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The Political Economy of Energy Regulation in the Coal Mining Industry of Emalahleni.

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in Energy Leadership.

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ABSTRACT

This study explores the perspectives on the political economy of energy regulation in the coal mining industry of Emalahleni. It seeks to discuss whether there are adequate steps within the political and economic sphere that regulates the efficient supply of electricity. The goals of this study are to ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa; examine the reasons for decision-makers' inaction in promoting a sustainable energy transition in Emalahleni, South Africa, and to identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy. This research draws upon theoretical discussions centred on the following: The Agency Theory, Classical Political Economy, Keynesian Economics, and the Political Theory of Governance. Informed by an interpretivist paradigm, the qualitative research approach will be employed to explore the political economy of energy regulation within the study area. A non-probability sampling approach through the use of judgemental sampling was used to select the research participants, and the research method utilised interviews through the distribution of a questionnaire. A sample size of 20 comprised individuals from mining organisations in Emalahleni, Department of Mineral Resources and Energy Officials, CGS, Petroleum Agency SA, COSATU, and the Department of Trade Industry and Competition. The study noted that the political system has an impact on the energy and coal regulation markets at Emalahleni. It is recommended that an efficient energy resource policy and local governance are required to address the challenges of increased energy demand and pollution in South Africa.

Declaration

The University of the Witwatersrand, Johannesburg, South Africa

SENATE PLAGIARISM POLICY

Declaration by Students

I, Elton J Selebi (Student number: 2514364) am a student registered for Master of Management in Energy Leadership in the year 2021-2022. I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
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- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

Signature: EJ Selebi

Date: 20 February 2023

Dedications

I dedicate this work to all the miners who continuously risk their lives to ensure that the country develops economically.

Acknowledgements

I would like to express my heartfelt gratitude to the Almighty God, as it is through Him that this project came to completion. Most of all, I would also like to appreciate my academic supervisor, Dr M Matshabaphala, who guided me throughout the research. Your support and assistance highly contributed to my research project and for that, I shall forever treasure your assistance. To the management of the different organisations that I interviewed, a special thanks to you, for allowing me the opportunity to use your organisations as the case study of my choice. I am truly humbled for allowing me to collect data despite your busy schedules and work commitments.

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LIST OF ACRONYMS AND ABBREVIATIONS

ANC –	African National Congress
CCUS -	Carbon Capture, Usage and Storage
CGS -	Council for Geosciences
COP -	UN Climate Change Conference of the Parties
CO2-	Carbon Dioxide
COSATU -	Congress of South African Trade Unions
EU -	European Union
IRP -	Integrated Resource Plan
JIT -	Just in Transition
MEC –	Minerals-Energy Combination
SA -	South Africa

CHAPTER 1. INTRODUCTION

1.1 Purpose of the study

The country's great dependence on coal is due not only to the availability of coal in South Africa but also largely to the history of the political economics of the energy sector in South Africa (Acheampong, 2019). This study seeks to undertake a qualitative enquiry on the role of political economics in the regulation of coal within the town of Emalahleni. This reliance on coal, as this research aims to explore, may primarily be attributable to energy policies and different systematic procedures undertaken within the coal-mining sector. Coal supremacy can be traced back to apartheid's energy policies, specifically when in the 1960s; sanctions from the international community compelled the government to focus on energy security. This focus thus led the government to incorporate this into its energy supply and development strategies with an emphasis on establishing autonomy and self-containment (Makgetla, 2018).

As a premise of this research, Majola (2015) argues that this was partially due to the country's political isolation, which obligated the apartheid administration to construct an energy ecosystem grounded on locally accessible resources (coal) to decrease the danger of supply instability caused by energy carriers that are imported. Considering this, the importance of this research is to further understand how the extraction and use of coal in the Emalahleni study area will contribute to the establishment of regional plans for lowering CO2 emissions from coal.

The political economy in any given environment affects how policies and their implementation are done. This case study seeks to examine factors that affect the political economics of energy regulation in the Emalahleni coal mining industry. Musango, Brent, and Bassi (2014) mention that it is important to note that coal exporters' revenues will decline if global coal markets fall, whether due to more active climate initiatives by major importers or cost-competitive alternatives from solar and wind generation.

Within the area of Southern Africa, Newell and Mulvaney (2013) are of the view that the reliance on coal is much greater as many mining districts are relatively rural and apart from this, have little to provide economically apart from mining coal and agriculture. Within this academic parameter provided by Newell and Mulvaney (2013), Wright, Calitz, Bischof-Niemz, and Muchwana (2017) assert that expanding the economies of coal mining regions in South Africa might be a lengthy and tedious process. The scholars who probed on the long-term viability of coal for power generation in the country, go further to mention that historical evidence from first-world countries proves that it can take decades to implement structural reforms (Wright et al., 2017). Snell (2018) confirms that coal mining in the Ruhr Valley in Germany began to tumble in 1957, but the consequences on its economy are still being experienced today, and this case provides an example.

With the example of Germany and its applicability to the current study in South Africa, coal mining regions gain from coal mining not just in terms of jobs and cash, but also in terms of negative local consequences such as air pollution, soil degradation, and toxic and acidic water, a point rightly put across by Shepherd-Powell (2017). In Emalahleni and other coal-producing towns, these unfavourable environmental consequences pose health concerns to both employees and local people (Valentine, 2015). This conduct thus limits the town and the region in general of its potential to undertake other economic activities like agriculture.

The premise of this study is to understand the dynamics within the political economy and autonomy in line with the regulation of coal. The politics as the Southern Africa Development Corporation (2015) mentions, “to guarantee that coal users rather than local people pay the external costs of coal, strict laws must be developed and enforced.” Finally, from a climate policy standpoint and within the realm of a Just Transition, this is critical to improving the cost competitiveness of low-carbon options and ensuring that the environment is protected at all costs. Thus, the keywords of this study are; political economy, coal mining and transition of energy.

1.2 Context of the study

The context of this study is based on the supposition of understanding the political economy of the development of energy policies in the country. In understanding the political economy, it is vital to note that this based on the ability by policymakers to influence decisions within the regulation of energy in the country. Policymakers frequently fail to adopt such “no-regret” options because political decisions on energy and climate policy are not exclusively driven by considerations to improve overall well-being but are also heavily influenced by special interests. These include, inter alia, public demand for low energy prices, lobbying from powerful interest groups, or the desire to create jobs and accelerate structural change.

Rennkamp and Boyd (2013) advocated for the proposition that energy discussions must be positioned with the wider domestic, political and global economic context. In line with this, the domestic parenthesis has to do both post and pre-1994 because energy policies presently have been predisposed by the politics of the past. The perspective of this study also draws lessons from the SADC area and the African continent at large. How have other countries managed to regulate the use of coal within the nuances of politics and the economy?

Contextually, it is important from an energy leadership perspective to analyse how a “just transition” needs to be incorporated with energy policies. In collocation, Shepard-Powell (2017) references the oil crisis in 1973 as a perfect example of understanding the undercurrents at play. The scholar states the heightened public awareness of the notion of national energy security, prompted many nations (including South Africa) to adopt sophisticated and deliberate policies and institutions to secure a continuous supply of energy.

Comparably, rising global worries about changes in the climate are forcing many countries to implement energy policies that address the issues created by the usage of energy carriers used in the traditional sense such as liquid fuels and coal. In support of the point posited by SADC (2015), UNDP (2021), states that

as a reaction to climate change, most governments are currently enacting laws that support renewable energy. In 2017, the country's state-owned energy utility (Eskom) announced the impending retirement of five of its coal-fired plants (Acheampong, 2019).

The news elicited a significant reaction from trade unions (such as COSATU) as well as invoking public deliberation on how communities and workers will be affected by the changes to the energy system (Burton, Caetano and McCall, 2018). Green (2018) maintains that regarding the transformation of the country's energy system, this route taken by Eskom was a departure from the old political debates on this issue. Within the context of the regulation of coal, these discussions in the past focused on economic and technical issues related directly to the energy system (Caldecott, Sartor and Spencer, 2017), with little consideration of the socioeconomic issues (Burton and Winkler, 2014).

Within the jurisdiction of a just transition, there seems to be a great body of knowledge provided by scholars like Campbell and Coenen (2017) and Cloete (2018) on how processes within the structural change correlate with the success of the migration to clean energy. Such is the case with other countries around the world (Cosbey et al., 2016), and in dealing with this migration, it is important that knowledge is shared across regions and nations (Cheong, 2018). In addition, policy departments, sectors and different disciplines need to comparatively deal with structural policies related to climate change (Fayomi et al., 2019).

The commencement point for this research study is the element that a reversal of the worldwide coal usage trend is imminent; whereas coal consumption has been steadily increasing in recent years; it is expected to peak and then decline in the nearby future (Green, 2018). The proponents of this drive are opting for the use of energy from renewables, which is cheaper and addresses the climate obligations set forth (Healy and Barry 2017).

Makgetla (2018) proclaims that this has far-reaching consequences for coal-rich countries like South Africa, particularly those that are major coal exporters. Even

in places where coal mining contributes significantly to the national economy (for example in Emalahleni), there are heated arguments about the future of coal, because some individuals (and sometimes structurally poor) communities rely quite heavily on coal in terms of jobs and tax income (Marais et al., 2018).

According to Musango, Brent and Bassi (2014) such areas, quite justifiably, want a “fair transition.” The query is what are the right countermeasures to neutralise, lessen, or eliminate the economically unfavourable effects of a decreased worldwide requirement for coal exports? How can countries rich in coal, particularly those who act as exporters, prepare for a coal transition while avoiding social and economic adversity?

One understandable possibility for the above is to delay or slow down the transition (Newell and Mulvaney, 2013). In line with the preceding thought, the preservation of the common code of conduct may appear appealing to governments, coal businesses, and employees. Indeed, historical patterns show that this has frequently been attempted, for example, by subsidising national coal mining, which was no longer a competitive option globally (Rennkamp and Boyd, 2013). In promoting high government subsidies, the slackening in the shift in many coal-mining districts resulted in limited innovation and progress (Healy and Barry, 2017).

To counter a declining demand for coal, coal-rich countries like South Africa can adopt the policy of increasing domestic coal consumption to compensate for anticipated economic losses (Roe, 2015). As this present study seeks to probe and understand, it is crucial to note that from the standpoint of climate policy, the above route provided by Roe (2015) is unappealing. It may also be unfavourable to the country because it may stymie investments, innovation, and the development of alternative industries that work towards economic sustainability (Wiseman, Campbell and Green, 2017). To build internationally sound policies for a low-carbon transition, a deeper look at existing policies and systems of how coal is produced in South Africa. On the empirical side, the current work adds to

the body of knowledge by doing a comparative analysis of energy regulation in Emalahleni – and given the dearth of extensive research on politics, economics and the regulation of energy.

1.3 Research problem

The underlying problem is fixated on how politics and economics affect the regulation of energy within the coal mining industry of Emalahleni. Coal constitutes the most important source of global greenhouse gas emissions, phasing down coal is a prerequisite for achieving ambitious climate targets. At the same time, in South Africa, most coal is burnt to generate electricity, for which increasingly affordable substitutes exist in the form of renewable energy sources.

Antonakos (2019) provides an interesting proposition by stating that there is now a global challenge confronting all economies, established and emerging, that can only be remedied by the combined efforts of all nations. Within the context of providing energy, it is vital to remember that climate change is the most significant obstacle to global sustainable development, appearing in a variety of ways and influencing many areas of each economy.

In line with the above proposition, South Africa's socio-ecological change begins with and is dependent on a clean and sustainable transition in its energy, and the oncoming global climate problem, which is becoming more severe by the day. The high levels of regional air pollution and social inequality might be reduced by using a well-designed and well-executed energy transition policy, as proposed by Baker, Newell and Phillips (2014).

Scholars such as Baker and Burton (2018) affirm that renewable energies like wind and solar are becoming more affordable and encouraging further investment, however, for South Africa, coal remains a profitable option. Thus, the predominance of coal within South Africa can only be adequately understood in light of the political factors that determine energy policy formulation. These include industrial towns like Emalahleni, coal importers and exporters as well as

other towns and cities that are either substantial coal users, are just beginning to ramp up their capacities, or have already initiated a coal phase-out.

Importantly, this current study is structured in understanding how a unifying framework that focuses on the central actors driving energy policy formulation, their main objectives as well as the context that determines to what extent they can influence policymaking within the area of Emalahleni. Faced with possibly significant decreases in coal employment, trade unions have urged for a “fair transition” for coal workers and communities, highlighting the importance of creating alternative quality job possibilities in impacted areas (Cloetes 2018). In line with the country’s long-term climate plan and goal to keep global warming “well below” 2^{o}C, the regulation of coal plays an important role in achieving these ambitious targets (Eberhard and Godinho, 2017).

1.4 Research objectives

The primary and secondary aims are explored more below.

1.4.1 Primary Objective

- To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.

1.4.2 Secondary Objectives

- Examine the reasons for decision-makers’ inaction in promoting a sustainable energy transition in Emalahleni, South Africa.
- Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.

1.5 Significance of the study

While South Africa’s dramatic history and enormous mining industry are distinctive, the three research subjects that emerge are not. South Africa’s mining

community is still prospering, but neighbouring communities are already experiencing post-mining life (Fine and Rustomjee, 1996).

When coping with this prosperity, Hess (2015) asserts that economic expansion in the mining industry requires all of the government's attention, within this assertion, it is clear that at times it is tough to envision and plan for change. Thus, the research is critical in analysing the dynamics for a just transition. Over 82,000 people are employed in the coal mining business (Minerals Council 2018), while Eskom employs over 50,000 workers in its network of predominantly coal-fired power stations (Eskom 2018). Through employment creation, the industry has been entangled in the country's political economy for decades. However, changes in the local and global energy sectors are altering the relevance of coal in South Africa (Korsten, 2015). As the grounding of what this study seeks to show, it makes sense to begin a discussion about what South Africa will do after coal, and how best to accomplish it.

As a start, major changes according to Mayr et al. (2015) are already occurring in the electrical infrastructure. Several coal-fired power facilities are nearing decommissioning, and they have outlived their usefulness and are becoming too expensive to maintain and run (Swilling, 2014). In his current study, Valentine (2021) notes that they are projected to be replaced by renewables, which are becoming more cost-competitive compared to fossil fuels' current coal-fired power facilities.

Long-term, carbon-intensive infrastructure finance is also becoming increasingly scarce (Wright et al. 2017). Simultaneously, present mines' coal supplies are decreasing, while new mining basins have tremendous economic and infrastructure obstacles, such as water supply and rail connections (Trollip, 2015). Second, if world demand for coal declines as predicted, South Africa's exports might suffer significantly. The demand for South African coal had decreased significantly in most European countries, as the European Union has put through its intention to rapidly decarbonise its electricity infrastructure (Burton et al. 2018).

This means that some mines would become unprofitable if export demand fell or vanished, regardless of local demand from South Africa's energy grid (Bouzarovski, Tirado, Petrova, 2017). This study's findings will contribute to the current literature on a "Just Transition" by studying the repercussions of shifting social responsibilities, new inequities, and sustainability challenges generated by South Africa's unavoidable energy transition to the depletion of the fossil-fuel era. By concentrating on the local realities in South Africa's developing coal and energy town, Emalahleni, it analyses whether a fair transition from coal-generated electricity is feasible and what the local ramifications of this worldwide restructuring of the energy business will be.

1.6 Delimitations of the study

1. Subject matters: Because there is an extensive range of subject matters in the political economy of energy regulation, such as just in transition, coal usage, renewable energy sources, non-renewable energy sources, and more, this research will be unable to examine the differences in perceptions attributable to different subject matters.

2. Physical location of the participants: The investigator will examine where the participants are and will be picked based on purposive sampling per topic area expertise.

1.7 Definition of terms

The findings of this study were reviewed utilising the following operational terminologies:

Decarbonisation: A substantial reduction and potential elimination of carbon dioxide emissions (Green, 2018).

Just in Transition: Musango et al. (2014, p.23) state that, "Just Energy Transition is a vision-led, unifying and place-based set of principles, processes and

practices that build economic and political power to shift from an extractive economy to a regenerative economy."

*Sustainabilit*y: Avoidance of the depletion of natural resources to maintain an ecological balance (Burton and Winkler, 2014).

1.8 Assumptions

It will be presumed in this research that:

(a) The participants will be willing to take the survey and provide honest self-assessment and self-perception.

(b) The participants are knowledgeable about the political economy of energy regulation in the coal mining industry.

(c) A just transition is required in managing the sustainable regulation of energy.

1.9 Structure of the report

This study is structured as follows.

Chapter 1: Introduction

This chapter encompasses the introduction and background of the study. It outlines the statement of the problem, objectives and respective assumptions.

Chapter 2: Literature Review

The chapter is an extensive literature review on energy regulation within the coal industry, just in transition, politics and the economy. The chapter further gives a detailed explanation of the topic of energy regulation in South Africa. The relevant theories are used to model the relationship between the different variables.

Chapter 3: Research methodology

This chapter gives a detailed account of the research design and methodology that was used to carry out the study. The population, sample, data collection and data analysis procedures are explained.

Chapter 4: Findings and Discussion

The chapter presents a report on the findings of the study. Results on the qualitative research methodology on which this study is based.

Chapter 5: Discussion of the Findings

This chapter essentially gives the findings of the study and have compared them to those obtained from related studies.

Chapter 6: Conclusions and Recommendations

Furthermore, conclusions and recommendations, implications and opportunities for further research are also highlighted based on the literature presented in chapter 2. The chapter also summarises all the findings of the study and the conclusions reached.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical examination of the theoretical framework, conceptual framework, and empirical literature on the political economy of energy regulation in the coal mining industry. The goal of this review is to connect the theoretical framework with the conceptual framework and the major research objective of this study, which is to determine the amount of regulation and policy formation in the coal mining industry in Emalahleni, South Africa. The chapter will introduce the reader to the important theoretical paradigms (political economics, decarbonisation, unemployment, and just in transition) that will be used to contextualise the study findings. The chapter also follows the evolution of the conceptual framework for political economics and energy regulation in the coal sector, which is based on a qualitative research model.

Because the present study is focused on identifying this function, this chapter will evaluate studies that investigate the political component among the various coal enterprises in the study region. Within the setting of these organisations, structuring politics and economics as an interdisciplinary and transdisciplinary process allows for the integration of skills and information gained in multiple situations (Guthrie & Jenkins, 2018). The next section defines the research topic and helps to define the study, which, as Miner (2015), identifies as the creation and the interaction between theory formation and research.

2.2 Definition of topic or background discussion

The main conceptual themes are centred on the use and regulation of coal. Coal is South Africa’s most widely utilised source of energy, and it has significantly benefited from the country's rapid industrialisation (Caldecott, Sartor and Spencer, 2017). Coal’s importance in South Africa’s energy basket stems from the fact that it is relatively abundant in contrast to other energy sources, as well as the current inability of large-scale deployment of other alternative energy

sources (Burton, Caetano and McCall, 2018). Baker and Burton (2017) reference that as a result, ensuring South Africa's energy security is inextricably linked to ensuring an affordable and long-term supply of coal.

The economy surrounding the politics of this country has historically been defined by the minerals-energy combination (MEC). Fundamentally, this is a growing accumulation system based on the utilisation of low-cost coal to create low-cost electricity, which, when paired with low-cost labour, provides input for export-oriented mining and mineral beneficiation (Beresford, 2012).

This chapter focuses on the key issues in the study topic of probing the political economy of energy regulation in the coal-mining sector.

The context of the coal mining industry is that between 1838 and 1859, coal was first discovered in KwaZulu-Natal, Mpumalanga, and the Eastern Province (Caldecott, Sartor and Spencer, 2017). The need for coal surged in 1886, with mines opened in Vereeniging in 1879 and 1895, Witbank. About 53% of coal comes from open-pit mines, while the remainder comes from underground, bord-and-pillar operations account for 40% of the total, stopping accounts for 4%, and longwall mining accounts for 3% (Caldecott, Sartor and Spencer, 2017). Based on this premise, the study is based within the area of Emalahleni where most of the country's coal is mined. Emalahleni owes its current "fortunes" to the abundant coal reserves which has been substantially mined in the past two decades in order support the country's energy demands and has been a lucrative source of income with regards to the export of South Africa's coal to the global market (Campbell, Nel and Mphambhukeli, 2016). Additionally, the area is historically the most important coal-producing region in South Africa with over 22 mines operating in the area.

It is vital to highlight that the linkages within and among the beneficiation sectors, mining and energy regulation reflect an interrelated industrial elite composed of private capital and governmental actors, as well as a distinct historical dynamic of "conflict and cooperation."

2.3 Conceptual Framework

The conceptual framework consists of theories, their derived hypothesis, and operationally defined variables and concepts used in examining the development of a research methodology that will tackle the research problem of investigating the factors leading to the problem of energy regulation in the coal mining industry in Emalahleni (Bouckova, 2015). In essence, the conceptual framework is positioned toward the development of a research model that seeks to identify two distinct dimensions namely, political economy and energy regulation.

This research study utilises the two concepts because it provides an interesting introductory avenue for examining the features of South Africa's energy economy from the perspective of Emalahleni. It is also a valuable foundation for comprehending some of South Africa's important political and economic progress, as well as a tool for investigating South African environmental and social issues, such as the impact of ongoing coal development on local people (Swilling, Musango and Wakeford, 2016).

2.3.1 Concept of Political Economy

Snell (2018) states that the South African economy has traditionally been and continues to be oriented toward an economic path based on energy and capital intensity in sectors dependent on labour. From a political standpoint, Wiseman, Campbell, and Green (2017) contend that the conversation on the necessity of coal mining and burning is imposed not just by the sector's corporations, but also by legislators, the media and trade unions. In general, the government has a major impact on coal, particularly in (partly) state-owned firms (Banga, 2014). Politicians' and coal companies' influence, on the other hand, operates in both directions, a point put forward by scholars Cosbey et al. (2016).

When it comes to amending regulations, big energy utilities are frequently contacted, whereas agents of renewable energy or environmental groups are generally disregarded (Wiseman, Campbell, and Green, 2017). Furthermore, personal ties between energy businesses and the government (the revolving-

door concept) boost the coal regime's effect on policy results (Green, 2018). Mining corporations may seek further political and financial help from the government if the electricity and heating sectors continue to rely on coal (Department of Energy, 2015).

2.3.2 Concept of Energy Regulation

In the context of energy regulation, a sizable number of employees in energy utilities and mining businesses, as well as their supporters, can impose indirect pressures on policymakers through election votes, particularly in municipal ones (Wright et al., 2017). One common argument advanced by coal-fired utilities is that a lack of high-voltage power lines and an inadequately designed electrical infrastructure will preclude the spread of distributed renewable energy resources (Acheampong, 2015).

Thus, as Delbufalo (2018) posits, changes in the structural sense of the economy and labour force are crucial for boosting intensive labour growth and the well-being of the economy while mitigating the conservational impacts of the different mining sectors. The formation and consolidation of a massive and powerful state-owned, vertically integrated monopoly dominated the history of South Africa's power industry for much of the preceding century (Atkinson, 2014). The majority of the early commercial power producers were gradually taken over by Eskom, which also acquired additional supplies, as suggested in the following statement:

"*The main drivers of increased concentration and public ownership of the industry were potential economies of scale in power plants, the need for large amounts of capital that government guarantees could facilitate, and the government's recognition of electricity as a critical component of its industrialisation strategy" (Atkinson, 2014:89).*

Baker (2015), states that at the same time, the state was establishing a strong presence in other essential infrastructure industries including rail, air and sea transport, telecommunications, water, coal-based synthetic fuels, nuclear energy, and the iron and steel sector. Competition and private ownership were viewed as

undesirable in these areas; instead, the state viewed these industries as important vehicles for industrialisation, employment creation, and economic development (Htay and Salman, 2013).

In concurrence with the above, the review process took into consideration the mining industry's difficulties and potential in the context of changes in the country's policy and institutional environment (Beresford, 2012). In a study on domestic electricity prices of six metros and Eskom compared, Yelland (2015) remarks that changes in labour legislation, the implementation of employment equity legislation, and the reform of the environmental regulatory system all contribute to a dynamic environment for this policy assessment. Beyond South Africa's borders, rising competition from mineral rich-nations that have liberalised their economic and political systems to attract investment has a significant influence on the policy reform process (Burton, Caetano and McCall, 2018).

Within the framework of this study on Emalahleni, the policy review process must take contemporary mining sector concerns and prospects into consideration (Trollip, 2015). The gold mining industry, in particular, is being forced to reconsider its production methods in light of a stagnant gold price, high levels of labour, and rising operational expenses (Burton, Caetano and McCall, 2018). Conclusively, notwithstanding the rise of new kinds of generation, notably renewable energy, there is concern about the transmission of Eskom's energy and the ability of the country's local governments, which account for over 40% of the supply, to absorb and assimilate this (Burton, Caetano and McCall, 2018).

Such a problem might be a significant impediment to the implementation of decarbonisation initiatives (Sen, 2014). Furthermore, in a country, that has long had one of the worst levels of inequality in the world; the decarbonisation efforts would not necessarily help South Africa's poor and disadvantaged (Monjane, 2015). Such a proclamation by Monjane (2015) is also evident within the Rational Choice Theory. Htay and Salman (2013) state that this theory shows the correlation between the consumption of public goods and public choice. Based on the concept of maximisation, this notion analyses how an individual makes certain decisions that affect the public (Swilling, Musango and Wakeford, 2016).

2.4 Theoretical Framework

This study is positioned on four theoretical archetypes namely; The Agency Theory, Classical Political Economy, Keynesian Economics and the Political Theory of Governance. The theories presented in this section were selected by the developer of the study from a large listing of political and economic theories. The selection was established through the following criteria; the importance of the theory, the applicability of the theory towards the ultimate development of the research model, 'the goodness' of the theoretical statements embedded in the theory and last yet most importantly, the usefulness of the theory.

Scholars such as Miner (2015: p. 6) assert that "good theories tend to attract research, and consequently much of what we really know about motivation and leadership within organisations is encompassed within the theoretical framework", and this study seeks to articulate the trajectory of a sound theoretical paradigm towards the development of the research model. In challenging the theory parenthesis, Dulap et al. (2017) explain that a theory stings together often-abstract propositions and hypotheses in an attempt to make meaning or explain complex phenomena. To add further, Balago (2014) perceives that some theories and approaches are written from a positional leadership stance. This view provided by the above scholars shows that determining leadership dimensions in the political economy within the coal mining industry in Emalahleni embodies diverse complexities.

Theory 1: The Agency Theory

The first theoretical archetype embedded in the study is the agency theory, which was presented by Stephen Ross and Barry Mitchick in late 1970. The history of the agency problem dates back to the time when human civilisation practised business and tried to maximise their interest (Panda and Leepsa, 2017). In essence, this theory assumes that there is a contractual relationship between the agent and the manager (Bouckova, 2015), and the notion of the contract is used as a metaphor to describe the agency relationship (Delbufalo, 2018).

The theory is thus grounded on a particular kind of social perspective (Lopes, 2016), and an agency arises if the cooperative (or first-best) behaviour, which maximises the group's welfare, is not consistent with each individual's self-interest (Balago, 2014). The management and the board of directors of companies are agents whose role is to act in the best interest of the stakeholders, and unfortunately, the objectives of these agents are often at variance with those of the firm's stockholders as well as those of the other stakeholders (Babalola, 2014).

Theory 2: Classical Political Economy

This is the main theory of this study. The Classical Political Economy is fixated on the new social consciousness that is being expressed as a result of the fragmentation of the old-fashioned system and the gradual alteration of simple commodity production into specifically capitalist production (Eden and Ackermann, 2018). Based on the above, it is important to note that this theory is governed by the premise of capitalism and the 'general equilibrium', which is ideally the case in South Africa.

Theory 3: Keynesian Economics

According to Eden and Ackermann (2018, p. 1147), "the basic premise of Keynesianism, contrary to neo-classical economics, is that (monopoly) capitalism has no internal mechanism which secures full employment and maximum resource utilisation at the state of 'general equilibrium." The proponent of this theory acknowledges that capitalism is based on a system that regulates itself (Hess, 2015) and that investment and output may be achieved within a level of equilibrium (Eden and Ackerman, 2018).

Theory 4: Political Theory of Governance

The fourth and last theoretical paradigm of this study is the Political Theory of Governance. This theory is also known as the "normative political theory", which

is a subfield of the castigations of philosophy and political science that addresses conceptual, normative, and evaluative questions concerning politics and society, broadly construed (Lopes, 2016). The term “political” however, is not regulated to the work of governments and it can also refer to a non-market entity (Healy and Barry, 2017). In addition, “the major concern of the political theory is how ownership is distributed between the shareholders of a firm may influence the decision-making into the firm and its corporate governance structure” (Bouzarovski et al., p. 21).

Based on the decision-making within the corporate world, the government’s role in the political sphere is of importance to diverse shareholders’ interests (Delbufalo, 2018). According to Miner (2015), this theory provides light on how profits, benefits and corporate powers are put in place by the government, which interestingly also represents the interests of different shareholders. Lastly, Htay and Salman (2013, p.90) assert that “the political theory suggests that both the government and corporate sector determine the delegation of power and authority to managers of a particular organisation and their relationship towards other stakeholders”. The relevance of this study lies in the suggestion that the present governance structure at mining departments is the consequence of past politics and is also a cause of future political and economic well-being.

2.4.1 Theoretical Fit to the Study

The importance of utilising the above-mentioned theories lies in the creation of a foundation from which all knowledge concerning the research model is constructed literally and metaphorically. The theoretical framework positions itself in the qualitative research methodology adopted for the study and thus seeks to inherently shape the research model through an analysis of data interpreted in light of these concepts. The study’s findings will then be discussed in relation to existing knowledge (some of which are present within the 4 chosen theories) to demonstrate how this present research has contributed to expanding the research and knowledge base. In the process of carrying out a qualitative

research methodology, the entire process reflects the culmination of theory building.

As Zencir, Zencir and Khorshid (2019, p.47) state, “this process requires grounding ideas in prior research and theory, categorising phenomena, and building models or narratives that explain or simplify details, perhaps leading to new or modified theories”. The four theories serve as a structure and support for the rationale of the study, the problem statement and the significance of the study. This theoretical framework will provide a grounding base for the literature on the political economy of energy regulation in the coal mining industry, and most importantly, the qualitative methods research methodology adopted for this study.

The theories chosen for the study provide a notion of generality or a broad application of the research problem. Even though the various theoretical models of politics and economy reflect the same general ideas, each of the theories employs a unique vocabulary to articulate the specific factors considered perfect for this study.

2.4.2 Regulation and policy formulation in the coal mining business

The Department of Energy (2015) states that efficient governance frameworks and regulatory environments aid in the attraction of adequate investment within the energy industry, and this importantly, helps in aligning towards the Paris Agreement’s target of 1.5°C and the Sustainable Development Goals 7. In support of the above proposition, UNDP (2021) states that these efficient systems also support the development of innovation, necessary human capital, financial and energy markets, and the much-needed infrastructure. These regulations have substantial influence regarding the governance of the country and in that regard influences operations in Emalahleni as it constitutes a large proportion of the country’s coal mining operations. Regulatory compliance is vital in order to carry out operations and these are guided by the policies that sector is bound to.

2.4.3 The Political Economy of Decarbonisation

The next conceptual theme is centred on the idea of the political economy of decarbonisation. Green (2018) is of the view that there seems to be a high level of political interference within the decarbonisation project, and this has affected the efficient decision-making of the electricity sector. Within the current ANC-led government, there are signs that there is a battle regarding the technologies and arrangements that need to be done with this decarbonisation project (Burton, Caetano and McCall, 2018). These struggles are also apparent within the regulation of the electricity sector which then affects the policy-making of the country (Healy and Barry, 2017).

According to Majola (2015), regarding the political economy of decarbonisation, a country's resource base in energy is essentially used to provide power in running its economy. In the relative power of different interest groups, a country's economic structure plays an imperative role (Burton, Caetano and McCall, 2018). As a country with diverse political and economic coalitions, a just transition from a non-renewable to a renewable state plays a key component in the development of South Africa's economy (Johansson, 2018). Swilling (2014) notes that the country has witnessed different power struggles which have contributed to how decision-making processes are conducted within the country. This is evident within the governing party and its allies. This raises the question of the extent to which tensions in policymaking can be resolved, with decarbonisation as the end goal.

2.4.4 Universal Provision of Electricity

Yelland (2015) mentions that in line with the universal provision of electricity, coal has previously been the lowest fossil fuel to produce. This is because of its capability to produce more carbon dioxide per unit than any other fossil fuel (Wiseman, Campbell and Green, 2017). In a study, Snell (2018) on the adoption of renewable energy, did not find any negative correlation between natural gas production and renewable energy. Based on the discussion on the provision of electricity, fossil fuel-dominated economies like South Africa need to formulate

policies that address a clean supply of energy (Valentine, 2021). Contextually, Makgetla (2018, p.4) notes that “strategic policy development is far more important to an effective long-term decarbonisation program in a state that might be hostile to renewables because of cheap fossil fuel energy.”

2.4.5 Diversification of the Coal mining sector

There have been several problems and tensions related to the diversification of the coal mining sector in South Africa (Majola, 2015). While within the country, it is important to note that there many drivers who are putting pressure on both the government and Eskom towards the adoption of clean energy (Korsten, 2015). This pressure emanates from the demand for coal which has grown largely to other markets like India and less to the common markets of Europe (Hess, 2015), and the majority of the country’s exports now head to the East (Eberhard and Godinho, 2017). This growing demand and exposure to new markets facilitated unnecessary competition with domestic consumers resulting in further pressure being exerted on Eskom (Baker, 2015). Thus, the diversification of coal is premised on several factors ranging from domestic to international pressure (Cloete, 2018).

2.4.6 Proposition 1

The influence between politicians and firms involved in coal is essential for energy regulation.

2.5 Promoting a Sustainable Energy Transition

In promoting a sustainable energy transition, there needs to be an urgent call in accelerating this conversion (Campbell and Coenen, 2017). On the positive side, there have been investments in renewable energy that have been made in the country but paradoxically this has also put pressure on low-carbon technologies (Fayomi et al., 2019). Majola (2015, p. 4) mentions that “policy frameworks set targets and develop the economic and financial instruments that provide direction

and certainty in investment; regulatory frameworks provide the market rules and allow the integration of low-carbon technologies; and governance frameworks provide the oversight and enforcement to secure finance and low-carbon investment that align with the SDGs and the Paris Agreement which accelerate the sustainable energy transition."

As the world is still gripped by the devastating effects of COVID-19, Valentine (2021) mentions countries need to adopt their renewable strategies so that they can keep track with achieving a sustainable energy transition, climate and sustainable development goals. COVID- 19 unquestionably brought about several challenges to many countries around the world and thus a sustainable transition of energy also poses a serious challenge. Majola (2015) affirms that transitions with the energy sectors bring about several challenges and uncertainties but mainly affect countries that are heavily dependent on fossil fuel extraction.

The development of this transition is also being done at a snail's pace and this weighs hard on whether most countries will eventually migrate to clean energy (Shepherd-Powell, 2017). According to the Department of Energy (2022), emissions related to energy have gone up approximately 1% each year since 2015, and this makes energy transitions very complex and detailed (Valentine, 2021). As this study on Emalahleni seeks to analyse, the permitting frameworks must be universal in their design, to provide a platform for a low-carbon transition.

From an energy leadership supply perspective, Cheong (2018) agrees that energy transition involves the uptake of renewable energy sources and the disregard of primary energy sources like coal. The energy system converts these primary energy sources through power plants or industrial plants to generate secondary energy in electricity, heat, biofuels, and potentially synthetic gases and fuels based on hydrogen (Cheong, 2018). According to Green (2018), this 'new' energy is transported and stored to meet the demand within the different energy service industries like agriculture, industrial, buildings, tertiary and residential.

Suitable outlines can provide an energy supply that provides greater electrification and better efficiency in the system of new technologies, developments and innovations (Department of Energy, 2015). Cheong (2018) states that factors like behavioural change, customer participation, and customer preferences easily influence the demand side of energy in a country. Further, Healy and Barry (2017) postulate that the underlying economics of the technologies adopted by a country influence heavily how a country will take on its transition of energy and the time it will take.

2.5.1 Energy Market Regulation

An important concept within this study is engrossed in energy market regulation. In many countries like South and Mozambique, power grids and energy markets were developed before the growth in the uptake of renewable energies like solar and wind (Monjane, 2015). As in the case of South Africa, some of these rules that were developed within the energy market have not been changed to accommodate the changes brought by the newer technologies (Bhorat et al., 2017). In adopting newer energy forms in the energy markets, it is crucial that the environment that regulates this has to be continuously updated and changed (Baker, 2015).

2.5.2 Proposition 2

Transitioning to a low-carbon economy has the lowest social and economic costs.

2.6 Political Support toward a Transition to Sustainable Energy

“Sustainable energy transitions are conceived here as complex socio-technical processes of decarbonisation within energy systems and involve both bringing in low, or zero-carbon energy and phasing out old, high carbon energy (Baker and Burton, 2018, p.95).” Majola (2015) states that our reasoning for sustainability is inclusive of various issues such as justice, equity, poverty and distribution of energy. Healy and Barry (2017) support this assertion by claiming that, in terms

of the social and demand infrastructures present, it is critical to understand the old and new dynamics of energy systems. There are sustainable changes occurring within the different energy systems present in many countries apart from South Africa, but several variations caused by past and present policies are vivid in these nations (Majola, 2015).

Acheampong (2019) who undertook a study on the financial development of economic welfare in sub-Saharan Africa found that in terms of outcomes, politics plays a crucial role in how energy is regulated within countries. The politics in this field of study is termed as 'energy politics' and involves multiple actors from across the globe (ACTU, 2016), and this means that politics and sustainable energy transitions are related (Acheampong, 2019). Politics affects the work and conduct of energy systems.

Energy policies within the sustainable energy field are embedded in institutional power relations, which also surprisingly still exist regarding issues brought about by climate change (Makgetla, 2018). In addition, energy politics relates to investment and decisions made in the facilitation of non-fossil-based fuels used as primary energy (Baker, Newell and Phillips, 2014). Due to the transition from the traditional fossil fuel based economies, this has resulted in reduction of opportunities in obtaining foreign direct investment from multilaterals and international banks. In the formulation of governmental policies, there will need to be sufficient policy promotion in place in order to facilitate this transition to the benefit of the country and the inhabitants in the Emalahleni area.

In the path towards a more sustainable agreement, sustainable energy transitions across several countries have been affected by the political work done (Caldecott, Sartor and Spencer, 2017). As stated in the political governance theory earlier on, the nature of policy responses and formulation lies in politics. Currently, as the country battles with the COVID-19 pandemic, the way the government will react to sustainable energy transitions, will have an impact on how the climate change agenda is addressed (Valentine, 2021). The bilateral and multilateral agreements that South Africa enters into will have to take the current political and social climate into account when deliberating the future of the country's outlook.

2.6.1 Employment Opportunities

The positive side of this discussion is that investments made towards the uptake of renewable energy will create more jobs and thus increase the GDP of the country (Eberhard and Godinho, 2017). This will have several multiplier effects in increased economic value and substance in other sectors of the economy, like agriculture (Musango, Brent and Bassi, 2014). As South Africa battles with an unemployment rate hovering at the 50% mark (Stats SA, 2022), development in renewable energy will provide jobs for those that do not have one and for those that no longer have jobs (Sen, 2014). The development and improvement of renewable energy throughout the energy value chain need to be central to South Africa's national development plans, to establish what jobs can be created domestically in these new markets (Johansson, 2013). The developments that take place will need to take various factors into account such as training and development and succession planning of not only current employees, but that of the youth of the country as a whole in order to ensure a reduced unemployment rate.

2.6.2 Proposition 3

Sustainable energy transitions and politics are deeply intertwined: politics can shape the nature of energy systems, i.e. the degree to which they become sustainable

2.7 Conclusion of Literature Review

This chapter gave the theoretical and conceptual framework to guide the study based on the proposition of three research objectives. The objectives were explained in detail and their overall applicability to the development of the research model for this study.

Below is the consistency table of the research questions and propositions of this chapter.

Table 1: Consistency Table: Research Questions and Propositions

Research Objective #	Research Objective	Proposition #	Proposition
1	To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.	1	Proposition I: The influence between politicians and firms involved in coal is essential for energy regulation.
2	Examine the reasons for decision-makers' inaction and missteps in promoting a sustainable energy transition in	2	Proposition II: Transitioning to a low-carbon economy has the lowest social and economic costs.

	Emalahleni, South Africa.		
3	Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.	3	Proposition III Sustainable energy transitions and politics are deeply intertwined: politics can shape the nature of energy systems, i.e. the degree to which they become sustainable.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Introduction

The underlying aim of this chapter is to present the research philosophy, approach, design and methods used to address the research problem as outlined in Chapter 1. This study sought to analyse and explain (the purpose of the research); through mainly qualitative methods (the process of the research), using deductive logic based on existing theories and the outcome is one of a survey (applying the research to a particular organisation). This is in line with the overall research problem as identified in Chapter 1.

2.3 Research approach

The study employs a qualitative research technique. The study's qualitative research will be distinguished by the goal of comprehending specific facets of political economics inside the energy regulatory debate. Qualitative research approaches rely on detailed, interpretative verbal descriptions rather than quantitative, numerical, or statistical tools (Saunders, Lewis and Thornhill, 2018). According to the interpretivism viewpoint, objective knowledge is not independent of thinking, and reality is socially and societally entrenched in the mind. This will enable the researcher to address and comprehend complex phenomena in many situations using an exploratory approach, such as observing, describing constructs and measures, and discovering patterns and regularities using the research issue described in Chapter 1.

2.4 Research design

The study will undertake an exploratory research design, and this is a significant advantage of qualitative research. Furthermore, the suggested study would use an exploratory research strategy. "An exploratory research design is an exploration of a subject to get further knowledge (Creswell, 2014, p.34)." This is a significant advantage of qualitative research. "In exploratory research, a researcher begins with

a broad concept and utilises research as a tool to find topics that may be the subject of future research (Creswell and Clark, 2014, p. 67)."

As a result, the proposed research intends to gather in-depth knowledge of the political economy of energy regulation, the problems that renewable energy adoption poses in the area, and how to effectively implement an efficient just in time system. Another advantage of utilising qualitative research is that it can provide insights that are specific to an industry as in the case of the coal industry within the country (Creswell, 2014). The disadvantage of qualitative research is that it does not provide statistically representative data. Furthermore, the effectiveness of using this research is dependent on the researcher's experience, which might contribute to researcher bias (Saunders et al., 2018).

2.5 Data collection methods

The choice of data collection strategy is informed by the nature of the study and the identification of the source of data that will provide the best answers to the research questions. This study will rely on interviews and document analysis to answer the research objectives defined in Chapter 1. These will be used to elicit useful data about the political economy of energy regulation in the Emalahleni coal mining business. In particular, these will be conducted by collecting primary data from progress on meeting targets from the Department of Mineral Resources and Energy, the Department of Trade Industry and Competition, the Congress of South African Trade Unions (COSATU), the Department of Labour and Employment and any other material of relevance to understand the transition of energy from high carbon emissions to low carbon emissions which encompasses the political economy therein.

3.5 Population and sample

"A target population is a full collection of components (people or things) who share some common trait" (Patel, 2018, p.8), whilst a sample is stated by the researcher's preferred sample criteria. Individuals from various organisations in the mining and energy industry including the Department of Mineral Resources, the Council for

Geoscience, Petroleum Agency South Africa, the Minerals Council South Africa officials and executives from some of the mining companies in Emalahleni that will be the study's target group. Their replies will aid in addressing the study's research objectives. This study's projected population is 20 individuals.

3.5.1 Population

The selected participants must possess relevant and reliable knowledge about the phenomenon under investigation. For purposes of this study, the interviews will be deliberately conducted with the stakeholders as mentioned above, who were selected for the interview owing to their in-depth knowledge of the South African mining and energy sectors. In conducting this research, the study believes that targeting these individuals will give useful information in achieving the study's aims. The population is defined by Timma, Blumberga and Blumberga (2015, p.34) as, “the collection of all observations of a random variable under investigation and about which one is attempting to make conclusions in practice.”

3.5.2 Sample and sampling method

A sample is a subset or fraction of a larger group known as a population (Waidi, 2016). The sample for this study will include employees and stakeholders that are leaders in the mining and energy sector who will respond to the researcher's interview questions during data collection. Non-probability sampling will be used in the investigation. Non-probability sampling, also known as judgement or non-random sampling is a procedure in which every unit of the population does not have an equal chance of participating in the research and no random selection is done (Saunders et al., 2018). The sample is chosen based on the investigator's subjective evaluation. These strategies can be applied to both sorts of populations: those that are too broad a category and those that are too particular (precisely defined) (Creswell, 2014). Table 2 shows the profile of the respondents selected for this study.

Table 2: Profile of respondents

Description of respondent/officials	Number to be sampled
Department of Mineral Resources and Energy Officials	5
Department of Trade Industry and Competition	3
COSATU	3
Petroleum Agency SA	3
Council for Geosciences	3
Mining organisations in Emalahleni	3
Total	20

3.6 The Research Instrument

This research takes the form of both open-ended and unstructured questions. In respect of the interviews, the specific questions and the specific sequence they are asked are predetermined. In this case, questions are open-ended and require concise responses. On the contrary, unstructured interviews identify thematic areas to be researched without predetermination of questions and their order.. According to Preece et al. (2002), this type of interview facilitates the generation of rich data due to an easy flow of ideas and information during such conversations. Respondents will be allowed to answer the questionnaire by either having a face-to-face interview and answering the questions, telephonically or the ability to transcribe themselves. This allows flexibility for the interviewer to vary the level of questioning in response to the context, allowing the interviewer to delve deeper into issues of interest as they arise in the conversation.

The research instrument will include a series of questions aimed to elicit information from respondents about specific events and their attitudes, values, and beliefs regarding the study issue. According to Wardle (2019), the questionnaire is by far the most often used research instrument. The study questionnaire will be divided into two sections: Section A (which will include all of the respondents' demographic information) and Section B. (research themes derived from the three research

questions). The questionnaire will constitute a total of 14 questions, with three objectives being the centre of the derived questions.

The questionnaire will be developed to assess attitudes and behaviours in the implementation of the conceptual framework, which focuses on the political scope of energy regulation. The questionnaire will also include a “cross-sectional survey design,” allowing the researcher to collect data at a single moment in time. Creswell (2014) also verifies that attitudes and views are about what respondents think, whereas practices are about what they do. As a result, this questionnaire is intended to capture both kinds of data.

3.7 Procedure for data collection

The surveys will be given through email to the participants.To obtain authorisation to conduct the research, a letter will first be written to the respondents, accompanied by an ethical clearance letter from the University. Respondents will be given a time frame in which to return the surveys.

3.8 Data analysis and interpretation

The qualitative data gathered from the questionnaire will be analysed using thematic analysis in this study based on the research model factors. Data will be processed through thematic analysis, which will be done manually. The research study will first make use of the process of transcribing the interview responses and identifying themes across the data set. Thematic analysis (TA) is a popular method for analysing qualitative data in many disciplines and fields and can be applied in a myriad of different ways, to a variety of different datasets, to address different research questions. A semantic approach (a method that looks at formalising the content from the respondents) to thematic analysis will be used which involves coding and theme development which reflect the explicit content of the data.

This study will group the similarities (if any) and the results into different categories to make inferences based on the specified outcomes as indicated by the respondents in which the findings will then be examined under the current research being conducted.

The information obtained from the interviews will be tested and contrasted with information from a variety of relevant public documents such as expert reports, written texts, and company annual reports as well as a variety of reports from the Department of Mineral Resources and Energy, the International Energy Organisation and other agencies which will be collected during the research. According to Creswell (2014), text and image data are so dense and rich that not all information derived from such qualitative documents can be used for enquiry. Accordingly, in analysing the information discerned from the documents, the data will be aggregated and organised into sub-groups or themes.

In ensuring the trustworthiness of the data collected, the researcher will use the four key components under this dimension namely; credibility, transferability, dependability, and confirmability. For credibility, the researcher will spend considerable time engaging and observing the research subjects. Under transferability, the findings of this study are meant to be generalised and applied to other situations and contexts. The judgemental sampling which was used for this study considers elements of the sample subjects' characteristics, which are directly related to the research question.

Dependability will be ensured by running a data audit with an external researcher, to determine the quality of the data collected. Lastly, confirmability will be achieved through the use of describing category properties within the thematic analysis procedure. This will be done to justify the inclusion of each data component. Concerning this study, it will allow for a nuanced comprehension of the intricacies of South Africa's political economy of energy regulation in the coal mining business of Emalahleni, to produce a composite analysis whose findings form the core of the contribution to the research.

3.9 Limitations of the study

The absence of an articulated and agreed-upon concept of 'energy regulation' results in definitional discrepancies that stymie comparisons and applications of prior efforts. The choice of research methodology might has impede in tackling the research problem very well. These definitional distinctions provide a dilemma since they are

viewed differently in various social circumstances. Each researcher makes his interpretation of the concepts, which may limit the knowledge accumulation within the field. Additionally, the use of an unstructured questionnaire, which will be distributed by email, may allow respondents to provide their best replies to the questions.

3.10 Trustworthiness

A thorough assessment of the literature will be conducted to analyse the theoretical and legislative underpinning for the hypothetical model to determine the credibility of the research instruments. To guarantee validity, model dimensions will be integrated into the study instrument. A highly qualified and professional research supervisor will cross-check the questionnaire and interview guide for content validity and relevance. Furthermore, validity will be tested by spending extended time in the field to obtain a thorough grasp of the subject under investigation and by having an external auditor assess the entire project (Creswell, 2014).

The reliability of a study is concerned with whether or not other researchers undertaking a comparative study would obtain similar results. Reliability indicates that if the same research procedures are used, the results will be the same (Saunders et al., 2018). Existing theories from many writers and experts were evaluated to strengthen the dependability of this research. The frame of reference was created using precisely defined ideas based on the examined literature (Creswell, 2014).

Inclusion criteria are a set of predetermined features used to categorise subjects who will be included in a research study, whereas exclusion criteria are a set of established parameters used to identify individuals who will not be included or must withdraw from a research study after being included. They form the eligibility criteria that determine who is eligible to participate in a research project.

3.10.1 External validity

This relates to determining the realm to which the findings of a study can be generalised (Balco, Drahošová and Kubičko, 2018). External validity in this study addressed the question of whether the data genuinely represents the reality of the

population from the sample chosen. It was then used in the study design. Instead, obtaining external validity does not require obtaining the greatest number of respondents feasible; however, having a relatively small well-chosen sample is generally preferable to dealing with a big poorly selected one (Saunders et al., 2018).

The use of judgement sampling would allow the researcher to interview the individuals most suited to offer the necessary information (Wardle, 2019). In this study, content validity test will be implemented to assess instrument validity, which is a measure of how well data is obtained using a certain instrument that reflects a specific domain of indicators or content of a specific idea. The tools will be presented to a research specialist to analyse the degree to which they could measure and decide the content.

3.10.2 Internal validity

Internal validity is only utilised in explanatory or causal research; it is not employed in descriptive or exploratory investigations (Wardle, 2019). The primary goal of internal validity will be to determine if the instrument accurately measures what it was designed to assess. A pilot study of a specified number of persons will be conducted to evaluate whether or not the respondents understand the questions to assess the internal validity of the research instrument. Following the completion of the pilot research, corrections and changes will be performed. As a result, the queries will be reduced to fewer and clearer phrases.

3.11 Reliability

The capacity to obtain similar findings when similar experiments are repeated is what reliability includes. A questionnaire is deemed trustworthy if it can be repeated and still produce the same answers in future research (Wardle, 2019). There are three forms of dependability. Stability reliability assesses dependability over a specific period. The same test is given to the same individuals at least twice in a short time (Balco, Drahošová and Kubičko, 2018). Many cases were used in the literature research to validate a logical chain of evidence. As described in earlier sections of the literature review, the cases were reviewed in the same manner to detect repeating patterns and

“if” features. This will provide consistency and dependability. Internal reliability, on the other hand, looks at the internal consistency of the variables under investigation such as political economy, energy regulation and sustainable transition of energy.

3.12 Objectivity

This qualitative research approach acknowledges that the researcher's subjectivity is inextricably linked to scientific inquiry. Subjectivity governs everything from the topic of study to the formulation of research propositions, the selection of procedures, and the interpretation of evidence. This research study will reflect on the ideals and aims and how these will impact the whole research effort concerning the study in Emalahleni. This will be done in the context of the researcher’s enthusiasm for the study issue under consideration.

3.13 Ethical considerations

According to Saunders et al. (2018), ethics is the acceptability of one’s behaviour following established standards and beliefs. The study will be carried out in such a way that participants are not subjected to bodily injury, discomfort, suffering, humiliation, or invasion of privacy. Each responder will be told about the goal and objective of the study, as well as the questionnaires that will be administered, in accordance with the university's ethical standards. The respondents will then be guaranteed that their disclosures would be kept private, anonymous, and confidential. This will be done to guarantee that all replies may be freely permissible without fear of any repercussions. The research will guarantee that the subjects (participants) of the research provide their informed permission to participate in the research by fully describing its goal and procedures, as well as the implications of their involvement. The participants will be informed that they have the right to decline to participate in the research and to withdraw at any time without justification.

Table 3: Consistency table: research questions, propositions, data collection and data analysis					
RO #	Research Objective	hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
1	To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.	1	Null Proposition: The influence between politicians and firms involved in coal is not essential for energy regulation. Alternative Proposition: The influence between politicians and firms involved in coal is essential for energy regulation.	Questionnaire	Thematic Analysis
2	Examine the reasons for decision-makers' inaction and missteps in promoting a	2	Null Proposition: Transitioning to a low-carbon economy doesn't have the lowest social and economic cost	Questionnaire	Thematic Analysis

Table 3: Consistency table: research questions, propositions, data collection and data analysis					
RO #	Research Objective	hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
	sustainable energy transition in Emalahleni, South Africa.		Alternative Proposition: Transitioning to a low-carbon economy has the lowest social and economic cost.		
3	Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.	3	Null Proposition: Sustainable energy transitions and politics are not deeply intertwined: politics cannot shape the nature of energy systems, i.e. the degree to which they become sustainable. Alternative Proposition: Sustainable energy transitions and politics are deeply intertwined: politics can shape the	Questionnaire	Thematic Analysis

Table 3: Consistency table: research questions, propositions, data collection and data analysis					
RO #	Research Objective	hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			nature of energy systems, i.e. the degree to which they become sustainable.		

CHAPTER 4. FINDINGS AND DISCUSSION

4.1 Introduction

The previous chapter focused on the research methodology. The research design, instruments and data collection procedures were explained in detail. This chapter takes over from the previous one and explains how the collected data was processed. A detailed account of data presentation, analysis and interpretation is given. The results of this qualitative study are based on interviews of 20 employees from 5 institutions; Mining organisations based in Emalahleni (3), Department of Mineral Resources and Energy Officials (5), COSATU (3), Petroleum Agency SA (3), Department of Trade Industry and Competition (3) and Council for Geosciences (3). All the interviews were completed. The various respondents were initially solicited through various communication channels and subsequently agreed to take part in this study.

Some of the 20 participants were scattered throughout the main research area at Emalahleni, and thus, had direct experience or knowledge regarding the research problem. Interviews were transcribed within a couple of days of occurrence, after which participants were able to review, change, or verify their comments. Interview times for the participants varied and were scheduled at times conducive for both participants and the researcher.

Once the data was transcribed, it was then coded, analysed, interpreted and verified. The process of transcribing the interviews aids the research process in gaining a better understanding of the subject from repeatedly listening to and reading the transcribed interviews. Coding the data began once all the data was fully transcribed (see appendix three). Each of the 20 respondents was given a code and this was done upon completion of the interview. For example, the first participant from a mining organisation in Emalahleni was coded as P1. The codes applied are keywords, which are used to categorise or organise text and are considered an essential part of qualitative research. The data was then analysed, categorised and organised into themes and further sub-themes, which emerged through the coding process. The

themes, which emerged, were assigned a specific code accordingly. The next stage involved interpreting the data by identifying any reoccurring themes throughout and highlighting any similarities and differences in the data. The final stage involved data verification, this process involves a process of checking the validity of understanding by rechecking the transcripts and codes, thus allowing the researcher to verify or modify propositions already arrived at previously.

Yin (2019, p.92) recommended the use of pilot studies as a way “to develop relevant lines of questions prior to conducting the actual study and to assist with the process of refining data collection plans and procedures”. In this research study, the intent was to locate an employee or customer who had direct experience in the political economy of energy regulation in the coal mining industry in Emalahleni. However, because participants were more difficult to find than the researcher originally thought (due to their demanding work schedules), a pilot study was not conducted prior to the actual research interviews.

The participant briefing and consent letter (Appendix A) given to the participants had a lengthy introduction and outline about the purpose of this study, who would have access to the participant’s responses, the participant’s risks and rights, and importantly when the interview data would be discarded. Based on the ethical considerations presented in Chapter 3, the intent was that the researcher would read to each participant the introduction verbatim as part of the interview. The researcher orally improvised this introduction many times when talking with participants to the participant briefing and consent letter ahead of time, so the researcher felt comfortable hitting the major points outlined in the introduction and asking each participant, “Do you have any questions before we commence this interview”? Most interview questions were asked exactly as they were written. In some cases, there would be a follow-up of the questions with other open-ended questions such as, “Why?” and “Can you elaborate a bit further?” This technique allowed for a deeper and more thorough understanding of each participant’s opinion on the political economy of energy regulation in the coal mining industry in Emalahleni.

Four distinct themes emerged from the research data. The major themes identified from the results of this study included:

Category 1 – Continued Use of Coal
Category 2 – Development of Friendly Policies
Category 3 – Amendment to the regulation of Energy

Category 1 looks at the first research objective; *To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.* Category 2 addressed the second research objective; *To examine the reasons for decision-makers' inaction in promoting a sustainable transition in Emalahleni, South Africa.* Category 3 highlighted responses from the last research objective; *To identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.*

The responses were grouped by frequency with a brief analysis of any outliers, or other conditions worth noting. A combined analysis of the three indicators is also reported within this chapter.

Table 4: Qualitative Research Coding Table

Research Propositions	Emerging Themes	Coding Number/Category
The influence between politicians and firms involved in coal is essential for energy regulation.	• Continued Use of Coal • Efficient Regulation	Proposition 1
Transitioning to a low-carbon economy has the	• Development of Friendly Policies • Rejection of Populist Narratives	Proposition 2

lowest social and economic costs.		
Sustainable energy transitions and politics are deeply intertwined: politics can shape the nature of energy systems, i.e. the degree to which they become sustainable.	• Amendments to Energy Regulation	Proposition 3

The findings from each theme are discussed in the sections below based on the three research propositions.

4.2 Results Pertaining to Proposition 1

The supply of coal to meet the demands of the area and the country at large emerged as an important theme among the respondents who were asked during their interviews if they were able to describe the energy situation within the context of Emalahleni and the rest of the country in general. Participants in the study raised and debated the primary political and economic effects of a coal industry decline, prospective alternatives for economic development, knowledge gaps, and institutional preparations needed to carry out a just transition. Interviews with respondents from the two Departments revealed a similar considerable worry effect on the environment and how they will be handled as well.

Field notes taken during each interview recorded that participants tended to pause before answering this question. The delay in responses to this question seemed to be more about the wording of the question than the responses from the participants. In most instances, there would often be a requirement to provide interval time for the participants to think about this question and sometimes rephrased the question to delve into their experiences of describing the energy situation at Emalahleni.

Responses on this theme were generally the same although presented in different contexts. For example, Participant 1 notes that within the context of the energy situation in Emalahleni, Mpumalanga is home to 12 out of the country's 15 stations. Participant 2 went on to say:

"The situation in Emalahleni is not unique to the rest of South Africa. While the area is endowed with, coal deposits of enormous proportion and power stations to power the country. The area suffers from chronic load shedding and water shedding. Therefore, the community is suffering from energy deficiency despite the potential capacity surrounding them. The community does not have enough distribution capacity as some outlying areas as without connection to reliable electricity supply." A similar view was shared with other participants (Participant 16 and Participant 20).

Further, Participant 6 notes that more than 50% of SA's electricity is produced in Mpumalanga through coal-fired power stations. The participant further noted that some of the power stations are nearing their end of life while some are running out of coal supply from the nearby mines that are currently experiencing coal resource scarcity (depletion of resources). Interestingly, the participant noted the following regarding whether there is a sufficient supply of coal in the country:

The coal resources are still present; however, challenges exist in mining them due to the increasing geological challenges and other economic factors including the quantity available within each mineral right area and the distances to the existing power stations. Thus, with enough investment and higher operating costs, we can still produce energy through coal for at least the next 30 to 40 years while expecting higher prices consequently. (Participant 6).

Participant 14 notes that Emalahleni is one of the top coal-producing coal regions in South Africa, but the region has over the years become the mainstay for South Africa's power generation. This assertion further hindered the ability of the energy sector to transform to a low carbon emission generation. Participant 12, speaking from a trade union perspective asserted that this transformation has placed the Economy in a serious conundrum. Participant 8 noted the following regarding the use of renewables:

“If the transition to a low carbon economy means immediate use of renewables instead of coal, then Emalahleni will be irrelevant. If the Just Transition takes into account, the socio-economic considerations then Emalahleni and many other coal-depend states need not be affected.”

Based on the above, the participant notes that the implementation aspect primarily affects the continued use of coal. While the policy landscape supports just transition, the critical failure might be in implementation. Towns that rely on coal production need to be supported and part of the transition to a low-carbon economy (Participant 8).

Every participant spoke about the importance of the utilisation of the energy needs facing the country. Participant 3 noted that the country is facing a serious electricity problem and thus needed to come up with feasible solutions related to this. In providing a befitting summary of this theme, Participant 19 noted the following:

Emalahleni is South Africa’s coal-producing giant, which further translates into South Africa’s major energy supplier. More than 70 % of South Africa’s energy demands are achieved through coal for the generation of electricity, petrochemicals and so forth. Additionally, South Africa is one of the major global coal suppliers in the market. The coal industry currently provides 72.1% of our country's primary energy needs. The current energy situation in Emalahleni is unstable given the fact that South Africa is a signatory to the Paris agreement pledging to decarbonise our energy systems from high carbon technologies such as coal, to lower carbon technologies such as hydrogen. This has resulted in a series of divestments thus threatening the economy of Emalahleni and South Africa as a whole. Additionally, most of the mines directly feed Eskom’s power plants to produce electricity; therefore, transitioning of energy systems into those areas ultimately causes a chain reaction of socio-economic unrest.

Other participants made brief mentions of energy demands but did not speak of it in line with the supply of coal. Participant 17 acknowledges that mining organisations in Emalahleni are trying to meet the energy demand of the country whilst at the same time contemplating a transition to renewable energy. These comments reflect that all the respondents replicated their views when it came to determining their opinions in line with the continued use of coal.

Other participants noted that continuous exploration indicates estimated coal reserves of 53 billion tonnes in South Africa, which can last for almost 200 years provided we maintain the current production rates. “The two biggest provinces hosting the majority of the coal reserves in the country are Mpumalanga and Limpopo, where some of the biggest mines are Grootegeluk Mine, Kriel Mine, and Wolvekrans Middelburg Complex Mine.” (Participant 10).

The same participant noted the following:

In addition to coal being used primarily for electricity generation in South Africa, it is also exported in large quantities. Therefore, just like any other commodity, the “relevance” of coal is affected by the simple economics of supply and demand. When the local energy sector changes to low-carbon technologies, the demand for coal will reduce and most coal mines will be decommissioned. This will also increase competition amongst coal-producing countries pinning everything down to which country can produce the most coal at the lowest costs.

An important question that was posited to the respondents was; *as a town that relies on the production of coal as an economic activity, do you think regulations and policies are formulated most appropriately?* Participant 12 noted that most of the regulations and policies need to be revised to address the Just Energy Transition in the context of South Africa. The IRP 2019 is one example where a piece of legislation is proposing the diversification of our energy resources to meet our Nationally Determined Contributions (NDCs) (Participant 12).

The energy mix should mainly be driven by the need for energy security or energy efficiency as well as systems adequacy, instead of the reduction of our GHG (greenhouse gas) to meet our NDC targets. For regions such as Emalahleni, regulations and policies should prioritise technologies such as carbon capture and storage, which will still ensure an efficient energy supply from fossil fuels and a balanced social-economic atmosphere.

(Participant 12)

In accordance, other respondents offered a Yes/No answer to the questions listed on the first objective. For example, Participant 13 noted that Emalahleni is a coal-mining town with an abundant supply of coal and that there is a sufficient supply of coal to continue mining operations in ensuring energy supply to the country. Participant 16 gave a short but precise answer in that the energy situation in Emalahleni is characterised by the good availability of electricity; however, the affordability by many is still an issue that needs to be addressed. This, as the participant noted, results in the continued use of coal by many households.

Based on the above responses, scholars Baker and Burton (2018) state that the local social and economic repercussions might be substantial hence; the effects of closures will be severely concentrated. Jobs in coal mines, power plants, and the transportation sector will likely be lost, municipal government revenue will likely decline, and there will likely be secondary economic consequences on local economies. Managing these risks is crucial for obtaining societal acceptability, lowering opposition to these transitions, and preventing an unexpected transition from worsening poverty and inequality, all of which are already considerable in mining regions (Ledger, 2016). Within this premise, the value of products and services generated in Emalahleni is significantly influenced by the coal mining industry. Within the context of interviews done with COSATU, the participants strongly feel that jobs and regional economic development will require attention as coal output falls.

This proposition shows that the political climate in South Africa is affected by significant developments in the mining and electricity industries. From the perspective of the environment, environmental effects will also need to be evaluated and considered, as they already demand regular attention. Given these and other factors, the transition away from coal should not simply be a priority for the Mineral Resources and Environmental Affairs departments, but rather a problem that is tackled at all levels of government and by a variety of ministries. In this light, Valentine (2021) mentions that developing countries need to come up with feasible strategies for the adoption of renewable energy. This literature resonates well with the first proposition's responses on how the country can achieve a sustainable energy transition and development goals. Other scholars like Majola (2015) state that politics plays a fundamental role

within the energy sector, especially in countries that are dependent on fossil fuel extraction. This fundamental role is based on the idea that several challenges might arise primarily caused by a lack of an efficient political system (Shepherd-Powell, 2017). These findings add to those done by Swilling, Musango and Wakeford (2016) who affirmed that the transition to clean energy in the country is being done at a snail's pace caused by political interference.

4.3 Results Pertaining to Proposition 2

The second category sought to highlight responses on the reasons for decision-makers' inaction in promoting a sustainable transition in Emalahleni based on the underpinning that transitioning to a low-carbon economy has the lowest socio-economic effect. To begin the discussion, Participant 1 argues that South Africa is still able to produce enough coal for use in various industries and still exports coal to other countries as well. This might be an indication that the current regulatory regime for the coal sector is working. "However, seeing that other areas of energy sources are being explored, it may be time to review the current regulations." (Participant 1). To support Participant 1's side, Participant 4 noted the following: *"The public sector must develop investor-friendly policies that will enable mining companies and benefit local/coal communities or the country as a whole*."

The two participants' views show that coal still has a role to play within Emalahleni. Several participants are of the view that South Africa's energy is produced through coal-fired power stations, and therefore the country's dependence on coal for energy will not change overnight. In line with this assertion, Participant 3 is of the view that the public sector is not decisive in terms of strategic direction and drive for coal usage to benefit the local economy. It seems more regressive in terms of the results if you look at the last 10 years, as there has not been growth relative to the population demand in the area (Participant 3). Domestically, power generation challenges in South Africa and ever-increasing energy costs are the main factors that might compel some to look into energy alternatives. With South Africa being part of the international community, it is forced to consider cleaner energy, although it is not feasible for a

developing country like South Africa, due to increasing calls and policies that are forcing countries to reduce dependence on fossil energy (Participant 7).

Within the factor of the current state of energy regulation within the coal mining industry in Emalahleni, Participant 3 acknowledges the idea that there is no regulation specifically designed or set for Emalahleni like an exclusive zone or strategic zone. "*There is no development plan or strategy in place. The state of energy regulation is inadequate and poor. This is one of the few areas that should have been thriving and existing without water/power cuts but there is no plan in place to develop and maintain beyond the coal energy strategic importance of the town.*" (Participant 3).

Within the context of unionism, Participant 9 states that clean energy is a false narrative being bandied about for other strategic interests. The production of clean technologies is not clean and costs a lot of energy and in most cases, their production is supported by energy from coal/hydrocarbons (Participant 9). The argument here from Participant 9 is supported by Participant 20 who mentions that government will adopt it by word but action dictates that coal will play a larger role for a long time than it is projected, even with all the climate talk and coal pollution.

Participant 1 agrees that within the dimension of Emalahleni and South Africa in general coal is here to stay. The participant further states that is why there is still so much of it underground. These thoughts show that the participant expects the country to still be using coal even after the current generation is gone. "100 – 200 years of heavy coal use still lies ahead." (Participant 4). Contextually, within this area presented by Participant 4, a participant from the Department of Trade Industry and Competition mentioned that the talk of policy is centred on the area of diversification within the use of different energy sources.

Diversification talk is largely driven by international pressures rather than local ones. But because South Africa is not decisive in its position and use of coal, hence the policy confusion and quagmire. Imagine what would happen if someone tried to tell Saudi Arabia to cut oil production because it is polluting. (Participant 15).

Participant 7 agrees that the public sector needs to be involved in energy regulation and work with mining companies to safeguard the sector, given its significant

contribution to employment status. The sector supports nearly a million people both directly and indirectly, therefore public participation is important (Participant 8).

Within the example of Saudi Arabia, the participant is of the view that a country should utilise its natural resource to the fullest. *When oil is their biggest and cheapest form of energy, why should they stop? Similarly, SA should have drawn a stance but we dilly dally like Gregory Hines tap dancing* (Participant 15). Drawing from the responses of this participant shows the task on the shoulders of the public sector in dealing with the political and economic regulation of coal in Emalahleni. Several participants (6, 11, 19 & 20) note that the public sector in South Africa requires some education on energy and the means of generating energy. Participant 11 asserted that as a country, we need to take one stance on the future of SA and the energy sources that we will utilise to keep developing. Alternatively, Participant 19 views the subject within the lens that there is a lot of injustice done by organisations that are willing to invest money and contest all projects despite the undisputed benefits, including the growth of the economy. In addition, Participant 6 noted the following:

We need to understand the need and discuss the implementation, finding a win-win solution to any project than fighting each other in a court of law and the court of public opinion. We need leaders that are bold to ensure that necessary projects continue, or better alternatives are established in a reasonable time to avoid further power cuts in the future.

The above points are fixated on crafting credible policies that look at the regulation of coal. Participant 20 noted the following:

The SA government has already bought into the just transition of COP26. The behaviour of the outside world will not deter the government from the commitment. However, the path taken by other countries before we will only help us in reshaping our strategy towards the just transition. This should also inform us on the understanding of how much coal-fired power we can't do without as a base load and instead, start thinking of using technology to reduce the emissions that they will cause in the future.

The transition of energy is a contentious issue within the global world. It is crucial to note that the state of energy regulation in Emalahleni is the same as it is globally across the fossil fuel space. Also, the public sector must provide coherent policy direction in respect of mining coal, particularly in the mitigation of its negative impacts on society (Participant 2). Regulators are facing challenges that are brought forth by external parties from the different climate justice organisations (Participant 3). Several participants noted that nothing is stopping major coal-producing nations to adopt renewable technologies. An important point was put forward by Participant 1 who stated that a nation that gets over 70% of its energy from coal, cannot be expected to immediately switch to renewables as a base load. Interestingly as noted in Chapter 2 of this study, the use of coal can be sustained to provide energy. According to participant 5, the country is moving toward the global trend of using renewable and cleaner sources of energy and judging from previous events, it seems they will be due to global geopolitical pressure.

There are cleaner coal technologies that can now be adopted in addition to other carbon mitigation options such as carbon capture utilisation and storage (CCUS), precombustion capture, and hydrogen production. Clearly, the mandate is to stop all fossil fuel projects regardless of whether or not the models are suitable for our systems. A case-by-case implementation of the transition should be considered instead of a global model, a view brought forward by Participant 11. Another participant in explaining how the public sector can assist coal mining companies to continue mining operations in the long term noted that the Government needs to do the following:

- ✓ Making sure policies are fair and attractive.
- ✓ Ensuring political stability
- ✓ Guaranteeing fast and effective communication
- ✓ Making sure all relevant application processes are fast and effective
- ✓ Supporting technologies such as CCUS

South Africa’s proposed energy mix still incorporates coal as stipulated in the IRP 2019, and that remains our main guiding legislative framework. The mix supports both renewable and fossil fuel technologies, not just one (Participant 11). Other participants

noted that the coal industry in Emalahleni is over-regulated and its efficiency can be reduced by eliminating red tape and the time it takes to comply with all the legislation. Participant 10 noted that there is no special dispensation of mining regulation in Emalahleni and therefore a special focus may be required in dealing with the higher levels of air pollution.

Within this framework of this research objective, the participants are generally of the view that moving towards cleaner energy production systems is inevitable and therefore innovative ways of eliminating the negative elements in coal and other fossil fuels must be found sooner if coal has to remain in the mix. The above findings based on the second proposition highlight that it is essential to understand the development history of those successive sustainable energy policies in some countries to guide in designing appropriate and effective energy policies for other countries like South Africa. Within the literature review analysis, scholars like Bhorat et al. (2017) stated that some of the energy policies were developed in the past and have not been updated to meet the changing needs of renewable energy.

This was exposed within the findings of this study, as respondents asserted the need to change policies and regulations. The study's findings also noted the need to draw lessons from other countries that have already started their transition to clean energy. Baker (2015) also postulated that the adoption of renewable energy forms is dependent on the regulations of the market. The present study noted that red tape was hindering the work of the energy markets. This point is supported by Monjane (2015) who after analysing the Mozambique energy markets concluded that energy market regulation was the most important factor in developing the uptake of renewable and non-renewable energy.

4.4 Results Pertaining to Proposition 3

The last proposition sought to highlight the link between politics and sustainable energy transitions. To open this discussion, Participant 6 notes that line with a transition of non-renewable energy like coal to cleaner energies like solar requires the country to address factors such as climate change, but most importantly to increase

power capacity or supplement the coal energy, as we know that South Africa currently has power generation challenges such as Load Shedding.

In the amendment of the regulation of coal, several participants noted that stopping coal production at Emalahleni would have dire consequences for industries and communities that benefit from the coal industry. Another point to consider is that coal is not only beneficial for electricity generation but also a source of energy for other industries such as the chemicals and steel industries, where current renewable energy technologies might not be sufficient (Participant 4). A way to mitigate this might be to say that if one energy unit is taken off, it must be replaced with one energy unit from another source, in other words, only take what we can afford to replace (Participant 12).

Yes, the government must continuously make amendments to regulations to keep up with the evolving energy needs and make up for the resulting socio-economic impacts. Participant 7 notes the following:

> *The need for transition is there. Simply because we are not building distribution networks fast enough as the population and demand growth in new areas which were previously not on main distribution grids. However, this should not be the premise for forcing coal into the sunset and then rushing back to coal like what Russia and Ukraine have demonstrated in recent months.*

Based on the Russian/Ukraine conundrum as demonstrated by the above participant, it is clear that the respondents agree that the economy of Emalahleni will soldier on like it has done for decades irrespective of the transition conversation/narrative. However, Participant 5 notes that Emalahleni is not destined or designed to thrive under the current circumstances. Another participant is of the view that Emalahleni can look at or adopt the district-based development model used in the Western Cape. The participant stated the following:

The district-based development model is working for the Western Cape and the quality of leadership for the interests of the people in the Western Cape is a good example. Emalahleni has a different set of challenges compared to Gauteng or the Northern

Cape, tailor-making the solutions like vertically integrating the mining to energy and beneficiation industries. (Participant 7)

The amendments to the energy regulation, as Participant 13 notes, should be centred on an easy transition of energy. “Yes, the need does exist, however, it is not that easy to transition all the energy needs at once, hence the need for the just transition. The social impact of such large-scale change must be determined, and projects are implemented to contract the effects” (Participant 13). Within this narrative, Participant 17 asserted the following also:

Yes, transitioning from coal to other sources introduces new processes to power generation. The skills available in Mpumalanga include coal mining and maintaining coal power plants, these skills will become obsolete or in high abundance leaving most people without jobs unless they are reskilled. The total value chain also goes way beyond just mines and power stations, but service providers contracted to the major operations; this will thus result in the collapse of other supporting companies and organisations in the future.

The above points show that the need for a more competitive environment in the energy generation sector is of great importance. Major sectors of the economy have thrived and welcomed innovation under perfect competition conditions in the economy. The government needs to open up a generation to other interested parties to promote innovation and alleviate the pressure at Eskom (Participant 3). Participant 9 agrees to the following:

Over time the new skills required to run these new technologies and businesses to support will emerge from the locals and facilitate the migration and only after enough critical mass has migrated, can we look at slowly decommissioning older more costly coal power stations. There will also be a need to ensure that the remaining fleet of coal power stations are fitted with the best technology to keep the emissions as low as possible, enabling carbon neutrality. SA would also have to look at new minerals to mine and invest in, to address the shortage of minerals necessary for the production of renewable energy products and find ways to bring the manufacturing of renewable energy equipment into the country.

The above participant notes that a transition to a low carbon economy must happen but in a manner that can be sustainable and take care not to negatively affect the socio-economic circumstances. The government must put the socio-economy at the front and centre of any policy regulation, and the state must take scientific input into any policy development. The current legislation did not consider this.

On the issue of policy regulation, Participant 19 states that any policy position must look at South Africa's energy mineral potential. "South Africa still has huge coal resources, battery minerals, uranium and other critical minerals needed for just transition. The classification of these minerals is critical and strategy must be taken into account when developing policy" (Participant 19).

Participant 1 provided an interesting take on the need to solve the climate change crisis. The respondent mentioned the following:

It is our duty as global citizens to support efforts of reducing GHG emissions and ultimately solving the climate change crisis. Africa is impacted the most by climate change regardless of our emissions being the lowest as a continent. For the country to achieve energy security through this transition the technologies should not be limited to renewable, there should be a balanced energy mix to ensure an efficient energy supply with no failures. Technologies such as CCUS can be utilised to address the use of coal and gas for blue hydrogen. Furthermore, coal can be used to extract Coal Bed Methane (CBM) which will increase our indigenous gas supply while reducing emissions by up to 50%.

If the transition is done in a systematic manner, where different imperatives are considered on a case-by-case basis, the economy of Emalahleni will be impacted in a positive way (Participant 2). But if the transition is rushed and does not consider socioeconomic stabilities, the economy of Emalahleni and South Africa as a whole will be negatively impacted (Participant 4).

"We should not only focus on our climate change commitments when it comes to our energy goals since we are among the world's lowest emitters of greenhouse gases"(Participant 10). Energy security is the primary goal, and reducing GHG emissions would be the cherry on top (Participant 13). Participant 5 agrees that we

must industrialise South Africa and Africa as a whole, and put our people's well-being first. Furthermore, all energy projects in SA should be treated as a matter of national energy security and given priority to expedite the process (Participant 5). The final proposition shows that regulations must prioritise solutions that can address the issues the country is currently facing such as fuel prices, load-shedding, unemployment, divestments, and lack of implementation strategies.

The findings of this study complement research done by Acheampong (2019) who discovered that in terms of outcomes, politics plays a crucial role in how energy is regulated within countries. Trollip (2015) asserted also that politics affects the work and conduct of energy systems. This is the case within the organisations interviewed at Emalahleni which support the premise that politics weighs heavily on the regulation of coal and energy in the country. In essence, the study notes that the political and economic situation in the country has a heavy impact on the regulation of coal. Conversely, this impact has also affected the country's stance on the adoption of renewable energy in line with the several social challenges affecting the country such as load shedding, unemployment and the after-effects of load shedding.

4.5 Summary of Research Findings

This chapter presented the results from interviews with 20 respondents who had direct knowledge on the political economy of energy regulation in the coal mining industry of Emalahleni. Findings were presented in three sections that corresponded with the primary themes that emerged from the results. Categories within each theme helped to support and provide insight into the themes. Participants in the study believed that coal still has an important role to play within the energy field in Emalahleni and South Africa in general. Feedback from the participants also supported the notion that a transition to renewable energies is needed. Finally, participants in the study also stated the need for the public sector to be more proactive in the regulation of energy at Emalahleni.

4.6 Comparison of literature review and own findings

The table on the next page shows the researcher's findings with the stated propositions.

Table 5: Comparison of literature review and own findings

RO #	Research Objective	Prop	Proposition	Findings
1	To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.	1	The influence between politicians and firms involved in coal is essential for energy regulation.	The political climate in South Africa is affected by significant developments in the mining and electricity industries.
2	Examine the reasons for decision-makers' inaction in promoting a sustainable energy transition in Emalahleni, South Africa.	2	Transitioning to a low-carbon economy has the lowest social and economic costs.	South Africa needs to understand the development history of successive sustainable energy policies in some countries to guide in designing appropriate and effective energy policies.
3	Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.	3	Sustainable energy transitions and politics are deeply intertwined: politics can shape the nature of energy systems, i.e., the degree to which they become sustainable	Regulations must prioritise solutions that can address the issues the country is currently facing such as fuel prices, load-shedding, unemployment, divestments, and lack of implementation strategies.

Chapter 5. DISCUSSION OF THE RESULTS

5.1 Introduction

The previous chapter provided the findings of this study. This chapter intends to give a summation of the study and provide an overall representation and analysis based on the initial research topic. The purpose of the study was to determine the political economy of energy regulation in the coal mining industry of Emalahleni, by gathering data from various industry experts and officials.

5.2 Demographic Profile of Respondents

The demographic profile of the respondents was centred on a sample size of 20 which was taken from individuals from mining organisations in Emalahleni, Department of Mineral Resources and Energy Officials, Council for Geoscience, Petroleum Agency SA, COSATU and the Department of Trade Industry and Competition.

5.3 Conceptual Framework

As indicated in the introductory chapter of this study, the conceptual framework is positioned toward the development of a research model that seeks to identify two distinct dimensions namely, political economy and energy regulation. These concepts provide an avenue for examining the features of South Africa's energy economy from the perspective of Emalahleni. It represents a valuable foundation for comprehending some of South Africa's important political and economic progress, as well as a tool for investigating some of the local environmental and social issues that form part of the global narrative regarding challenges in the energy industry.

5.4 Discussions Regarding Research Objective 1

The first research objective of the study sought to ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa. The proposition of this objective was drawn from the influence between politicians and firms involved in coal and how the link is essential.

There were certain milestones identified in the pursuit of this objective including the identification of a few shortcomings. This has proved to be of integral importance and clarifies the concept that regulation and policy formulation are critical in addressing the energy regulation needs at Emalahleni. Regulation, in its broadest sense, aims to solve “market failure” and is thought to be essential to safeguard people, the community, and/or the environment. To promote adequate competition and prevent the development of a dominating group or sole utility supplying each purpose, regulation of infrastructure sectors (public service sectors) like electricity is often driven by the need to control pricing. It is noted that the level of regulation in non-liberalised markets is directly decided by politics and is overtly linked to policy objectives. The introduction of competition has always been thought of as a strategy to lessen regulation. In a purely economic sense, regulations in competitive markets should only be used when they have the potential to lower consumer costs more than they would otherwise, such as when limiting market abuse. It is sometimes asserted that “competition is the best regulator,” i.e., that strong competition would result in the most effective market functioning since businesses will have incentives to meet customers’ requirements.

This research study has identified this, however, does not imply that regulation is no longer required in areas with competition. Regulation may be necessary to sustain successful competition, such as to stop firms with market dominance from engaging in anti-competitive behaviour that might hurt customers and rival businesses. When competition alone is insufficient to guarantee the provision of certain goods or services, regulation may also be necessary. Further improvement regarding regulation and policy formulation must be country specific as there cannot be a “one size fits all” type of approach to policies surrounding the country’s resources as compared to that of countries which are more industrialised, in a better economic position and have substantially varied social circumstances to what South Africa is experiencing. In so doing, these will affect all aspects of the political economy in Emalahleni.

5.3 Discussions Regarding Research Objective 2

The second research objective of the study was premised on examining the reasons for decision-makers' inaction in promoting a sustainable energy transition in Emalahleni. The study notes that decision-makers lack the several will and political power to implement changes in line with a transition to renewable energy. In this context, the study recognises the fact that energy systems are inseparable from larger ecological and social patterns and relationships, and therefore energy requires a strong political will and strategic construction of alliances.

Milestones in this objective refer to building alliances as respondents from the trade union sector noted or advocated for and could begin with learning from other movements working toward a deeper transformation through energy transitions. These include increasing collaboration among potential allies, for example, ecological and social movements, labour unions and energy sector workers, public managers and administrators, low-income communities and research institutions like Wits. Following on from research objective 1 with regards to policies and regulations, a further discussion is what some could perceive as inaction by decision-makers in this just energy transition process. As it has been historically seen with some controversial topics such as with the likes of religion and in this case politics, there will never be a consensus on what is deemed as the best form of corrective action to be taken.

Even though there has been substantial improvement in the transition from fossil fuels to renewables as identified in the IRP 2019, there can still be a more diversified energy mix that can be incorporated into South Africa's energy mix. Emalahleni has a large coal fleet and with the research and development that is currently out there, there are methods for converting current coal power stations or those nearing decommissioning phase or the end of their life span to that of gas or renewables such as wind and solar, and there is also an opportunity for nuclear energy to be implemented. With the continuous change in the various elements of the world including technological change, increase in global population resulting in an increase of worldwide energy usage and the increased need for connectivity due to globalisation, this change also will require changes in regulations and policies. This will require a more fluid nature

concerning changes in these energy policies to keep up with the changes in the environment.

5.4 Discussions Regarding Research Objective 3

The last objective was fixated on identifying political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy. The study’s apex is focused on one key realisation: the global energy system is dominated by the usage of fossil fuels. Within the context of Africa as a whole and South Africa as a subset, this entire system has several challenges, including various environmental difficulties, and long-term energy security is occasionally called into doubt. The insecurity of energy supply poses a great threat to the functioning of the economy. Achievement of energy security in a strategic way holds importance for the South African economy as well as for the growth of its human development especially concerning getting rid of poverty and inequality.

What comes out very clearly from the interviews is that several respondents noted that a great deal of planning is required for achieving an alternate source of energy, which ensures a long-lasting energy supply to address the issues related to energy demand. All the respondents identified that there is a need to transition to cleaner and more sustainable energy sources, but many of the respondents have indicated that although there is a recognition of the need for a “just energy transition”, the emphasis has been that it must involve people, be about the people and not just about the numbers. South Africa is one of the countries that has agreed to comply with the conditions in the Paris Agreement and as a result, must be cognitive of its emissions. However, South Africa derives more than 70% of its electricity from coal which forms a base load of energy. As such, it has been widely agreed upon that such a resource can’t just be discarded without a suitable replacement technology or primary resource. As was also stated by a respondent was that there would be no chance of convincing the countries in the Middle East to stop their oil production as that is their primary energy source, so the same logic could be applied to South Africa.

6. Conclusion

As stated above, there is a need to transition to cleaner energy sources and what needs to be improved is that there needs to be a more reliable base load energy source other than coal. In certain countries/certain parts of the world, nuclear energy is seen as a clean/cleaner energy source. South Africa is embodied with optimal conditions for energy sources such as solar PV and wind technology due to the favourable climate, but these don't provide base load energy. What is critical is the energy availability factor and energy security. Load shedding has had severe impacts on our local economy and more so on small businesses and organisations. The cost of living has increased substantially and South Africa's attractiveness from an international investment point of view has also diminished drastically causing the country to be downgraded to junk status. International events such as the G20 Energy Summit, COP 27 and BRICS Summit must take into consideration not only the developed and more industrialised countries, but developing nations including the archipelagic states, and have to learn from each other to provide support in solving the global energy crisis.

Energy storage will be a key component to optimise the utilisation of various energy sources and allow tilting of the scales to more renewable sources. Various energy carriers such as hydrogen will also be crucial in the energy mix. There has been substantial research done regarding the various uses of green hydrogen and its efficient utilisation which will be largely beneficial to the environment. Production of raw materials in these developing nations will also be critical so these countries can achieve better economies of scale. What separates developing nations from more developed nations is the ability to carry out the transition through its financial impacts. South Africa has managed to obtain funding through the Just Energy Transition Partnership agreement, but there are very differing views in terms of whether the terms and conditions of the agreement will be beneficial to the country in the long term. As per the discussions in the above paragraphs, a common consensus that was reached was that there is a need for a transition from high to low carbon emissions. Regulations and policies however don't allow for these changes to develop overnight, meaning that there needs to be systematic and progressive planning in place to benefit not only

certain personal interests or political narratives, but has to focus on South Africa as a whole. Load shedding has had catastrophic effects on households and businesses at large, meaning that energy availability and security must be at the forefront of the county's welfare.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes a study that was undertaken to determine the political economy of energy regulation in the coal mining industry of Emalahleni. This research report consists of six chapters as follows: Section 6.2 to section 6.4 provides conclusions of the study. Section 6.5 provides focuses on the recommendations for the study. Further areas of research are discussed in section 6.6. The study was organised into six distinct chapters, each serving a different purpose. The first chapter presented an introductory account of the study by providing expositions on the background to the study, the statement of the problem, the delimitation of the study and ethical considerations.

In the second chapter, an extensive review of the literature was conducted which focused on the use of different theories, specifically the use of the Political Theory of Governance. The third chapter gave an overview of the qualitative research methodology adopted for this study. The fourth chapter gave a revelation of the analysis of the qualitative data as well as the interpretation of the results emanating from the study. The fifth chapter provided a discussion of the findings of the study. The sixth chapter of the study is concluded with a major emphasis on issues the summary, further study area, recommendations and conclusions drawn from the research study.

6.2 Conclusions Regarding Research Objective 1

The first research objective of the study sought to ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa. The proposition of this objective was drawn from the influence between politicians and firms involved in coal and how the link is essential. The study concludes that regulation and policy formulation are critical in addressing the energy regulation needs at Emalahleni. It is also concluded that the current political climate in South Africa is affecting the significant development of the mining and electricity industries. The findings are identical to the literature presented within the proposed proposition, as

other scholars noted that the country's political system is affecting the work of the energy markets. The current study sought to zone in within the context of Emalahleni where the majority of the coal mining companies are based, a limitation that other researchers didn't do. Respondents from the trade union side provided some key insights on how the political economy will affect the work of the employees. The respondents noted that a transition to renewable energy will be devastating to the unemployment figures of the country.

6.3 Conclusions Regarding Research Objective 2

The second research objective of the study was premised on examining the reasons for decision-makers' inaction in promoting a sustainable energy transition in Emalahleni. The study concludes that decision-makers lack the several will and political power to implement changes in line with a transition to renewable energy. Although a lack of will was not evident within the literature review, the study notes that regulators in the country are facing challenges that are brought by external parties like labour unions and several climate justice organisations. The pressure thus shows the role of the politician within the economic governance of energy in the country. The context of Emalahleni provides a different overview of the literature presented in Chapter 2.

6.4 Conclusions Regarding Research Objective 3

The last objective was fixated on identifying political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy. The study concludes that the country needs to learn from other countries that are implementing their sustainable policies very well. One such country is Rwanda. Based on the stipulated proposition, the study concludes that regulations put in place must also address several social issues currently affecting the country. The consistency table is shown on the following page.

Table 6: Consistency table: research questions, conclusions and contribution to knowledge

RO #	State Research Question or Objective	Literature-based proposition	Conclusion	This Knowledge
1	To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.	The influence between politicians and firms involved in coal is essential for energy regulation.	Regulation and policy formulation are critical in addressing the energy regulation needs at Emalahleni.	The difference is that respondents highlighted the need for efficient regulation and policy formulation.
2	Examine the reasons for decision-makers' inaction in promoting a sustainable energy transition in Emalahleni, South Africa.	Transitioning to a low-carbon economy has the lowest social and economic costs.	Decision-makers lack the several will and political power to implement changes in line with a transition to renewable energy.	Identical with the literature.

RO #	State Research Question or Objective	Literature-based proposition	Conclusion	This Knowledge
3	Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.	Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.	That the country needs to learn from other countries that are implementing their sustainable policies very well.	Identification of a yardstick from a successful country.

6.5 Recommendations

The growing popularity of renewable energy sources as a solution to the energy crisis gives the impression that they will simply replace fossil fuels and serve as a panacea for all the aforementioned threats. This seems evident, particularly in South Africa, where companies in Emalahleni play an important role in the implementation of the government's various programs. For these companies, it is important to note that the country's energy consumption has grown considerably in recent years as a result of industrial expansion and population growth. Hence, there is a need for companies to regulate the supply and demand of utilities efficiently. As the country has seen, the energy supply is far insufficient to satisfy actual demand.

Energy resource policy and local governance are required to address the challenges of increased energy demand and pollution. A well-planned sequence of operations involving policymakers at all levels, from local to national, is required to achieve a systematic change to more efficient energy regimes. Due to its rapid economic progress, excessive energy usage, and significant carbonisation of the economy, South Africa is a prominent player in the oil and gas markets.

Focusing on renewable energy to address the country's energy crisis enables organisations operating within Emalahleni to create a trustworthy and reliable database system for policy analysis, knowing that a new energy policy is typically proposed based on current technology and related database systems. The database system may be used by national and local governments to decide when and where policy implementation needs to be changed, as well as when and where energy-efficiency standards for building materials need to be tweaked.

If the government opts to cut the use of coal, renewable energy support policies for mining organisations in Emalahleni must take many forms, including grants for research development, and demonstration, fiscal and financial incentives for investors, and price and quantity-based incentives such as feed-in tariffs, feeding

premiums, net metering, renewable portfolio standards, renewable energy certificates, and marketable procurement.

As a result, establishing a “New Eskom” or utilising our natural resources well, will need a determined effort to develop a more democratic strategy that avoids the faults of the past. Eskom’s current crisis presents a great opportunity to build new forms of governance, a new outlook on the organisation, and service delivery that strengthens the public ethos, stimulate worker and community participation and increases transparency and accountability in public enterprise management specifically with organisations in Emalahleni.

6.6 Suggestions for further research

The research advocates for a study done to probe the effects of additional renewable energy on an energy-only competitive market and how renewable energy targets can be met. This can be termed the surge in ‘Green Growth.’ Green growth may be characterised as a narrative that aligns environmental conservation, particularly concerning climate change, with new employment, innovations, and local industrial competitiveness, as well as the long-term usage of renewable energy. A growing number of countries and territories, including the European Union, China, and South Korea, are pushing for and enacting further renewable energy regulations. A study can thus be localised to South Africa.

Another study could be done to determine the economic perspective for renewable energy implementation and growth. If renewable energy technologies do not have a cost advantage, they will be unable to compete with traditional resource technologies. Establishing a precise estimate for the unit cost of renewable energy against traditional sources, on the other hand, is difficult. External costs like social and environmental costs are included in the analysis of traditional sources. Furthermore, fossil fuel subsidies act as a barrier to other energy sources, making them more expensive to compete with. Increasing the amount of renewable energy in the overall energy supply is crucial for mitigating the negative energy effects of climate change

On the contrary, the debate on what is termed “clean” energy also has a base for further discussion. As with most things in life, resources are finite. Further research can be done on the increased production and development of renewable technologies such as the production of solar panels and wind turbines that will become obsolete or reach their full life span. The composition of these components is made up of “non-clean” resources, so as a result there needs to be a determination of the effects on the environment once the components needed to be discarded. . This is a worthwhile study that a researcher can understand.

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Appendix A: Research Instrument

Interview Questions

My name is Elton J Selebi, and I am currently studying towards my Master of Management in Energy Leadership with the University of the Witwatersrand and the title of my research is: *The Political Economy of Energy Regulation in the Coal Mining Industry of Emalahleni*.

I hereby invite you to participate in my study. Your responses recorded are anonymous and the strictest of confidentiality is guaranteed. You may withdraw at any stage should you wish to. The questionnaire will take approximately 10-15 minutes to complete.

SECTION A: BIOGRAPHICAL INFORMATION

Please indicate the responses below with a tick.

1. Age: 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐

   65 or above ☐

2. Gender: Male ☐ Female ☐

3. Capacity (level) Top ☐ Middle ☐ Lower ☐

SECTION B: RESEARCH OBJECTIVES

Research Objective 1: To ascertain the extent of regulation and policy formulation in the coal mining business in Emalahleni, South Africa.

1. Can you describe the energy situation currently in place at Emalahleni?
2. Do you think that there is a sufficient supply of coal to continue mining operations in ensuring energy supply to the country?
3. In your opinion, do you think changes in the local energy sector is altering the relevance of coal in Emalahleni?
4. As a town that relies on the production of coal as an economic activity, do you think regulations and policies are formulated in the most appropriate manner?
5. Do you think that renewable energy technologies can be efficiently and effectively regulated?

Research Objective 2: Examine the reasons for decision-makers inaction and missteps in promoting a sustainable energy transition in Emalahleni, South Africa.

6. In your own view, what is the current state of energy regulation within the coal mining industry in Emalahleni?
7. In what ways do you think the public sector can assist coal mining companies to continue mining operations in the long-term?
8. There is a growing demand for coal in countries like India, do you think the government will adopt clean energy in spite of this?
9. In the long-term, do you think that coal will still have a place in the energy sector in South Africa?
10. Would you say that the the diversification of coal is premised by factors ranging from domestic to international pressures?

Research Objective 3: Identify political channels and platforms that can garner public and/or political support to speed the region's transition to sustainable energy.

11. Do you think that there is a need for a transition of non-renewable energy like coal to cleaner energies like solar?
12. Based on your answer in Question 10, do you think this will affect the economy of Emalahleni?
13. In terms of energy regulation, do you think any changes need to be made by the Government?
14. If you answered yes in question 12, could you provide any suggestions of this?

End of Questionnaire. Thank you for your time.

Appendix B: Research Participants

Participant	Sex	Age	Capacity (Level)	Description of respondent/officials
Participant 1	M	35-44	Middle	Mining organisation in Emalahleni
Participant 2	M	35-44	Top	Department of Mineral Resources and Energy Officials
Participant 3	M	25-34	Middle	Mining organisation in Emalahleni
Participant 4	M	25-34	Middle	Department of Mineral Resources and Energy Officials
Participant 5	F	25-34	Middle	CGS
Participant 6	M	18-24	Lower	Department of Mineral Resources and Energy Officials
Participant 7	M	25-34	Lower	CGS

Participant 8	M	45-54	Middle	Petroleum Agency SA
Participant 9	M	45-54	Top	COSATU
Participant 10	F	25-34	Middle	Department of Mineral Resources and Energy Officials
Participant 11	F	18-24	Lower	Mining organisations in Emalahleni
Participant 12	M	Above 65	Top	COSATU
Participant 13	M	25-34	Middle	Department of Mineral Resources and Energy Officials
Participant 14	M	35-44	Middle	COSATU
Participant 15	M	25-34	Middle	Department of Trade Industry and Competition

Participant 16	M	45-54	Top	Department of Trade Industry and Competition
Participant 17	M	35-44	Middle	Petroleum Agency SA
Participant 18	M	35-44	Middle	Petroleum Agency SA
Participant 19	M	35-44	Middle	Department of Trade Industry and Competition
Participant 20	F	18-24	Lower	CGS