility (environmental, economic and sustainability) also had to be incorporated. All of these permits that you have to apply for also take a lot of administration and they have some costs involved as well. There were also sector-specific conditions which had to be specified in implementation such that processes for implementing solar energy plants were different from processes followed in implementation of wind energy. Wind energy would require engagement of additional stakeholders such as environmental analyses for impacts on the ecosystem. On the other hand, solar would also require analyses on irradiation. These sector-specific processes had an effect on the implementation process itself as well as duration taken to implementation if all was considered acceptable.

The insights shared above were shared by another participant who worked in an energy firm located in Johannesburg. He added that with particular respect to both wind and solar energy, regulation sets in from the onset where implementation is contingent on how some key stakeholders review an investor's proposed undertaking.

> *Government regulation comes in the form of environmental laws where the Department of Environment, Fisheries and Forestry enforces those environmental laws.*

The close regulation by the state allows for a thorough scrutiny of the processes particularly on implementation. However, the scrutiny that is implied here is not always thorough as the failure to establish sustainable contracts under one of the bid windows. In the window, bidders were awarded contracts as independent contractors but later proved incapacitated to deliver. Moreover, the state failed to coordinate the awarding of contracts such that oversubscription threatened to complicate the contract awarding process. The regulation was therefore thorough in some instances but could also prove to be inefficient. To complicate matters even further the participant added that regulation across various layers could make for multiple sites in which scrutiny of the process was held. They gave the example of regulation which applied at the local level where,

> *At the local level, municipalities are involved in considerations related to wind energy. It might sound trivial, but there are rules at both the local and provincial levels that actually restrict the transportation of equipment, like blades, categorizing them as abnormal loads.*

The researcher understood this to be a detailing of the multiple layers in which regulation was executed. The government at a macro level could institute regulations which were thorough and elaborate in places, but these were then complemented by additional rungs of regulatory measures such as on a municipal level.

Evidently from these insights, the key stakeholders included Environmental Management Authority, landowners or farmers, NERSA, Department of Electricity, ESKOM, DMRE, Banks/IDCs, and permit issuers (government departments, telecoms entities, municipalities). The insights from these two participants is corroborated by official positions adopted at the Department of Energy. Among the key statutes that are considered when a project is under assessment for potential adoption are:

- The National Water Act (Act No. 36 of 1998);
- The White Paper on Water Policy (30 April 1997);

- The National Environmental Management Act (NEMA) (Act No. 107 of 1998);
- The Environment Conservation Act (Act No. 73 of 1989).

Having considered how a project fits with respect to these regulations, the next phase is a multi-pronged consultative process wherein various stakeholders are engaged depending on the type of project and energy technology. The figure below portrays the process according to the Department of Energy wherein a technical process is held concurrently with a public participation process.

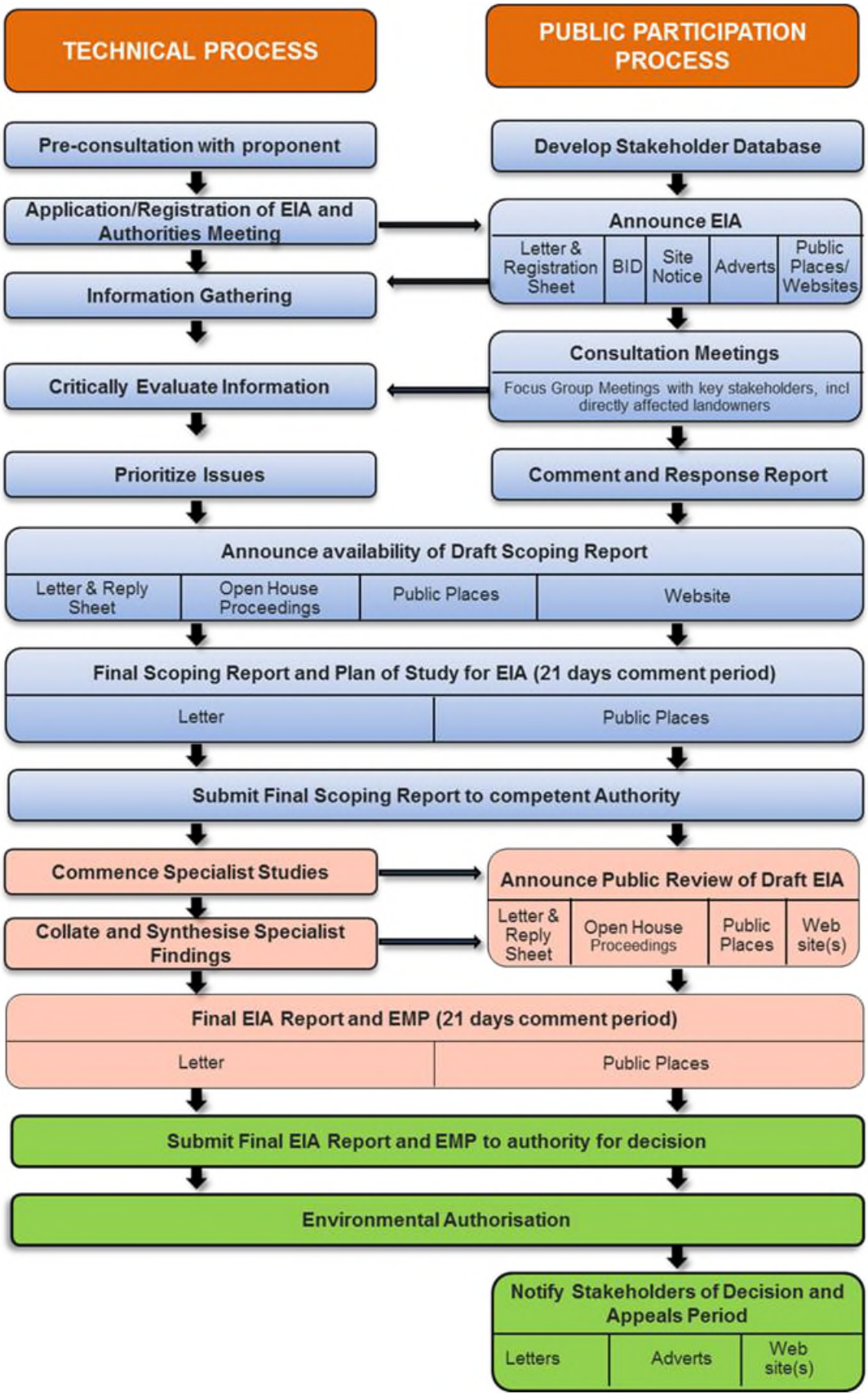


Figure 4: Technical and public participation process leading to project in renewable energy in South Africa

Source: Department of Environmental Affairs (2013, 64)

The multiple interests involved meant that projects could take long before full take-off. Such delays were noted by local participants. Yet, participants who hailed from outside of South Africa but represented independent power producers that were active in the sector held more sympathetic perspectives as they appeared to make comparisons with other jurisdictions as well as their home countries. One such participant indicated that

> *This country is not as challenging as others; I can tell you that in Italy, developing a project takes much longer than in South Africa. The development phase is more challenging for a project due to the authorizations required from all regulatory bodies and public entities—there's a significant and, I mean, a considerable amount, and they are very strict. They're very, very strict. South Africa, in comparison, is not as challenging.*

Such an opinion from a person actively involved in both countries gives some perspective on the comparative positions of two markets. However, the study's interest was not a comparative analysis but an exploration of the stakeholder positions in South Africa. As such, the implementation dimension indicated a raft of stakeholders who in pursuing their mandates and interests, created a complex network which –if unsatisfied– could delay the commencement of work.

Still on the area of implementation, the study sought to ascertain 'what policy and practical implications do the meanings have for deploying renewable energy in South Africa's urban and rural areas?' The answer to this question is best presented by considering the "value judgements" that participants identified in indicating where they understood the present and future direction of renewable energy to be. In the same process, they also indicated what the hindrances were and offered some solutions in instances. Some of the terminology used to describe the practical implications of what was observed and experienced included, "inertia", "lack of continuity", "lackadaisical", "market uncertainty", "transparency", "inadequate", "not useful", "not yet mature", "policy uncertainty" and "evolving". Such positions inform a later analysis of what stakeholders understood of each other's roles in the sector and what they perceived as limitations.

While these insights are revealing of the stakeholder concerns regarding implementation, a contrasting view was shared by a participant representing an international power producer. He indicated that,

> *I would say the barriers to entry are higher for local players and local energy providers, but from an international Independent Power Producer (IPP) perspective, opportunities are prevalent. However, from a regulatory standpoint*.

These words mirror Bellantuono's (2017) argument which suggests that regulatory stability which makes ideal conditions for investment and participation, is an idealised perspective which is neither attainable nor possible to sustain.

5.4 Finance of renewable projects

The question of finance yielded consistent results in terms of who was deemed most active in providing finance. The persons interviewed indicated that their companies had relied on a mix of methods. As a starting point, equity financing was useful to enter the market and then approach other funders as a form of assurance of the robustness of the firm entering the South African market. Although certainly useful, equity financing was however not deemed sufficient and so much more detail was provided around debt financing.

To start off we note the stakeholders most prominently identified as financial players. With limited access to offshore debt financing, all the participants indicated that local banks were active in the renewable energy space.

In addition to local banks, institutional investors were identified as part of the financing arm. Here, pension funds and entities were identified. Added to these were financial organizations which served to support government’s policy interests. In this cohort were entities such as the Development Bank of South Africa (DBSA) and the Public Investment Corporation (PIC).

Among the interests in the renewable energy sector are BEE partners who fulfil the statutory obligation for foreign investors to have a local partner in the ownership structure. These BEE partners are expected to also make financial contributions. However, because of the initial capital outlays which are beyond the means of most BEE entities, quasi-governmental entities assume the role of financier. As one participant noted,

> *In South Africa, there is a regulation requiring BEE partners in the ownership structure of projects. This regulation is governed by REIPPPP. Additionally, these BEE partners are likely to secure equity funding from their parent company or through debt, either from Development Finance Institutions (DFIs) or private banks, depending on the entity's structure.*

The inclusion of a compulsory additional player meant that the issue of finance was not as straightforward after all. Securing a competent BEE partner was of the essence.

Developmental financial institutions, such as DBSA and IDC, play a critical role in financing these transactions, especially when considering the BEE component and Community Trust. African DFIs, including them, are crucial players. The PIC also plays a significant role, particularly in financing the BEE element of these transactions. Entities like the DTIC are important as well. You might wonder why I mention the DTIC as a financier, but if you look at programs they have, like the Black Industrialist Programme, these initiatives aim to make industrialists more bankable. So, it allows banks to take a view on individuals who wouldn't ordinarily receive consideration.

The participant's response highlights a developmental role played in supporting a specific class of people who may have an interest and some form of capacity in entering renewable energy sector. The active involvement of state entities in the form of the Department of Trade, Industry and Competition as well as Public Investment Corporation suggests that there is an interest to uplift or support these specific groups. But, the support might not always be adequate and the capacity of BEE actors is not always sufficient for the projects at hand.

The result is a colourful terrain comprising of financial services providers, often attending to different needs and parties.

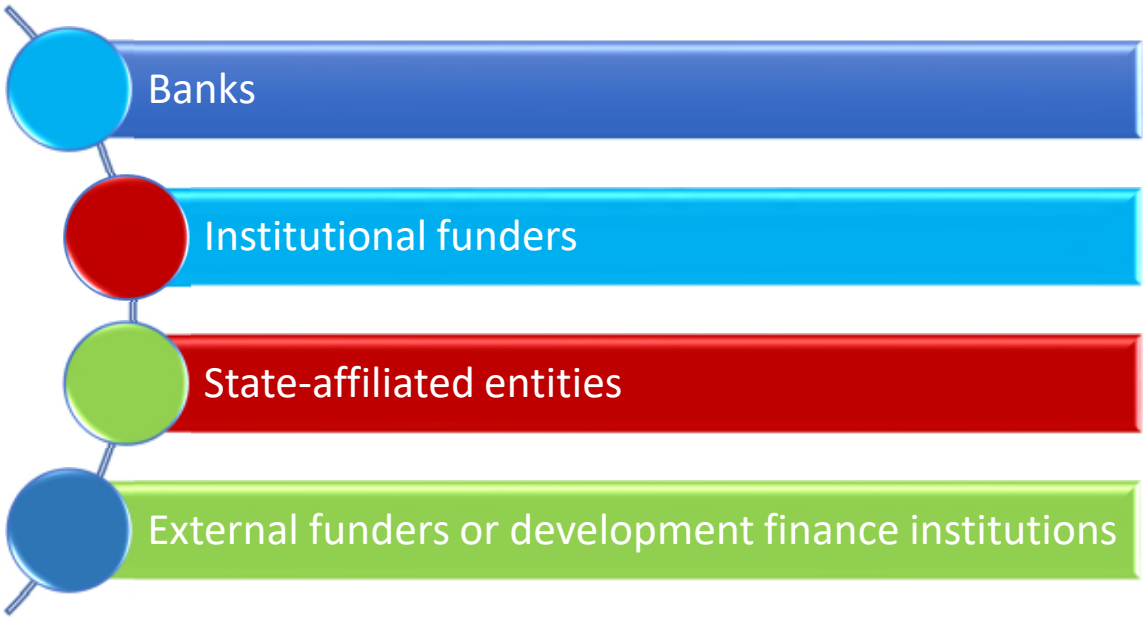


Figure 5: Various financial services providers in South Africa

To emphasise the prevailing conditions within the financing of renewable projects, one key participant noted that:

> *So, in my view, I mean, financial services or financial institutions, I think, play a critical role within the sector. They play a critical role because, if we look at the funding structures right now, we're probably looking at around 85-90% of debt financing going into these projects. From that perspective, financiers are critical, but they also play another important role, which is often not appreciated, especially when we're running project finance structures. In these cases, there's a certain element of policing the structure, ensuring that the EPC works according to the schedule and cost that were agreed upon during the operations phase. This includes overseeing maintenance through some of the reserve accounts that lenders would have and also ensuring that the offtake on the other side is managed effectively.*

The participant indicated the various roles played by financiers in addition to mere provision of funding under a specific financing model. In other words, financiers in the form of bankers could also provide oversight or "police" a project to ensure that other areas were attended to and that the deliverables were attained. Activities which would typically lie ultra vires a bank's mandate were taken on board to ensure that the project ran smoothly. Although this is a contribution which was raised by a financier, it is interesting that none of the independent power producers gave an indication of such diverse or broad roles being adopted by financiers.

Lastly, whatever the funding agency/source, two principal models were followed in providing finance to renewable energy entities. Either funding was availed as project financing or as corporate finance. These two are pursued in greater detail in the analytical chapters as they are instructive in how renewable energy firms set up their operations and remain viable. For now, suffice to state that interlocutors suggested that the architecture is influenced by current structure of the sector as laid out by prevailing regulations. A banker was interviewed and their insights together with those from investors who have operations in South Africa are engaged. One key example is sustainable energy reported failure to launch its proposed projects in renewable energy. Promit Mukherjee[13] portrays a dim picture concerning both the success of renewable energy projects awarded by the state and more importantly sustainable energy under the aegis of Black Economic Empowerment. He reports that:

- ✓ Just half of capacity from 2021 bidding round came online
- ✓ Six projects failed to raise finances
- ✓ Six others never signed agreements.

[13] https://www.reuters.com/business/energy/south-africas-green-power-push-falters-projects-fail-2023-07-18/

The article highlights how implementation is difficult even for entities that appear sufficiently backed by notable black industrialists.

5.5 The elephant in the room: Regulation

Participant understanding of who the regulators are and the roles that they play in the industry was quite varied. The most cited regulators were the NERSA, the central government, local municipalities, Ministry of Electricity, Department of Minerals, Resources and Energy and DEFF. However, the list also encompasses institutions and regulations such that a more comprehensive grouping of regulators includes:

Key regulators identified by participants were:

- DFFE – Department of Forestry, Fisheries and the Environment
- DMRE – Department of Mineral Resources and Energy
- DOE – Department of Energy
- DTIC – Department of Trade Industry and Competition
- NERSA - National Energy Regulator of South Africa
- PIC – Public Investment Corporation
- SARB – South African Reserve Bank
- SITA – State Information Technology Agency
- SARS – South African Revenue Service
- SAWEA – South African Wind Energy Association
- SAPVIA – South African Photovoltaic Industry Association
- REIPPPP – Renewable Energy Independent Power Producer Procurement Programme

As will be discussed in a later analytical chapter, these regulators operate at different rungs, sometimes in complementary roles and in other instances in conflict. It is in this sense that they serve as renewable stakeholders together with other interested parties whose positions also shift. But returning to the stakeholders identified as key regulators, one of the study's participants noted that there were some key players which had to be noted and then other additional interested parties.

> *The national government, specifically the DMRE (Department of Mineral Resources and Energy), plays a key role, with the IPP office under the DMRE being a crucial driver of the transition through the renewables procurement programme. On the private sector side, independent power producers (IPPs) are significant players. These IPPs include multinational companies that have entered and established a local presence. Supporting the transition are financial institutions, including commercial banks, private investors, and development*

finance institutions at both the local and African levels, as well as European DFIs. These institutions aim to fund and support the industry. Additionally, the Department of Environment, Forestry, and Fisheries (DEFF) has shown efforts to be supportive of the energy transition and renewable initiatives. Despite challenges, including those faced by Eskom, there is a collective push towards a more sustainable future.

To the above participant's mind, there were key players in the sector and then others whose roles were important but not as much as the principal players. This acknowledgement was interesting as it hinted at power matrices in the sector. By virtue of playing regulator and primary actor determining the rules of the field, the government via DMRE stood out foremost. Independent Power Producers and financiers in various capacities followed. What is interesting is the perspective given and who gave it. In the above participant's response, an official from a government department understood the government's role as vital and other big actors. A local government official also indicated the government as vital but placed importance on slightly different additional stakeholders. Hence, the local municipality participant stated that:

In my opinion, the key players would be, firstly, the government, especially the Department of Mineral Resources and Energy, responsible for policy and framework. This is crucial because when introducing something new in this sector, a clear direction needs to be formulated. Secondly, collaborative partners such as investors, communities, customers, utilities, and environmentalists are significant players. In terms of communities, you can find various stakeholders, including customers and environmentalists. Lastly, utilities are also essential contributors to the overall landscape.

The official at the local municipality was alone in identifying communities and interested parties as important actors in the sector. Presumably, this could be due to the service delivery orientation derived from their work environment. For the rest of the participants almost silent stakeholder in the analysis to follow are households or domestic producers and consumers of renewable energy. From the interview data, discussions over stakeholder matters suggest that households were peripheral in the agenda. The orientation as of now does not appear to be concerned with supplying to households although the regulations have begun to slowly turn in that direction. However, supply is predominantly for other corporations especially with new arrangements over the wheeling framework.

Besides identifying the stakeholders in the sector as understood by the study's interlocutors, attention was also cast on an ancillary question which was stated at the research's genesis.

“What roles do stakeholders play in the financing and regulation of renewable energy in South Africa?” Such a question provoked issues relating to what exactly the stakes at play were and how the stakeholders engaged around the stakes. As such, a prominent theme which has emerged are the stakes or issues around which stakeholders converge. Therefore, what is at stake? This is a pertinent entry point as it constitutes the key focus of the study: stakeholders. What lies at stake is contingent on whom one speaks to. But while self-interest is markedly dominant in the interactions, there are some areas of confluence. The key area that appears to garner consensus is the salience of regulation and the role that regulators have in shaping the terrain.

5.5.1 Regulation’s shortcomings in clarity, consistency and fit

All participants in the study identified shortcomings in how regulations word crafted particularly in light of what was needed in practice. Issues such as regulatory clarity regulatory consistency and cross departmental clarity in regulations were raised. In some parts the criticism was directed at political actors. One analyst indicated that there was lack of clarity even in the political processes that shaped the sectors environment. They detailed that,

> *The clarity has been lacking. Initially, we had a Minister of Electricity appointed, and only three months later were his actual tasks defined. It's akin to the private sector advertising a director position in a company, appointing someone, and then saying, 'Now that you've been appointed, we will begin determining the tasks you should perform.*

Speaking on the implementation side, another participant noted the lack of clarity by stating that gaps existed in how things were thought out and how they were then set to be actioned on.

> *I think there's always a plan, but there's often a gap between the strategy, policy, and implementation. Another challenge is this ongoing struggle. You can create a comprehensive policy list, outline all the lovely programs, plans, and actions you intend to take, but then there's the challenge of implementation.*

A third related perspective around the regulatory framework and specifically in policy was the level of quality which then affected how policy was understood. Speaking on this front, a key participant stated that:

> *In my opinion, what's really needed is more coordination. Coordination, for me, also implies... Many people talk about policy certainty. I tend to say, if I make a policy stating to drive on the left because I didn't specify 'do not drive*

on the right,' I'm certain about the need to drive on the left. However, policy quality would go even further, ensuring that I can specify to drive on the left and to drive 2 meters away from the pavement, you know?

Such critical examinations hinted at the scrutiny that other stakeholders gave to government especially regarding regulations and policy. As key areas which shaped the environment, it was clear that some aspects needed attending to. The quantity of regulation was less of a concern than the quality of policy formulated and clarity thereof. The sentiments shared were indicative of concerns over the regulatory environment which encountered numerous changes aimed at improving conditions but in soe instances yielded even more clutter.

5.5.2 Examining the regulation space

Many participants noted that there were various issues of concern regarding regulations and the room that investors had to manoeuvre in the regulatory environment. Part of the challenge lay in overlapping and sometimes conflicting regulatory processes. To give clarity here, the regulators identified by participants as listed earlier, include no less than five departments, municipalities, specialist offices in departments and formal regulations in the form of statutory instruments. Therefore, regulators operated at various levels with emphasis shifting depending on key area of interest or enforcement. On the government's side where regulation was preeminent, there prevailed a multi-layered terrain which comprised of local authorities/municipalities, provincial, and state. At state level, there prevail many institutions which have their own interests and sets of demands. These complement and contradict one another in instances with the result of creating uncertainty for other players. It is useful to consider some of the opinions shared in detail here.

The issues are evolving all the time. […] We had a Minister of electricity that was appointed. And only three months later. Was he given what his actual tasks would be. That's like the private sector. […] So we have three different ministries each having a little piece of this energy puzzle, and together they constitute the energy sector now.

The words above are taken from an interview with an analyst and public commentator on renewable energy in South Africa. Importantly, he notes how tumultuous the environment is at the highest level where political decisions are made in the key departments that formulate regulation and policy. If the key actors cannot get their house in order, there is little confidence in the sector delivering on the targets it sets out to achieve. Retaining an element of stern criticism directed at regulators, an officer in an independent power production organisation stated that much needed to be done by regulators in enhancing policy quality.

There were more qualitative perspectives on regulation which were thematically presented as value judgements. The participants in the study were detailed in their analyses of the renewable energy sector, often clear on their sentiments around shortcomings on the part of the regulators both in finance and regulation areas. These were often deemed to be “poor execution”, “inadequate” or inconsistent. One such detailed response went as follows:

> *Unpredictable, I would say, because, despite having the Integrated Resource Plan and rolling out the risk mitigation plan, tenders with successful bidders announced in 2021 are yet to reach financial close or break ground in 2023, two years later. Additionally, looking back to round 4, when the political regime changed between Jacob Zuma and Cyril Ramaphosa, it resulted in a renewable hiatus and the non-signing of power purchase agreements for round 4 for 36 months.*

The sentiments showing frustration were prominent from most stakeholders and by and large reflected on how regulators related with either independent power producers or bankers and households. It appeared that much of the frustration or despair and hope for improvement was largely regarding regulation. For this reason, much of the data regarding value judgements is presented in the regulation section of this findings chapter.

What abstract and practical meanings does renewable energy take in both regulatory frameworks and as an area for finance investments/capital allocation? This was a question which the study sought to engage at inception. The data suggest a myriad meaning with respect to finance and regulation. Idealistic meanings were in confluence with practical implications. One of the tools used in preparing for detailed analysis to answer this question was opinion mining.

5.5.3 Additional features causing gridlock: perspectives from secondary data

The study also engaged in desk research to augment to primary data. One of the entities consulted for its expertise and research output was Intellidex (which now operates as Krutham) which has published a few reports on renewable energy with particular focus on energy justice. Intellidex has 15 years in research; consultancy firm that serves corporate clients who range from investors to philanthropists. Their key focus is mobilizing finance for better social outcomes. The firm produces sectoral reports in line with its areas of specialization. Because of some of the issues it addresses, it was identified as a useful source of secondary data. Two key reports attend to renewable energy and these are extensively cited here. The first report addresses financing social justice in a just energy transition while the second engages financing South Africa’s energy transition.

Figure 6: Challenges of financing renewable energy projects at scale in South Africa.

While these are understood as “blockages” in the Intellidex report, in this study, we engage them as sites of stakeholder interaction. The reports from Intellidex also hint at financiers in the sector. These have been corroborated by the study’s participants although some minor differences occur. The financiers in the report are listed as:

Development Finance Institutions:

Development Bank of Southern Africa (DBSA); Industrial Development Corporation (IDC); Agence Française de Développement ; Private Equity; Banks; Pension funds; Environment Social and Governance (ESG) investing.

The secondary data presents a crucial issue which participants in the study also reflected upon. That is, what are the stakes. In the Intellidex report, the question is much more nuanced given their focus on just transition. They ask, “just for whom?” and add that they seek for “understanding of the JET”. It is generally considered as a transition to clean energy that leaves no one behind, yet there is a lack of strategic vision on what this entails, the pathway towards a transitioned economy, the speed at which this needs to materialise and the specific role that representatives of international firms operating in the sector referenced the structure of the market as problematic. Their common concern was enabling a more market-based interaction between buyers and sellers of energy. To this end, they decried the need for structural adjustment interventions aimed at breaking down or “unbundling” ESKOM.

Switching to renewables everywhere has the problem of unbalancing the grid because the generators putting energy electrons into the grid are usually very concentrated. This is a problem every country is facing while transitioning to renewables, phasing out fossil fuels, and integrating other renewable sources into the grid. Regarding the South African grid, it was likely constrained because the infrastructure was not ready and was insufficient to accommodate additional capacity.

This concern was notable because of the issues it raised which politicians and policymakers appeared to be wary of adopting. As such, it highlights a potential area of discordance between stakeholders and was worth exploring further for a deeper discussion.

5.5.4 Regulators making strides

Complementing these are wider political issues[14] which affect the renewables energy sector as principal stakeholders at a multilateral level engage on the best pathways for the future. Most prominent among these and cited by participants who worked for international investors is unbundling of Eskom and the political ambiguities signalled by ministry changes and apparently unclear and/or overlapping of roles.

You'll likely receive a similar answer from most people regarding how you access the grid. The grid is controlled by Eskom, which means it's controlled by the government. So, if you're unable to connect to it, and the regulations don't permit it, only a limited amount is essentially allowed, and there are some restrictions.

In addition to the above insights, the study recognised that there were other areas where participants were very complementary of regulators while being critical about the role of other stakeholders. This was the case with one participant who worked in one of the regulator's offices. In the interview, the participant stated that:

The role of public and private research companies, especially the private ones, in the renewable energy industry, for me, raises certain questions. While there's an element of supporting the country and patriotism, somewhere in there, I think, at times, most of them are self-serving. This is because they are ticking boxes,

[14] https://www.greenbuildingsafrica.co.za/transmission-crisis-soon-to-compliment-generation-crisis-in-south-africa; https://www.greenbuildingsafrica.co.za/south-africas-electricity-minister-trumpets-ipp-power-procurement-programme; www.news24.com/fin24/economy/urgent-electricity-bill-key-to-solving-sas-power-crisis-finally-tabled-after-delays-20230824

whether it's partnering with another country or a specific sector. So, I do sometimes question, especially when a company is not South African, whether their true intent is to genuinely drive the mandate of renewable energy or if they are primarily contributing to their own objectives, such as partnering with other countries.

The statement above was made in response to a question on the participant's opinion about the role of pressure groups and research organisations in the renewable energy space. Not only were they critical of these entities, but they was also quite appreciative of government's role despite some admitted challenges. With respect to the government, they stated that,

I'm going to say South Africa is one of the very well-established countries in terms of research and development. So, from a research point of view, we have done very well in understanding the kind of technology and programs that we wanted to get into. From a policy point of view, we are probably one of the first in the continent. I'm quite happy with how we've drafted our policies, engaged the public, and involved other private sectors to help shape the regulations and other best practices in the country.

Evidently from the perspective of this participant, the government was making some positive strides especially when compared to other peers on the African continent. This glowing appreciation was however scrutinised more intently by other participants when policy was discussed.

5.6 Policy and practical implications of the issues identified

Another key question that the study explored pertained to the policy and practical implications derived from participant interpretations of stakeholder ties in the sector. Of interest was to understand what the practical and policy possibilities meant for deploying renewable energy in South Africa's urban and rural areas. To this end, participant insights were varied, and we consider some of them here. The overall tenor is that specific acts and municipality by-laws are not always streamlined. Neither are regulations and pronouncements by officials.

The implications on policy formulation and implementation were very limited. Although consulted in some deliberations, non-regulatory stakeholders indicated that they were not participants in the policy crafting and implementation stages. Some indicated that they saw little influence of policy complexities in the operations of projects while other were much more critical. We start with one participant who presented a complex but nuanced reading of the interaction between policy and practice. Having noted that the policy environment was complicated and characterised by a raft of challenges, they then clarified that with regards to

finance, the implications were not necessarily grave. Below, I present the interaction that we had.

> *Interviewer: In South Africa, as you mentioned earlier, it sounds like there are policy and regulatory issues in terms of how one department is not communicating or linking its requirements with another department, which is then leading to a lack of cohesion within the policymaking space. Does that impact the industry from a financing perspective?*
>
> *Participant: Not really, because the finance industry is very competitive. So, their mandate is actually the opposite way. They bid on the projects that the IPPs compete against each other. They drive the narrative in the industry, in terms of rumors around interest rates and who's getting the best deals. This information does not come from IPPs because we have a lot to lose. So, we find that there's a lot of bidding against each other that happens. At least that's what we think happens within the banking sector..*

Although not privy to formulation, the awareness of what good policy should entail was not lost to participants. Such awareness was demonstrated through expressions of the ideal scenario or environment. A participant who worked for an IPP which was an international player indicated that:

> *[Ideally,] the most important impact they need to have is to create the environment. So, it's not necessarily that they directly invest, support, or build infrastructure – although in some cases, it could be the case. More importantly, their role is to create conditions so that IPPs, for instance, can enter the market and understand how it would work. These projects are really long-term, with potentially 20-year PPAs or even longer lifetimes. Having a view into the distant years is crucial for investment appetite in the country, and I think that's the most significant impact from the IPPs' point of view.*

This was predominantly the preserve of government. What the stakeholders could give detailed commentary on were the practical implications of engaging renewable energy. Here, suggestions for researchers included adopting a more innovative and visionary approach in executing renewable energy projects. One consultant proffered an alternative way of envisioning the future:

> *We are at the cutting edge of renewable energy, not only in terms of our ability to produce these products but also from a research perspective. We have all the raw materials we require, and research houses can explore how to manufacture*

solar panels more cost-effectively and so on. These are the things that research houses can do.

Practical implications on businesses varied. From the perspective of financiers, the real cost was establishing a fair price on finance for clients and the implied returns thereof:

So, for me, the first issue is returns. That's a significant concern. As commercial enterprises, banks have shareholders, and with the current pricing, I think it makes it challenging to invest in the sector. These are the kind of challenges, and I would label it as policy uncertainty. It's difficult to plan and finance in such an environment. I think political uncertainty is probably the biggest issue that we face in the sector.

5.7 Conclusions

The chapter has presented findings from interviews held with key stakeholders within the renewable energy sector in South Africa. It highlighted the key codes and the merging themes from contributions of the participants and complemented these with secondary data from studies conducted by other consultancies as well as media coverage. The principal stakeholders which have been identified in the study are the state and its various departments, independent power producers, financiers as well as consumers of energy. This is a broad collection of stakeholders which comprises of entities that are in some instances very close while in others markedly different. As such merely identifying stakeholders is inadequate as it does not tease out the power relations and complexities within the sector. Such inadequacies are attended to in the following chapter as a much more nuanced discussion is engaged highlighting what stakeholders bring into the arrangement as executors of power and as mediators of power.

With respect to financing of renewable energy projects two key models were identified namely corporate finance and project finance. While this is a useful contribution which is valued by stakeholders, it wasn't critical analyzed seeing as the extent scholarship has identified various financing models across the globe. Engaging what exists within the South African context and specifically in the financing of renewable energy projects also demands that an examination of what lacks is engaged. Such an examination is also teased out in the following chapter where the literature is brought to a head against the findings contained here.

Having laid out the findings the chapter sets a stage on which to conduct a discussion and analysis based on stakeholder theory. Given the multiple positions, roles, and conceptions of

stakeholder engagement a discussion that identifies the areas of confluence and points of departure is attended to in the following chapter.

Chapter 6: Analysis/Discussion

6.1 Introduction

The previous chapter presented the study's findings. The findings were presented to address issues raised in Chapter 1 of the study and more precisely, the research questions. Having presented the findings, the current chapter now shifts into a more analytical mode which scrutinises the data using the theoretical frames from Chapter 2. The analytical presentation attempts to follow the research questions sequentially but also privileges the themes that emerged from the data. As such, some readings of the data overlap and categorisation presented is not indicative of strict disjuncture's. The key concept that emerges from the analysis is renewable stakeholders. This is derived from stakeholder ship which anchors the theoretical framing as well as renewable energy which is the focus of the study. In coining renewable stakeholder(ship), the suggestion is that within South Africa and in pursuing an effective and efficient renewable energy policy and practical environment, the relations between stakeholders are continually shifting, such that actors have to adjust and renew how they relate to the context. This renewing does not change their interests as stakeholders, but it changes the ways in which they relate particularly to the state which serves as the principal regulator and policymaker via its various arms. To develop this further and present a more nuanced analysis of the complexities, the chapter turns to the overarching question as a key starting point.

6.2 How renewable energy projects are understood, implemented, financed, and regulated by stakeholders in South Africa

6.2.1 Understanding renewable energy

Renewable energy projects in South Africa were understood by many as projects in a sector that is still emerging or becoming particularly with regards to regulation. The researcher agrees with Ayamolowo et al (2022, 1208) who identify "energy accessibility, energy diversification and enhancement, energy governance, environmental impact, and economic impact" as measures by which to assess South Africa's renewable energy development. These are not only impact measurement areas but arguably ways in which renewable energy can be understood. From a stakeholder standpoint and in light of the data from interviews, issues such as diversification of the market and governance of the sector stood out without using those terms specifically. Governance aspects were evident in discussions of participation, inclusion, and policy formulation while diversification manifest via wheeling,

unbundling of ESKOM and talk of the market structure. The concerns with “unbundling” ESKOM are part of a wider debate which other scholars (Murshed, 2020; Nicolli & Vona, 2019) have engaged as part of market liberalization in the renewable energy sector. The focus on reforms which are oriented to market determination of pricing and distribution is part of a broader set of reforms under the aegis of structural adjustment. With respect to state-owned enterprises or parastatals, Bowman (2020) highlights how political and economic decisions have become part of a myriad of issues that encumber ESKOM. The prescribed solution to the challenges includes market reform and privatizing unviable sections of state enterprises. It is in this sense that participants made reference to unbundling of ESKOM.

As far as the financing was concerned, the South African renewable energy sector was also understood as mature in some respects and needing major change in others. Maturity was associated with financial markets and their robustness to accommodate both local and international players. The models deployed by banks in particular were deemed by some to be of similar quality to global peers. Similarly, some regulations were also considered to lie within the global norm although the Broad-Based Black Economic Empowerment (BBBEE) expectation stood out as peculiar to South Africa. As such, the stakeholders understood the sector largely from their vantage point, and often with a critical eye directed at other stakeholders.

The practical importance and implications of adopting renewable energy in South Africa were also variably understood by participants. This is hardly surprising given the energy crisis that continues to manifest through ‘load shedding’. For some stakeholders, renewable energy presents as the new frontier worthy of embrace if energy justicity is to be attained. This generalization would suggest cohesion in an effort to attain a common goal. However, there are some interesting subtleties which warrant further analysis and commentary. Understanding the salience of renewable energy was variable when engaged in the public discourse by politicians. Evoking discussions made by researchers in their own scholarship (Booyens et al., 2023; Fortuin, 2022; Sinwell et al., 2022), the key stakeholders considered in this arena did not share the enthusiasm about adopting renewable energy ostensibly because of the political ramifications. The Minister of Minerals, Resources and Energy is exemplary in this regard. As a key stakeholder leading the country’s energy portfolio, his concerns about implications on job losses/retention culminated in perceived lethargic progression to fully embracing renewable energy. Although the president intervened and appointed a new minister to a new ministry, the continued intertwinement of roles in regulation and political tussles with the Department of Minerals, Resources and Energy indicate that political contests remain intact and these political issues have a bearing on economic decisions in the renewable energy domain (Swilling et al., 2022). At the centre of

this is a tussle for power over who generates and distributes energy. The power theme plays out at state level and also cascades as well as manifests even among other stakeholders (later on we will refer to the discursive expressions of power). In this arrangement, it would be useful to think of the interactions between these stakeholders through the lens of 'cooperative advantage' which (Ahsan & Pedersen, 2018) present in their paper on stakeholder groups in Denmark. Although the concept is not theorised in their paper, its implications appear invaluable for the discussion made here. More cooperation between and among stakeholders could most likely yield an advantage both to the stakeholders as individual entities as well as to the country as an investment destination. Unfortunately, while cooperation manifests in some instances, there remain many others where it does not find full expression; in its stead prevails competition. As the findings chapter revealed, communication was an area where departments did not always cooperate with one another. In issuing out tenders to the market and then discovering that other departments were ill-equipped to process the applications, the question of mutual engagement aroused to questions just as happened when one firm[15], which sought litigation in a matter involving ESKOM which serves both as generator and distributor of electricity plus regulator of some parts of the sector. The desired unbundling of ESKOM and deregulation of the sector is also not an agenda that builds on cooperation but rather on competition.

The study's finding that government demanded adherence to regulations by investors especially at inception echoes Gaeatlholwe & Langerman (2023) who recognise the current and imminent demands on land. Land is one resource through which the resource demands in renewable energy can be understood. However, equally pressing were the demands stemming from a technological arena whose evolution particularly in wind energy was quite brisk. The end result was that flux was a constant in the sector. Understood in this way, the study is consistent with De Vries & Verzijlbergh (2018) who recognise reshaping of Europe's markets as a result of the adoption and proliferation of renewable energy. The changes in the sector and in related markets could not be ignored and were met by responses such as adoption of wheeling and regulatory relaxations on size of independent power producers.

Akin to Colvin et al. (2020), the study recognised the areas of difference among stakeholders particularly with regards to key regulators in the sector who were unanimously understood to be the state and its many departments; they were understood to have immense power in contrast to other stakeholders. Such a conception is synonymous with Marcon Nora et al.'s (2023) observation that different actors play various roles on energy transition scenarios resulting in imbalances of power. Such scenarios were evident in the model which outlined

[15] https://www.engineeringnews.co.za/article/g7-renewable-energies-withdraws-case-against-eskoms-interim-grid-rules-2023-09-07

awarding of tenders, procedures to project, requirements, and which parties were additionally involved (even where an investor has their own capital). Furthermore, in agreement with Liu & Feng (2023), the study recognised that the government and its arms stood out as the principal stakeholders since they shaped the terrain in which renewable energy was imagined, practiced and regulated. The introduction of wheeling into the system was soon to be a serious shift in the field which –in the opinion of many participants who spoke from the perspective of independent power producers– would result in better access to market and offer opportunities for expansion of the projects and growth of the sector.

6.2.2 Implementation and practice

With respect to its implementation and practice, renewable energy in South Africa was largely understood as a sector which was still in its formative stage. Such perspectives were supported by details provided around market instrument considerations, the market structure, incessant changes in law leading to inconsistencies and lack of clarity, as well as shifting policy positions over who generates energy inclusion of smaller IPPs in solar. The literature says shortcomings prevail on an international stage such that renewables have not been universally enforced (Bruce, 2013b).

While the analysis so far considers the areas where negative connotations were evident in how renewable energy was understood and implemented, the findings also revealed areas of cooperation and mutual interest especially with respect to financing of projects. Renewable energy was understood by participants to be well financed but financing models were rigid. In this respect, the study recognised that innovative financing models were still poorly developed in the sector. In some countries, Blockchain technology has been embraced as an alternative financing mechanism (Gawusu et al., 2022) albeit with relatively little uptake. In the study, with project finance and corporate finance standing out as the two key models, participants fully understood the role of renewable energy as a long-term contributor to the country's energy mix and pursued these models as the best ones available.

Although difficult to secure, funding was seldom short-term in the sector. Given the short-term orientation, it is apparent that from a financing standpoint, renewable energy was understood as primarily misunderstood and underappreciated by government. The failure to regulate for growth is the main criticism in this regard. The study however recognises that there also prevails a lack of innovation in how the financial landscape models funding into the sector and presumably this is also because the regulatory authorities have not made clear how products such as green finance or green bonds (Alharbi et al., 2023; Azhgaliyeva et al., 2020b) can be availed. Bonds by their nature are instruments availed to the public by the government typically via the central bank. An equally important model to consider for the

government would be auctions (Hochberg & Poudineh, 2018). The fact that the government in South Africa is yet to pursue these avenues suggests that their role as far as extending finance or finance opportunities is still very tepid. Importantly in this analysis, these instruments have been scrutinised by researchers who have observed that the possibilities of shifting from concept to practise are manifold (Le et al., 2020; Sharma et al., 2022). Instead of attending to this area, the government's focus was not generation, environmental impact, and inclusion of some groups. In the latter case, a detailed discussion finance viz Broad-Based Black Economic Empowerment (BBBEE) suffices.

BBBEE partners are included in renewable energy projects as part of government policy on economic empowerment which applies across most economic sectors (Patel & Graham, 2012). In this sense, they are injected via regulatory provisions. The finance dimension is however not straightforward as they ought to secure funding on their own terms and according to their profiles and risk appetites. As indicated in the secondary data, many of these stakeholders could not secure sufficient funding resulting in failed take-off of projects after one bid window. This scenario pits four key stakeholders together: government, financiers, investors, and BEE partners. The poor backing of one stakeholder (BEE partners) by government results in lack of confidence and financial support from financiers and affects investment projects that international investors are interested in. Approached from this systemic way, the position of one stakeholder over finance can culminate in shifted positions by others and eventually affect the renewable energy agenda in sum. In making these remarks, the point is that while immense scrutiny in the interviews and in the analysis so far has been on stakeholders in their individual capacities, the broader picture is that the actions and positions of one stakeholder influence and affect the actions and positions of others which collectively then affects the renewable energy sector as a whole.

Drawing on scholarship which recognises formal and informal power in organisations and institutions (Norbom & Lopez, 2016; Peiro & Melia, 2003; Walls & Berrone, 2017), stakeholder power was understood as contained in both formal structures and informal ones regardless of which entities were under consideration in government, or private entities. Formal structures in this instance refers to codified procedures, regulations, and institutions. Informal structures are made of uncodified ties and networks between entities and people. ESKOM for example derived its regulatory authority from the regulations which clearly stated its mandate and how it could manage and control the distribution of electricity as a public utility. In addition to wielding this formal power over independent power producers who could not freely distribute energy, ESKOM could also exert informal power in the form of imposing grid rules which lay ultra vires ESKOM's ambit. Such was the perceived case with the Interim Grid Capacity Allocation Rules (IGCAR) which were contested and later dropped by an IPP.

Other informal shows of power were manifest discursively. The neglect of households in discussions about key stakeholders in the sector was understood not as a mere omission of an interested party but, a reflection of which entities lay at the periphery and which ones mattered. It was only in discussion with a municipal officer and one representative from an independent power producer that households featured in the discussions. By comparison, the government was noted in all interviews. Stakeholder analyses are not merely concerned with listing of who is involved and who is omitted or neglected. Rather, when identifying relations, power and value can be discerned and these within the context of renewable energy are indicative of governance (Maqbool et al., 2022), participatory opportunities (Rountree & Baldwin, 2018) as well as values and priorities at different levels of government (Díaz et al., 2017). The position of stakeholders such as households and pressure groups reflected on these dimensions, suggesting the Orwellian notion that some stakeholders were 'more equal than others'.

In closing on this section, the study notes that conceptually, the various understandings point towards renewable stakeholdership. Renewability means that the stakeholders did not have a single understanding of their position within the sector nor a single understanding of other stakeholders in the same. The variations in conception and practice can be further explored through the roles that stakeholders played. This further advances the conceptual proposition of renewable stakeholders.

6.3 Stakeholder roles in financing and regulation of renewable energy in South Africa

The roles played by the stakeholders revealed what the stakes were that bring stakeholders into the fray. Roles were considered with respect to regulation and financing. To start off with, regulatory roles were largely performed by the government. Writing on South Africa's renewable energy sector's growth, government's role was consistent with the Ghanaian experience where the government plays the role of regulator while availing financial incentives for actors to join the renewable energy sector as producers (Aboagye et al., 2021b). As already noted, the government did not directly fund projects, but departments and institutions offered support to BEE partners in some instances, ostensibly as a way of funding entities whose presence was demanded at law. One such institution which was noted in Chapter 4 was the PIC. Other stakeholders did not play any roles in formulating regulation but certainly had perspectives on what regulation could and should look like.

Although not an actor in physical form, policy has been recognised by Adedoyin et al. (2021) as salient in playing a role within renewable energy. Government is responsible for

crafting/formulating policy as well as implementing it. NERSA stands out as the principal institution in regulation, but it is complemented by environmental institutions, the distributor ESKOM as well as various tiers of government.

It is easy to be critical of the domineering role that government plays with respect to regulation. Yet, it is debatable since regulation relies on enforcement and compliance. This implies cohesion which as the study has showed, also contains tensions and contests. In this light, Bashir et al. (2022) suggest that policies be developed to ensure participation of environmental interests in the policymaking process. This is consistent with scholarship which suggests that participation be engendered into policy. In the study, such inclusion was not necessarily participatory but entailed ticking of boxes particularly at project inception phase. This accounts for the renewable stakeholdership which although appearing static, meant that some stakeholders had to persistently refresh and reframe their positions.

Among those whose role was discussed in a markedly peripheral sense were research institutions and pressure groups. These have been reflected upon within South Africa by previous studies. For instance, the co-authors to one paper note that:

> "a number of tertiary institutions have developed Research groups and Centres relating to sustainable energy, including the University of Cape Town, the University of Stellenbosch and the Cape Peninsula University of Technology. Development of the world's first numerically verified Wind Atlas and the high quality Solar Energy Resource Maps are examples of RE projects undertaken" (Jain & Jain, 2017, 726).

Although this remains true, the fact that some stakeholders in the study urged researchers to become more involved especially via universities while another cast suspicion over the objectives of research institutions suggests that their voice remains weak. This is a salient point given that the study has already stated that there prevailed uneven power. The government does not stifle dissemination of information or even debates around renewable energy policy and practice. What it does however is it shapes the discourse, and this is magnified by media coverage. During the duration of the study, renewable energy was largely an appendage to the debate over solving the country's energy crisis. In other words, the key focus was on renewable energy as a solution to the prevailing crisis and not necessarily renewable energy as a utilitarian technology which has value over time.

With respect to pressure groups, they were recognised as key in the process of evaluating a project especially in wind energy. However, their influence in regulation and in finance did not appear prominently. This is hardly surprising since two key issues appear to shape such a position for these stakeholders. The first issue is that renewable energy discourse appears

to be predominantly technocratic and exclusionary to the ordinary public. As such, pressure groups as entities serving community interests lack gravitas to press with an agenda which their public/communities are out of sync with. The second issue is that much like academic and research institutions, pressure groups have not been able to reshape the public discourse away from the media's fixation with load-shedding and ending the energy crisis. In this scenario, advocating for a specific position yields little traction if the position is not intimately tied to the dominant discourse.

Financial players provide finance but also play a monitoring role within projects depending on the finance model chosen. Although certainly important as demonstrated by a panel study of over 55 countries (Le et al., 2020), playing the role of financier is not enough as the changes in the policy environment and market warrant close scrutiny of the delivery of the project. In adopting this approach, bankers as the main financiers interviewed show that they are willing to adjust their position in order to interact with other stakeholders in a manner that seeks to ensure project success as well as generate profitability.

Equally important is to reflect on the roles of financiers in light of diverse finance models and options detailed in the extant scholarship. With respect to finance, Elie et al. (2021) recognise various mechanisms by which finance is availed to renewable energy projects in Europe either privately or through public finance. These mechanisms are listed as

RE public support policies in European countries (FIT)

RE finance via private financial intermediaries

RE public support policies in Anglo-American countries (REC, RPS)

RE finance via individuals/households

Solar public support policies

The assessment of RE investment opportunities by private investors

The impact of public or private finance on RE deployment

Clean Development Mechanism (CDM)

Such diversity in financing was not recognised in the interactions with stakeholders in the study with the predominant structure being project and corporate finance from banks. Funding secured by other stakeholders was not clearly articulated although it is clear that much of the financing was privately arranged and availed. The role of government was

therefore peripheral in this area with scrutiny largely focusing on whether compliance with BEE requirements and capital demands for launch of projects.

Research institutes and pressure groups are largely concerned with regulation, leaving scrutiny of financial arrangements and resources unchecked. From some of the interviews, private researchers were viewed with suspicion despite some entities occupying key parts in leading the research agenda in terms of practical and economic feasibility (Bjørner & Mackenhauer, 2013). The roles of institutions were understood to be neutral with respect to siding either with government or with independent power producers. The implications on power and authority within the sector were that research entities could be prominent and impactful if they generate quality research which is widely accessible. Unfortunately, some participants felt that this was not the case at the time of the study.

6.4 Regulation and financial investments/capital allocation in renewable energy

The findings chapter has already noted that there were no specific regulations on how finance was secured and allocated in South Africa's renewable energy sector. Rather, finance was governed by the broad regulations which applied in the economy as a whole. Neither were there limits to capital allocations on investors. This meant that investors only had their end to worry about in the sense that there was no pressure to satisfy the demands of a regulator or third party. In this sense, key considerations in seeking finance were risk profiles (economic and political risk), cost of finance, and fair pricing for the market in terms of regulations, the key issues that were discussed included compliance with BBBEE, environmental regulations, local bylaws, other sector-specific regulators such as civil aviation authorities and expectations of local communities.

Investments and general financing have a bearing on the development of renewable energy in South Africa. The fact that little regulation exists around renewable energy financing is therefore a positive light for stakeholders such as investors. This is because it entices innovation. Innovative finance would help reduce or hedge against risks inherent to renewable energy projects which can be problematic even "when the project is ready for financing, [such that] while all the contracts and permits may be in place, there may be gaps or deficiencies that render financing difficult" (Raikar & Adamson, 2020, 59).

Conceptually, the non-existence of strict regulations was a gap filled by considerations of what should happen. The normative and the ideal are positions which were routinely adopted by stakeholders as they imagined what a better scenario looked like for them. Idealised

notions of what should exist and how it could benefit stakeholders is evocative of Beck's (2014) suggestion that renewable energy financing is an art which comprises of multiple legal financial structures. Understood as an art –and not an exact science- the possibility to pursue various finance measures open up. In this frame of thinking, the study understands the question of regulation of finance and capital allocations as an area where limited experimentation exists with finance models. The perceived limitations due to unclear regulation do not constrain stakeholders from formulating models that could solve the ideals that they imagine. The reference to ideals and normative values is also indicative of the earlier-stated notions of renewable energy as an emerging and growing sector which remains unsettled.

Practically the long-term play is understood by investors and financiers as unappreciated because government has a framework which is short-term. The bid window cycles are short-term, the capital markets are narrow and the regulatory reforms are slow-moving.

6.4.1 The renewable stakeholder

Although the concept of stakeholder is broad, its usage is however dependent on the content and research framework (Franklin 2020). In the current study, stakeholders were considered in the renewable energy sector to encompass groups which can be understood on the production side and facilitators of production, regulators and support entities as well as consumers and interest groups of variable size. Having considered the data from the study, the concept of renewable stakeholder was coined to capture the meanings drawn from studying how stakeholders interacted among and with each other and how ties shifted as time, the environment and relations also changed. Both internal and external stakeholders indicated the aspects of the sector that they deemed inadequate and also celebrated some of the progress that has been made. In all the processes, the renewable energy terrain changed such that stakeholders had to react to the changing conditions. As such, they renewed the meanings of their stakeholdership resulting in changes in power relations and even outcomes. Ministers were introduced, regulations on wheeling embraced, market-centred pricing mechanisms mooted, and the adoption of new technologies such as storage batteries mooted. Renewable stakeholders have continuously changing understandings of and attach changing meanings to the sector to mimic the changing environment. In this sense, even among a single group of stakeholders, the roles and outputs can be understood in different ways.

The Energy Act [Number 34 0f 2008] defines renewable energy as “energy generated from natural non-depleting resources including solar energy, wind energy, biomass energy, biological waste energy, hydro energy, geothermal energy and ocean and tidal energy”. It

does not rely on finite resources for its generation. Renewable stakeholders are not infinite as the resources are but, they wield an infinite combination of ideas, interests and positions of relatedness such that as technology, regulations and opportunities shift, they too shift. Resultantly, power arrangements are also affected as some stakeholders gain an upper hand while others lose out.

As far as stakeholder analyses or accounts are concerned, much of the scholarship on the African continent and in South Africa seems to suggest a static group of entities with static interests. In part, this is due to the regulatory framework at state, municipal and local levels which articulates the various interest groups in the sector. As such, the stakeholders are deemed to have rigid interests.

6.5 Policy and practical implications of deploying renewable energy in South Africa's urban and rural areas

So far, renewable energy in South Africa has been understood as a sector in some progressive state towards maturity. As a sector that is becoming from the various perspectives of stakeholders, the practical implications of how this sector is understood and operates warrant attention. What are the practical outputs and realities of becoming? The starting point is to draw from discussions made elsewhere on the continent where renewable energy is also in its infancy. Writing on Ghana's experience, Gboney (2009, 508) states that "despite domestic and international financial incentives, barriers from the regulatory framework and from conventional practice prevent the utilization of renewable resources in both grid-connected and off-grid applications." This assertion partially applies to South Africa but requires further attention through the lens of stakeholder theory wherein we consider the functions of various stakeholders and consider in what way they are deemed to be impacting on deployment of renewable energy.

Government regulation lags behind the pace of technological advancement, a situation which the importance of well-thought regulation. In other words regulation matters (He et al., 2016b; Hille et al., 2020) and it must be updated to meet the expectations of various players in the market. This was evident during the study over issues such as grid allocation and electricity distribution. How South Africa attends to energy storage, the affording of more liberties to producers for wheeling and other regulatory affordances is of the utmost importance.

A sector in its growth spurt and comprised of stakeholders whose positions in the field vary would do well to include as many stakeholders as possible in providing input in policy drafting and crafting. Such is the perspective offered by Shari et al. (2023) who note that in their study, the clients were involved in policy coordination processes. Yet even in the discourse both in public media and in the interview conducted, some stakeholders were an afterthought as potential contributors to the sector's growth and policy dimensions. Households could be understood as representing the smallest consumer in the value chain. Including them in policy is not a matter of ticking boxes as appeared to be the case in the participant narratives over pre-project evaluations. Rather, the study agrees with Lucas et al. (2021) that broad inclusion and participation enable better attitudes towards the sector as a whole and towards renewable energy policy. The net result is an informed public and decisions which are more inclusive, instead of the prevailing state-led approach which is in some instances lethargic.

As already noted, some stakeholders such as end-users were largely excluded in the discourse just as they have continued to be held at a distance in policy formulation – although efforts have been made to include them in practice via incentives on rooftop solar installations. However, in noting that these stakeholders are either excluded or treated as peripheral figures, the suggestion is that as far as policy is concerned, a key part is missed. Writing on a select case in Germany, the salience of end-users as key stakeholders is recognised by Li et al (2013) and supported by Rountree & Baldwin (2018) in their much broader discussion. Yet the South African position appears more technocratic, with end-users or households as consumers taking a passive role due to sidelining or exclusion.

There were clearly practical shortcomings as a result of policy. Consistency, clarity, capacity, policy quality and such issues were identified as needing attention because they were aspects of the environment which did not satisfy some stakeholders particularly regarding regulation. If these sentiments are considered against the literature, then they are in agreement with Wall et al. (2019) whose suggestion for improvements in tariffs, tax incentives and standards are made in their paper discussing instruments that attract foreign direct investment.

Although not interested in the debates over energy efficiency as Zhao et al. (2022) do in their work, the study recognises that regulations do have an effect on the renewable energy's growth. The relaxing of conditions on who generates power within set limits has culminated in less strain on the grid as households and small producers opt for private generation of power. However, the costs of installing solar continue to be high as many implements are imported. Such circumstances hardly allow for sector growth especially considering the harsh economic climate for many households.

For independent power producers who seek a bigger slice of the market share, a pertinent issue revolves around the state monopoly ESKOM which they desire to be unbundled as part of wider sectoral reforms. Sector reforms have been pursued with varying outcomes in places such as Indonesia (Maulidia et al., 2019). There is therefore precedence in that regard. But, from the view of other stakeholders, reform comes with consequences for labour which partly accounts for the Minister of Mineral Resources and Energy's purported sluggish approach to adopting renewables more broadly. Ayamolowo et al. (2022) also add that reforms allow for a much more robust grid which has a healthy energy mix.

Given that the study has advanced renewable stakeholdership as a concept to explain the stakeholder relations conceptually, a look at its interface with the practical suffices. Renewable stakeholders are in a state of movement. They are not fixed in terms of holding a singular view of the renewable energy sector. Rather, they understand the sector in a dynamic way which in this study considered finance and regulation. In practical terms, the renewable stakeholder is adaptable and adjusts. Taken from government's view, policies and even appointments and roles are not fixed but move as deemed fit. This does not imply that a stakeholder is right or wrong as other stakeholders will hold different views.

6.6 Conclusions

The chapter has discussed the study's findings by highlighting key themes and engaging them with available conceptual, theoretical and/or empirical literature. In the process of presenting the discussion, the chapter has made a theoretical intervention through proposing 'renewable stakeholder' as a concept.

Consistent with Nasr et al. (2020), stakeholder roles were limited and did not experiment with a broad array of finance options available in other studies (Azhgaliyeva et al., 2020b; Gawusu et al., 2022; Sharma et al., 2022). Nonetheless, the available options were adequate for the needs of the clients who used predominantly local sources of finance. Much like financiers elsewhere (Daszyńska-Żygadło et al., 2021; Raikar & Adamson, 2020), the financiers themselves acknowledged their pivotal role in providing funding to producers but, consistent with Mejía-Montero et al. (2023b) performed the additional role of watchdog which meant ready to ensure that milestones were met and systems were adequately in place for project fruition and completion. Such roles are ancillary and have few similarities with other renewable energy sectors.

With respect to regulation, the study found consistency with Murombo (2015) in that various entities were recognised as regulators in the sector although the government stood out. Moreover, given the multiple nodes which contributed in varying intensity to regulation, the

study revealed how stakeholders wield and exercise their formal power either in regulation or in influencing regulation.

It is as a result of the complexities in regulation that the study suggested that persistent changes in the environment –law, actors, technologies– (Bowman, 2020; Fortuin, 2022; Jain & Jain, 2017b) meant that the stakeholders had to persistently reposition themselves. This shifting of positions as a result of changes elsewhere (Mkhize & Radmore, 2022) was understood as playing the part of a renewable stakeholder. This is the central contribution derived from the chapter and the analysis. Stakeholders themselves are not static but continue to adjust as policy, regulations, technologies, other stakeholders, and the broader climate change. Their understanding of renewable energy in South Africa was not static but shifted with the shifting conditions. This was hardly surprising as changes had transpired on the political front (Hanto et al., 2022; Oxford Analytica, 2023) during the research period; even prior to ministerial adjustments, the policy environment had changed to accommodate small producers (Khare et al., 2023). Renewable energy is characterised by activities of renewable stakeholders.

The renewable stakeholder highlights dynamic ties among stakeholders which imply shifting of connections (Maqbool et al., 2022). The government, financiers, independent power producers, households, pressure groups and other stakeholders do not have a fixed set of interests which is unmoveable when in contact with others. Instead, as the interests and activities of other stakeholders shift, so too do the positions, interests and activities of their counterparts. This is evident in how perceptions of the other change such that complementarity and harsh criticism are expressed. It is also evident in how intended outcomes can in some cases differ considerably with actual outcomes as some BBBEE partners have learnt.

The chapter has tied what was set out to be done at the study's inception to the outputs of the fieldwork. Given how this process also draws in the scholarship of other researchers and the methodology employed, the remaining aspect of this work is to reflect on the signposts and offer concluding remarks as well as recommendations for future scholarship in the area of renewable energy. The next chapter presents such a final snapshot.

Chapter 7: Conclusions and recommendations

7.1 Introduction

The current chapter presents a synopsis of the issues covered. It offers a reflection of the key issues that were engaged regarding renewable energy scholarship from a stakeholder perspective. It suggests that within this scholarship specific focus on how stakeholders relate around regulation and financing it previously been afforded little attention. Through the engagement with literature and the empirical data presented this study is presented a discussion of how stakeholders engage within the context of South Africa this chapter presents it's a summation of these issues and connects the key research questions 2 the data. In doing so it highlights the theoretical contribution made in noting that stakeholders themselves are renewable in the sense that their positions shift as they relate around regulations and finances.

7.2 The study's agenda and value

Based on a reading of renewable energy as a concept and as a set of technologies, the study explored how the concept is understood by stakeholders in South Africa and how these stakeholders understand the relations that they share. The value of exploring renewable energy from such a standpoint is that it contributes to the contested conceptualizations of renewable energy (Harjanne & Korhonen 2019; Güney (2019) from the perspectives of people involved in regulation, finance, implementation of projects. Approaching the meaning from the perspective of key stakeholders in the sector is important because it gives both abstract and practical sense of what the concept, technology, and sector entail.

Equality of interest where the empirical contributions that the study sought to make. Although there are numerous studies which have adopted stakeholder analysis into their framing, these studies have not given spotlight to financing and regulation as a symbiotic set of tools which shape the way that renewable energy is understood and how renewable energy environment plays out. The current study made a contribution to this empirical gap through focusing on stakeholder relations within South Africa. Apart from identifying the actual stakeholders involved in the renewable energy sector in South Africa, the study also highlighted how power is infused in these relations as well as what the perspectives are of particular stakeholders. A key aspect of the findings is the silence of households or smaller end users within the discourse of stakeholder engagement. This silence is not interpreted as indifference or disinterestedness but rather is understood as a manifestation of stakeholder value within the ecosystem. In other words, while some stakeholders were understood to be central to how the renewable energy sector was formed and operated, others such as

households remained an afterthought. This suggests different power hierarchies as well as perceptions of difference in value, a dimension which much of the scholarship particularly in South Africa he's not attended to or documented.

7.3 Research context/setting

In reflecting on the research context there are two perspectives that the study approached this work from. The first one is the broad socio-economic, political, and spatial context which draws from contemporary South Africa's issues challenges and experiences. A prominent feature within the energy sector is the phenomenon of load shedding. Load shedding was a manifestation of various challenges which in the public domain have included dilapidated infrastructure over reliance on one energy source political interference and resource constraints. In practical terms what it implies is that households, industry, and many other consumers of energy have limited access to electricity because the distributor identify the areas which must endure intermittent disconnections from the grid so that the energy demands on the grid minimized. The second perspective through which the research context can be understood is via an energy justice context. Renewable energy is an intervention which provides access to energy to households in poor urban communities as well as excluded rural communities. These communities are predominantly at the margins of the socioeconomic hierarchy in South Africa. Their demands for energy have continued to be the subject of debate around how to include them in a market-oriented environment. In other words what is a fair price to charge to these communities. Renewable energy it's both cheaper and much more accessible given the natural resource endowments of South Africa. Yet compared to other countries with much lesser resources harnessing the power of renewable energy in South Africa it's been rather slow. The quest for justicity has therefore continued unabated. The study intent a discussion within this context aiming to incorporate the perspectives of households as key stakeholders within the energy sector. Their perspectives matter because they are understood as end users with little meaningful input to give with regards to policy regulation financing of renewable energy. This is a position which needs to be dispelled. Besides changes in consumption of energy, shifts in renewable energy frameworks have meant that households can also contribute to the generation of energy for domestic consumption. In this sense they contribute to easing the burden one resource constrained developmental states such as South Africa.

7.4 Research questions

The following questions made up the research focus.

How are renewable energy projects understood, implemented, financed, and regulated by stakeholders in South Africa?

Ancillary questions which deepen the study's agenda are:

1) When self-reported among stakeholders, which stakeholders are identified as most important in renewable energy conception and implementation in South Africa?
2) What are the typical financing models used in the renewable energy sector in South Africa?
3) What roles do stakeholders play in the financing and regulation of renewable energy in South Africa?
4) What abstract, policy and practical meanings does renewable energy take in regulation and as an area for finance?

7.5 The knowledge contributions

Broad research on renewable energy has been documented engaging various aspects of stakeholder engagement or stakeholder involvement (Ahsan & Pedersen, 2018; Colvin et al., 2020; Maqbool et al., 2022; Rountree & Baldwin, 2018). What remained unattended within this area of scholarship were the interactions among stakeholders with respect to relating to regulation as well as access to and use of finance. The study has attended to this gap considering how stakeholders have related, what issues are at stake and what possibilities there are for the stakeholders to develop the sector. The literature is also well documented with respect to renewable energy financing (Abolhosseini & Heshmati, 2014; Elie et al., 2021b; Raikar & Adamson, 2020) as well as renewable energy regulation when attended to separately. What had not been extensively engaged is the confluence of regulation and financing within the renewable energy sector and particularly from a stakeholder perspective. This is an intervention which the study has conducted both at conceptual level - what are the meanings of renewable energy when understood both from finance and regulation perspective- and empirically.

Also established in the literature are the stakeholders that are involved in the renewable sector across the globe (Pillay, 2010; Ruggiero et al., 2014). The composition of stakeholders differs depending on the state of advancement within a sector. What remained under explored within the South African context was a critical examination of stakeholders and stakeholder relations. In this respect the current study is not only identified the

stakeholders in South Africa but it is also considered the way in which these stakeholders relate principally from two perspectives.

7.6 Answering the questions: methodology and procedures

The study was situated within Gauteng province and the selected participants were identified to participate as key informants. Although their perspectives are largely their own, they also presented perspectives which were in line with the organizations that they represented organizations that they work for such that an employee working for an independent power producer tended to respond in line with the perspectives of independent power producers just as an employee within a bank would give contributions which were consistent with perspectives of bankers. The study deployed a qualitative methodology which comprised of key informant semi-structured interviews. Equally important was secondary data extracted from publicly accessible platforms such as media reports and publications by other research institutes. The secondary data was deployed not just to enrich the empirical content of the study but as a way of trying relation to ensure reliability.

Interviews were conducted predominantly on Microsoft Teams because most participants where employed in various organizations within the renewable energy sector. This meant that these participants we often constrain for time just as the researcher was constrained for time in exercising his role. As a result, interviews were conducted online, and transcriptions were generated automatically thereof. Interview transcripts we read for consistency and at the same time identification of codes and development of themes was initiated. The analysis stage entailed a movement back and forth consulting data consulting teams as well as consulting the literature that had been covered in earlier chapters. In compiling the report and presenting findings identifying markers of the participants were obscured to ensure anonymity of the participant. This was done even in instances where a participant had preferred to be identified by name.

7.7 Making sense of the findings

There are three key findings which this study makes. The first one is that the study recognizes that within the stakeholder community in South Africa's renewable energy sector the constant shifts and changes in how stakeholders relate because of changes in the regulatory end policy environment (Ciarreta et al., 2020; Dzwigol et al., 2023b; United Nations Economic Commission for Africa, 2021). The meanings that are therefore attached to renewable energy as subject to the conditions in this sector at the time of study a dominant aspect of how renewable energy stakeholders understood the sector was in a state

of becoming. Although having been formed more than 10 years earlier the sector was still in its infancy as regulations kept changing, the relations between and amongst state stakeholders continued changing and the outcomes because of regulatory changes also tended to shift (Aykut, 2019; Ebrahim, 2018). It is because of these continuous processes of change, that the study identified renewability as a vital cog and concept through which to understand the stakeholder relations within the sector. In other words, renewable stakeholders was developed as a concept which can be used to understand how all of the stakeholders that we studied relate with each other relate with regulations and relate with the financing renewable energy projects. In an environment of continuous change, continued renewability was the essential and this is what the stakeholders in the study did.

The second finding worth noting from the study is that renewable energy was characterized by power tussles between the stakeholders (Ayamolowo et al., 2022; Díaz et al., 2017). An important observation in these power tussles between stakeholders was that in some instances the tussles were held in what can loosely be identified as intra-stakeholder heterogeneity (Bae & Fiet, 2023) or a diverse yet coherent stakeholder group. Hence the example of tussles between department leaders in the form of ministers of electricity and ministers of mineral resources and energy demonstrated that even the way cohesion was anticipated to prevail such cohesiveness was not always aligned. The implications in practical terms are that power contests animated stakeholder relations. This power was not only understood in formal terms (Norbom & Lopez, 2016) as the example of ministers shows but also through the discursive data that the study identified. In this vein consideration was given to who was mentioned and who was ignored in the discussions about stakeholders in the sector. Here the most prominent stakeholders were government departments banks and independent power producers while households proved to be the most peripheral.

A third finding relates to the abstract where stakeholders presented their imaginations for a functional sector. The study presented this finding through idealized and normative positions taken by stakeholders. In this finding stakeholders indicated that they anticipated more clarity more consistency more cohesion and similar ideals largely from the government as the chief regulator and a key stakeholder. In other words, while there was a recognition that there was a regulatory framework already in existence, there were certain inadequacies which all stakeholders identified (Inês et al., 2020). Criticism or reflection was not only reserved for the government but also applied to research institutes as well as bankers. Institutions for example we perceived with suspicion by one stakeholder who represented a local municipality. Bankers were on the other hand also examined on the basis of financial models which we are available to investors. These criticisms are consistent with some of the

literature. For example, literature on finance in the renewable energy sector identifies much more than two financing models that are deployed (Freudenreich et al., 2020; Gawusu et al., 2022; Jebaraj & Iniyan, 2006; Raikar & Adamson, 2020).

7.8 Contributions to the current scholarly debates

As noted earlier in this chapter as well as in Chapter 1 conceptions of renewable energy vary if understood as a set of ideas as well as is the technology (Harjanne & Korhonen, 2019; Hille et al., 2020). The differences in meaning suggest that they can also be differences in policy direction and even in claims of attainment. This latter part is especially important in a context we energy justice does not prevail. The contemporary inequalities in South Africa (Hanto et al., 2022) which some identify as a legacy of a dark history, persist and manifest through access to energy (Jenkins et al., 2017; Sinwell et al., 2022). Households in poor communities are not guaranteed access to electricity. Neither are small businesses within those communities. As such what renewable energy is how it is shared how it is developed and who gets access to it a pertinent economic and political issues. Within a business environment, engaging in what renewable energy means is also important as it affects business strategy in a global environment which is shifting away from traditional forms of energy. The debates around what renewable energy is are therefore important and also invite scrutiny into areas such as who finances renewable energy, how are those finances secured, who regulates the sector, and what are the positions of actors within the system. These are debates which have been heard in jurisdictions such as China and Brazil (He et al., 2016b; Hochberg & Poudineh, 2018) which feature among the global leaders of renewable energy generation. The current study has contributed to this debate by demonstrating how stakeholders within the system relate to one another and, in a continuous game of musical chairs, shift from one position to another. These changes inform how they understand renewable energy and how they imagine renewable energy will be like. They also inform what they aspire for within the sector, hence ideal positions and an ideal environment are drawn out from the study's outputs.

With respect to stakeholder theory, the contribution has been made with respect to how stakeholders self-report their positions in a field constituted by multiple actors. Whereas the traditional approach is concerned with ties between the firm and its stakeholders (Freeman et al., 2021) and this perspective has been applied elsewhere replacing the firm with the state in some instances (Nasr et al., 2020; Rountree & Baldwin, 2018), the study understood stakeholder perspectives in light of real and perceived ties among stakeholders themselves. This approach, which was understood as self-reporting, adds value to the stakeholder approach as it spotlights real and imagined, formal and informal power-laden relationships

(Colvin et al., 2020)which sometimes result in competition but can also produce cooperation. Moreover, stakeholder theory presents stakeholders as entities whose interests and positions are fixed in relation to the firm and to others. Through the formulation of renewable stakeholder in the study, the research has contributed to an understanding of stakeholders in South Africa's renewable energy sector as actors with multiple positions, often shifting and frequently in movement. Stakeholders renew their positions in response to regulations, to other stakeholders, to changes in the environment and to changes in how renewable energy as a whole is understood.

7.9 Limitations of the study

While the methodology was deemed appropriate for the study, no research is perfect and entirely foolproof. The task of the researcher is to be rigorous and honest in how the research was conducted. Part of this honesty includes identifying and acknowledging areas where the study could be improved upon. This brief section reflexively performs such a task. The key areas which pose as limitations of the study include

The study sampling approach which was non-probability based and therefore cannot be generalized. Findings and analyses made are only applicable to the research context alone and general insights can therefore not be made outside of the study.

A second limitation was the researcher's experience which was limited to the study. Approaching the field and conducting interviews was initially challenging but became easier over time. This limitation was made slightly easier by familiarity with some of the participants in the study. However, such an aspect also presents as a limitation as it implies that familiarity may have influenced interactions or even the depth of quality in the interviews. It is for this reason that data triangulation via secondary sources was an essential part of the study's methodology.

Although cyber-ethnography (Kurubacak & Yuzer, 2011) is now a widely accepted approach to conducting qualitative research, it runs the risk of missing non-verbal cues which could have been enriching to the study data. The study relied on interviews conducted predominantly on Microsoft Teams and so may have failed to detect the non-verbal communication cues which in-person interviews might extract.

7.10 Current knowledge and possibilities for future research and practice.

Difference characterises ties both among and between stakeholders. This is a critical contribution to the discussions around stakeholder engagement within the renewable energy

sector as the notion of stakeholder does not retain consistency is a singular group. Interests even within a group can vary culminating in concepts (Bae & Fiet, 2023). In addition, stakeholders even of various kinds can she similar perspectives on matters of concern such as what is renewable energy and what needs to be done for it to work in South Africa. These are contributions that the study has made and from engaging such perspectives the studies also drawn some lessons which are useful in areas of learning in future research. They are therefore presented as recommendations for further scholarship. The first suggestion or recommendation is for more attention to be given to households and end users as crucial elements within the renewable stakeholder ecosystem. Their interests their focus their roles and concerns are all worth recognizing even though government and other stakeholders appear to neglect their voice similar approaches can be adopted to gain a grasp of specific stakeholder group interests such that independent pro power producers can be considered on their own just as regulators can be considered on their own.

The study also makes recommendations based on methodological issues encountered. Is already outlined the study deployed qualitative approach which entailed asking and answering questions of how stakeholders related what meanings they ascribed to renewable energy and what roles they played. Although very insightful and useful for the purposes of this study this approach sheds light on some of the issues that cannot be attained using qualitative means. An interesting area of study could be the distribution of financial resources and what via distribution contributes two different stakeholders such as local communities and economic growth. Approaching research in this manner demands that a different methodological approach is deployed namely, quantitative study.

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Appendices

Appendix 1: Interview Guide for Producer

Gordon Institute of Business Science
University of Pretoria

Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis.

KEY INFORMANT INTERVIEW GUIDE (Producers)

Introduction
My name is Tafadzwa Wudebwe**,** an MPhil candidate from the University of Pretoria. I am conducting a study entitled: **Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis for which I cordially invite you to participate**. I believe that your participation, opinion and perspective will offer invaluable insights for the study. The information from this interview process will help me in writing a thesis for my degree.

Procedure
After receiving your permission for the interview, you will be asked a series of questions that relate to your experience, understanding and perception of financing and regulation of the renewable energy sector in South Africa. This will take about one hour of your time. If you feel uncomfortable in answering any question please feel free to decline. Information gathered through this research exercise will be used only for academic purposes and sources of information will remain anonymous. You are free to opt out now or anytime during the course of the interview.

Benefits
There are no direct financial or material benefits for participating in this study.

Further Information
Should you require further information about this research feel free to contact My Supervisor, ***Professor Johan L. Olivier***

NAME OF THE INTERVIEWER:
LANGUAGE OF THE INTERVIEW: English
DATE OF INTERVIEW: **LOCATION/SITE:** **START TIME:** **END TIME:** **TOTAL MINUTES SPENT ON INTERVIEW:**

Confirmation of verbal Consent and audio recording consent.

Verbal Consent	**Yes**		**No**	
Audio recording Consent	**Yes**		**No**	

Participant's Position In their Organisation:

Years of service

Key role(s) in your organisation

Setting the tone

Who are the key players that are driving the green renewable energy transition in South Africa?

Please give us a general overview of renewable energy in South Africa from your organisation's/office's perspective?

In terms of production, how does your organisation fare within the sector?

Questions on regulation

1. Who are the key producer in the renewables industry in South Africa?
2. How do they generally impact the industry?
3. In your opinion, how does the regulatory environment affect your business? Please also identify key legislation in the renewable energy sector?
4. In your own words, how would you characterize the regulation of renewable energy in South Africa. (Ask them to elaborate).
5. In your opinion, how are rights to explore/set up renewable energy projects, such as solar or wind farms, granted? How do these differ based on the source of energy, i.e. solar and wind?
6. What is your organisation's position regarding regulation of public-private partnerships in energy production within South Africa?
7. In your opinion as a producer, what are the key issues facing the regulation of renewables industry in South Africa across solar and wind?

Finance

1. In your own words, are there specific regulatory positions in terms of how renewable energy is financed?
2. Who are the key financiers in the sector?
3. Of the financiers that you stated, which ones do you engaged more and why?
4. Which ones are you likely to engage in future? Why?
5. Do you have any access to government incentive schemes promoting renewable energy? For example, are there any special tax deductions or incentives offered?
6. What are the key contracts you typically expect to see in a different types of renewable energy contract?
8. How does your organisation envision funding (if at all) of public-private partnerships in energy production within South Africa?
9. In your opinion as a producer, what are the key issues facing the financing of renewables industry in South Africa across solar and wind?

Appendix 2: Interview Guide for Users/Consumers

Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis.

KEY INFORMANT INTERVIEW GUIDE (Households/Industrial Users)

Introduction
My name is Tafadzwa Wudebwe**,** an MPhil candidate from the University of Pretoria. I am conducting a study entitled: **Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis for which I cordially invite you to participate**. I believe that your participation, opinion and perspective will offer invaluable insights for the study. The information from this interview process will help me in writing a thesis for my degree.

Procedure
After receiving your permission for the interview, you will be asked a series of questions that relate to your experience, understanding and perception of financing and regulation of the renewable energy sector in South Africa. This will take about 45 minutes of your time. If you feel uncomfortable in answering any question please feel free to decline. Information gathered through this research exercise will be used only for academic purposes and sources of information will remain anonymous. You are free to opt out now or anytime during the course of the interview.

Benefits
There are no direct financial or material benefits for participating in this study.

Further Information
Should you require further information about this research feel free to contact My Supervisor, ***Professor Johan L. Olivier***

NAME OF THE INTERVIEWER:
LANGUAGE OF THE INTERVIEW: English
DATE OF INTERVIEW: **LOCATION/SITE:** **START TIME:** **END TIME:** **TOTAL MINUTES SPENT ON INTERVIEW:**

Confirmation of verbal Consent and audio recording consent.

Verbal Consent	**Yes**		**No**	
Audio recording Consent	**Yes**		**No**	

Household: Yes No

Organisation: Yes No

Duration using renewable energy (in years):

Type of renewable energy used: Solar Wind

Setting the tone

Who are the key players that are driving the green renewable energy transition in South Africa?

Please give us a general overview of renewable energy in South Africa from your perspective?

Questions on regulation

10. How did you get onto renewable energy?
11. In your own words, how would you characterize the regulation of renewable energy in South Africa. (Ask them to elaborate).
12. Did you encounter any regulatory issues when adopting renewable energy in your home/organisation?
13. If yes above, do you think these issues continue to impact the industry? How?
14. In your opinion, do households/industry fit into government's plans and strategies for the renewables industry? Please also provide a brief overview of key legislation in the renewable energy sector?

Finance

7. How did you finance your adoption of renewable energy in your home/company?
8. Were you aware of any key financiers in the sector?
9. Were you or are you aware of any government incentive schemes promoting renewable energy for households/industry?
10. What are the key issues facing the household/industry financing of renewables industry in South Africa across solar and wind?

Appendix 3: Interview Guide for Government

Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis.

KEY INFORMANT INTERVIEW GUIDE (Government)

Introduction
My name is Tafadzwa Wudebwe**,** an MPhil candidate from the University of Pretoria. I am conducting a study entitled: **Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis for which I cordially invite you to participate**. I believe that your participation, opinion and perspective will offer invaluable insights for the study. The information from this interview process will help me in writing a thesis for my degree.

Procedure
After receiving your permission for the interview, you will be asked a series of questions that relate to your experience, understanding and perception of financing and regulation of the renewable energy sector in South Africa. This will take about one hour of your time. If you feel uncomfortable in answering any question please feel free to decline. Information gathered through this research exercise will be used only for academic purposes and sources of information will remain anonymous. You are free to opt out now or anytime during the course of the interview.

Benefits
There are no direct financial or material benefits for participating in this study.

Further Information
Should you require further information about this research feel free to contact My Supervisor, ***Professor Johan L. Olivier***

NAME OF THE INTERVIEWER:
LANGUAGE OF THE INTERVIEW: English
DATE OF INTERVIEW: **LOCATION/SITE:** **START TIME:** **END TIME:** **TOTAL MINUTES SPENT ON INTERVIEW:**

Confirmation of verbal Consent and audio recording consent.

Verbal Consent	**Yes**		**No**	

Audio recording Consent	**Yes**		**No**	

Participant's Position In their Organisation:

Years of service

Key role(s) in your organisation

Setting the tone

Who are the key players that are driving the green renewable energy transition in South Africa?

Please give us a general overview of renewable energy in South Africa from your organisation's/office's perspective?

Questions on regulation

1. Who are the key regulators for the renewables industry in South Africa?
2. How do they impact the industry?
3. How would you characterise the current role of government/research organisations and pressure groups involved in the renewable energy sector?
4. Are there regulations specifically crafted for organisations such as yours? If yes, elaborate.
5. How do you perceive the policies, plans and strategies the renewables industry? Please consider the positions of various entities involved in the sector.
6. In your own words, how would you characterize the regulation of renewable energy in South Africa. (Ask them to elaborate).
7. In your opinion, how are rights to explore/set up renewable energy projects, such as solar or wind farms, granted?
8. What is the government's regulatory plan regarding public-private partnerships in alleviating the current load shedding scenario that South Africa is plagued with?
9. From your organisation's perspectives and especially in light of its role(s), what are the key issues facing of the regulation of renewables industry in South Africa across solar and wind?

Finance

11. In your own words, are there specific regulatory positions in terms of how renewable energy is financed?
12. Who are the key financiers in the sector?
13. In your opinion, does the current architecture promote renewable energy funding in South Africa? For example, are there any special tax deductions or incentives offered?
14. Who are at are the key contracts you typically expect to see in a different types of renewable energy contract?
15. How do you perceive the role of research entities/pressure groups in public-private partnerships aimed at alleviating the current load shedding scenario that South Africa is plagued with?
16. What are the key issues facing the financing of renewables industry in South Africa across solar and wind?

Appendix 4: Interview Guide for Financiers

Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis.

KEY INFORMANT INTERVIEW GUIDE (Financiers)

Introduction
My name is Tafadzwa Wudebwe**,** an MPhil candidate from the University of Pretoria. I am conducting a study entitled: **Complexities in finance and regulation of renewable energy projects in South Africa: An enquiry using a stakeholder analysis for which I cordially invite you to participate**. I believe that your participation, opinion and perspective will offer invaluable insights for the study. The information from this interview process will help me in writing a thesis for my degree.

Procedure
After receiving your permission for the interview, you will be asked a series of questions that relate to your experience, understanding and perception of financing and regulation of the renewable energy sector in South Africa. This will take about one hour of your time. If you feel uncomfortable in answering any question please feel free to decline. Information gathered through this research exercise will be used only for academic purposes and sources of information will remain anonymous. You are free to opt out now or anytime during the course of the interview.

Benefits
There are no direct financial or material benefits for participating in this study.

Further Information
Should you require further information about this research feel free to contact My Supervisor, ***Professor Johan L. Olivier***

NAME OF THE INTERVIEWER:
LANGUAGE OF THE INTERVIEW: English
DATE OF INTERVIEW: **LOCATION/SITE:** **START TIME:** **END TIME:** **TOTAL MINUTES SPENT ON INTERVIEW:**

Confirmation of verbal Consent and audio recording consent.

Verbal Consent	**Yes**		**No**	
Audio recording Consent	**Yes**		**No**	

Participant's Position In their Organisation:

Years of service

Key role(s) in your organisation

Setting the tone

Who are the key players that are driving the green renewable energy transition in South Africa?

Please give us a general overview of renewable energy in South Africa from your organisation's/office's perspective?

Questions on regulation

1. Who are the key regulators for the renewables industry in South Africa?
2. How do they impact the industry?
3. How would you characterise the current role of regulatory organisations involved in the renewable energy sector?
4. Are there regulations specifically crafted for organisations such as yours? If yes, elaborate.
5. How do you perceive the policies, plans and strategies the renewables industry? Please consider the positions of various entities involved in the sector.
6. Are organisations such as yours involved in the crafting of policies and plans in the sector? If 'yes', how? If 'no', is this something that you are comfortable with?
7. From your organisation's perspective and especially in light of its role(s), what are the key issues facing of the regulation of renewables industry in South Africa across solar and wind?

Finance

8. Who are the key financiers in the sector?
9. In your opinion, does the current architecture promote renewable energy funding in South Africa? For example, are there any special tax deductions or incentives offered?
10. How do you perceive the role funding organisations in public-private partnerships aimed at alleviating the current load shedding scenario that South Africa is plagued with?
11. How can the roles be better played in renewable energy?
12. What are the key issues facing the financing of renewables industry in South Africa across solar and wind?

Appendix 5: Informed Consent Statement form

Informed consent for interviews

Note: *This standard informed consent letter to be used in qualitative interviews, must be separate from interview guide, must be signed before the interview commences. The signed form must be stored separately from the data collected*

I am conducting research on the "**Complexities in regulation and financing of renewable energy projects in South Africa: An enquiry using a stakeholder analysis"**. Our interview is expected to last **one hour** and will help us understand more about the complexities in regulation and financing of renewable energy projects in South Africa. **Your participation is voluntary and you can withdraw at any time without penalty**. By signing this letter, you are indicating that you have given permission for:

- The interview to be recorded;
- The recording to be transcribed by a third-party transcriber, who will be subject to a standard non-disclosure agreement;
- Verbatim quotations from the interview may be used in the report, provided they are not identified with your name or that of your organisation;
- The data to be used as part of a report that will be publicly available once the examination process has been completed; and
- All data to be reported and stored without identifiers.

If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher name	Professor Johan Olivier
Email	Olivierjo@gibs.co.za
Phone	011 771 4000

Signature of participant: _____

Date: _____

Signature of researcher: _____

Date: _____