ALLISON IN AUSTRAL AFRICA:

THE ORGANISATIONAL PROCESS OF OIL SECURITY

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ABSTRACT

This paper aims to uncover and examine some of the strategies used by states to secure their oil needs by opening the black box of government and considering how these needs are built and constructed within an organisational process. To explore oil security strategies used by states, the paper employs the case study of South Africa's liquid fuel policy from 2007 until 2022, studied through documentary research and qualitative analysis. The analysis aims to consider the impact of private & public enterprises, political organisations and government departments on the framing of the issue and the fault lines regarding energy security. Through a SWOT analysis of South Africa's liquid fuel policy, it uncovers that there is a continued influence and presence of an informal industrial, mining and energy elite in South Africa built around the issue of the place of coal and renewable energy in the country. Illustrating the role of development as a security issue, South Africa questions the function and use of energy as a factor for labour control as it exemplifies the triple role of energy as a 'carrot', a 'stick' and an element which determines the structure of the labour market. This case study exemplifies the challenges ahead regarding the construction of energy security discourse to fight climate change and hostile actors.

INTRODUCTION

Energy is too important to be left to the engineers. Fundamentally, "*It is humans who make history even though machines determine the conditions in which this story is written*."(Aron, 1997).

With the start of the Russian invasion of Ukraine on the 24th of February 2022, western European nations were reminded of their dependency on Russian gas and oil and rediscovered the need for a comprehensive energy security policy. This new conflict acts as an insurmountable counterargument to those who, like Germany, had hoped to differentiate between the political and the economic by continuing the Nord Stream 2 pipeline while opposing Russia's aggressiveness on the diplomatic front. It also forces those who had hoped that the development of new technologies and the continuation of market forces would help bypass the reduction in the availability of fossil fuels to reconsider their models.

The current conflict on Europe's border illustrates the impending challenge of the double carbon constraint on the security environment. A constraint in the availability of fossil fuels industrial societies are dependent on due to declining stocks worldwide. A constraint in the amount of carbon the world can release into the atmosphere without risking provoking irreversible damage to the climate and jeopardising a liveable future for the next generations (theshiftproject.org, 2022). The double carbon constraint points to the fact that energy, its securitisation and the effects of its consumption, will be the structural factor determining the nature and intensity of the conflicts of the 21st century. The comprehension of the challenges that lay ahead requires an in-depth familiarity of energy and its risks.

With the multiplication and expansion of energy access through the accumulation of sophisticated machines in every branch of the economy, societies have become more industrialised and complex, often with dedicated organisations and structures whose role is to address increasingly niche and technical issues. Due to the cross-cutting nature of energy and its uses across all sectors in society, it is necessary not only to grasp the physical aspect of the debate but also the various interactions and relations with the policy network and how these specialised organisations and groups tackle energy security. The study of energy requires a systematic and cross-disciplinary approach. Analysing these complex parameters is necessary to improve our collective resilience to the challenges of the coming decades. Hence, this dissertation aims to use models that open the black box of governance to provide an understanding of the energy policy network. This paper hopes to offer some knowledge and anticipation on the future challenges of the 21st century.

To achieve this goal, the dissertation will attempt to answer the question what are the strategies used by states to secure their oil needs?

When attempting to tackle this question, a few preliminary interrogations emerge. First, what is the history of oil security and energy security as a concept and a practice? Second, have new elements emerged that make it necessary to re-examine it in a new light?

Energy has been at the centre of geopolitics and conflicts since the seminal decision taken by the first lord of the admiralty Winston Churchill to switch the British navy's primary fuel from coal to petroleum in 1913. This switch redefined the UK's strategy whereby at the beginning of the first world war, London imported nearly 90% of its oil from the US and the middle east and controlled 5% of global production. By 1918, due to the realignment of strategic priorities in the middle east, England held 50% of the world's oil

output. During this first phase of oil and energy conflicts in the first half of the 20th century, the energy security approach mainly adopted a direct control approach by seizing access to the market (Colgan and Stockbruegger, 2021).

With the infamous oil shock of 1973, which pushed the creation of the IEA in response to the OPEC's oil embargo during the Yom Kippur war, the focus changed from direct control to market provisioning. With the development of the international oil market within the context of the cold war, the progressive installation of globalisation, and the development of neoliberalism as an international policy practice, the main approach became primarily an economic and market one whereby the interpretation of the problem was formally an issue of ensuring adequate supply and demand at a reasonable price (Hughes and Long, 2015).

From the 1990s into the early 2000s, energy security became somewhat of a background concern. This is not to say that energy was no longer a parameter in international security. Oil has undoubtedly played a role in the two gulf wars of 1990 and 2003, but it was no longer at the top of the security agenda. This change of focus was primarily due to two crucial factors. First, on the material side, the emergence and development of shale oil and gas, renewable energy, increased energy efficiency, and a mature international energy market led some states to believe that energy scarcity was no longer a threat (Bros, 2018). the South African 1998 energy writes in its first chapter: "*The 'limits to growth' school of thought has receded. Energy security is now being achieved, not through self-sufficiency, but through greater diversification and flexibility of supply, including increased cross-border energy trade.*" (DMRE, 1998: 20). Second, the end of the cold war also marked a reconsideration in the security and strategic studies field. The emergence and development of Critical security studies led researchers to take more consideration into the ways oil needs were created and how discourse influenced the creation of political reality (Özcan, 2013).

However, two new saliant factors make the question of energy and oil security of prime importance. First, the peak of conventional oil in 2008 has led many states to reconsider shale oil and gas exploitation as the commercial and energetic viability of exploiting such a complex and expensive energy carrier has become apparent. Hence, scarcity has become one of the key drivers of energy security again (Rech and Duterne, 2022: 5). Second, the arrival of climate change at the forefront of the international policy agenda has forced countries to consider new parameters which were previously unaccounted for. The integration of GHG emissions and material security to produce new energy carriers has prompted a realignment of global priorities.

To study the research question while considering the evolutions in the energy security field, the dissertation will adopt the single extreme critical case study approach by examining the unique occurrence that is South Africa. The rainbow nation, with its unique history and particular geography, offers the researcher a rare opportunity to explore the development of strategies used by states to secure their oil needs. Due to nearly thirty years of isolation on the international stage, Pretoria needed to develop creative ways to circumvent the limitations of its geography and feed a growing industry and mining sector. Due to its high mineral endowments, South Africa developed an efficient mining sector that conditioned the use of coal in its energy mix as mining corporations expanded their production to include both precious minerals and coal mining. Currently faced with the need to decarbonise its energy mix whilst at the same time ensuring energy security and development, the country developed unique structures and organisations that question not only the technical and strategic side of the equation but the organisational process which led to the development of an energy policy and how this policy interacted with its population.

This case study will be explored through documentary research and discourse analysis examining primary sources such as policy documents, parliamentary

commission reports, integrated reports, financial reports and strategic documents supplemented by secondary sources such as news articles, radio interviews and scientific papers.

What this case study hopes to illustrate is that the strategies used by states to secure their oil needs can be achieved first, through a security of supply strategy enacted by the diversification of suppliers and through the decompartmentalisation of energy supply chains. Second, through the transfer from energy security to material and mineral security by emphasising the need for an energy switch using favourable mineral endowments present within the country.

The South African case study also questions the construction of oil needs through the ways different organisations and stakeholders frame the issue in the policy debate. The securitisation of oil within the policy network is at the nexus between development to ensure stability to protect from the threat of instability and development to ensure the security of supply to roll out new technologies and energy carriers such as renewable energy.

South Africa also questions the role and use of energy as a factor for labour control as it illustrates the triple role of energy. First, as a tool for constraint by denying access to energy to communities and as an element for control in the mines of South Africa. Second, as an incentive to ensure peace through development by expanding energy access to grow the economy. Third, as an element which predetermines the structure of the labour market.

Finally, the case study also questions the relative sensitivity of each component of the energy system to the broader whole. Due to a cascading failure of energy systems in South Africa since the start of the war in Ukraine, the country is facing critical shocks and stresses. Hence, it appears necessary to further examine the relationship of these interlocking systems.

This paper is organised into six chapters:

Chapter one will provide a literature review on de debates and saliant questions surrounding energy security by attempting to determine the referent object of energy security by asking *what are we trying to secure? From what? How and at what cost?* And to examine some of the literature surrounding oil security to illustrate an example of energy security strategies. This chapter hopes to define energy security as the securitisation of energy systems from shocks and stresses by ensuring the affordability, reliability, availability and acceptability of the energy carriers composed by it through diversification, demand reduction, increased robustness and protection from enemy coercion.

Chapter two presents the primary analytical model used in this dissertation, Graham Allison's organisational process model, developed in *Essence of decision.* It hopes to present Allison's models, their advantages, and their limitations for studying the decision-making process of energy security. Namely, to understand decision-making in the energy sector, it is necessary to examine the various agents of the state, their respective history and internal processes and how they interact with each other. Moreover, Allison's model has the great advantage of being scalable to each policy echelon and allowing for granular analysis of decision-making. At the same time, the models have theoretical limitations regarding the degree to which organisations compete within a single field of policy, how efficiently the division of labour between organisations is achieved, the clarity with which one can differentiate between organisational process and governmental politics, and the stability of the rules governing the policy sector. It also has practical limitations regarding the mass of information required to conduct an analysis of the organisational process and determine the organisations which part and those excluded from the policy network.

Chapter three presents the research design and methodology used for this dissertation, first by outlining the advantages and limitations of the case study method. Second, by outlining why South Africa was chosen as a case study.

Third by presenting the data collection method of qualitative documentary research and the data analysis methods of thematic analysis and discourse analysis.

Chapter four aims to present the relevant background literature on the South African industrialisation process and energy system with a special focus on two seminal works: *The political economy of South Africa: From Minerals–Energy Complex to Industrialisation* and *The Origins and development of South African energy policy.* Following the presentation of these texts, the energetic profile of the country will be presented illustrating that South Africa (SA) is highly dependent on coal, that industry is the primary consumer of energy, there is high dependency on imported oil, liquid fuels and petroleum products, and that the economy is highly energy intensive. The final sub-sections will outline the model used by previous literature to analyse the South African energy, industrial and mining policy complex called the Mineral-Energy Complex and how it affects the case study.

Chapter five will be the core of the analysis and will be divided into three sub-sections. The first will present and illustrate some of the key stakeholders in the energy policy debate by outlining their history, objectives, strengths, and challenges. The second will present South Africa's liquid fuel security policy and a SWOT analysis of this policy as interpreted by the stakeholders of the debate. The third will outline how these different organisations presented in the first sub-section have influenced this process and how the MEC continues to be a relevant analytical model for the South African energy policy system.

Chapter six will discuss the case study's findings in relation to the literature review done in chapters two, three and four. The first section will directly answer the research question and outline a few elements to support the findings. The second section will attempt to illustrate how the results from previous chapters question the literature review by exploring the question of sensitivity in the relationship between components of the energy security

policy system. The third section will attempt to be reflexive, illustrate some elements that could have been overlooked by the case study, and propose directions for future research.

CHAPTER I: DEFINING ENERGY SECURITY

Aristotle once submitted that the ones who control the definitions, control the debate (Sovacool, 2011). However, any short inquiry into the scholarly research on energy security will yield several definitions, approaches, and points of view. Depending on whom you ask and when, the understanding of what is the stake, and the subject of energy security varies considerably.

The more classical approaches are often borrowed from geopolitics as well as security and strategic studies. Others have attempted to define it within their sector by emphasizing social, economic, or ecological issues, to name a few. More creative endeavours have asked the question of scale by proposing to differentiate between the macro (international energy threats such as resource depletion or climate change), the meso (regional issues regarding diversification and market practices) and the micro (usage and problematics of energy within a given community) (Sovacool, 2011). What can potentially explain such variance is the numerous political objectives different stakeholders and actors of the energy security debate have, as seeing one's definition triumph might produce a hegemonic position in the debate.

To make this overview of the available research more didactic and synthetic than an enumeration of the different approaches, this section will ask the literature four questions whose answers will be arranged in three sections: *What are we trying to secure? From What? How and at what cost?*

As such, the first section will propose an overview of the different definitions given to energy. The second section will attempt to present potential threat models to energy security. Third, will attempt to outline what are the potential costs of threat reduction. A fourth section will centre more specifically on oil security, which will be the focal point of this thesis.

This overview is a synthesis of available writings form the *Routledge Handbook of Energy Security* (2011), *The Oxford Handbook of Energy politics* (2021) as well as a synthesis from other available scientific articles, conferences and reports on the matter.

A) WHAT ARE WE TRYING TO SECURE?

1. ENERGY AS A PHYSICAL VALUE

The first understanding stakeholders have of energy is that of a physical value. In essence, it is the hard scientific approach to the question. Energy is the value which measures our collective ability to generate heat, motion, etc. According to this approach, the real question becomes an energetic supply chain issue since the goal is to search for the best energetic return on investment whilst considering each energy carrier's different advantages and drawbacks. As such, while coal is very useful for electricity generation due to the relative ease with which it can be extracted from the earth, it is inefficient for mobility due to its bulky nature. In this instance, the different energetic supply chains need to be secured according to their most efficient end-use (Jancovici, 2019a).

While in the early days of our energy-intensive societies one energy carrier was used for a limited number of purposes, since the second part of the 20th century, energy carriers do not constrain as much the final consumption. This has mostly been the case with the progressive and ongoing electrification of end-uses, first with heating and today with a progressive attempt to decompartmentalise the mobility sector with the development of electric cars and maybe eventually hydrogen fuel cells. The consequence is that from a one carrier one use situation, our societies are now made of different energetic

supply chains which can feed into each other if there is a certain level of capital level investment made beforehand (energy.ec.europa.eu, 2020). As such, the second physic view of the issues is concerned not with a given supply chain but the numerous energy systems composed by it which make up our society, from the primary energy consumption to the final energy consumption.

2. *ENERGY AS AN ECONOMIC RISK*

The second approach that should be mentioned is the view that energy is understood to be a commodity. In this understading, energy is fundamentally something which can be bought and sold by different actors. Considered to be a simple product, this view of energy believes that the real challenge when faced with energy security is maintaining adequate product affordability. As such, what needs to be secured is not energy per se but the global market requiring protection from unfair trading practices. In practice, this mostly means ensuring the security of supply to the market by counterbalancing disruptions which could disrupt the conditions for perfect or quasi-perfect market competition (Sovacool, 2011).

Inversely, the view of energy as an economic product also has the opposite effect of viewing it as a product of primary necessity and thus a social welfare issue. In this view, energy is an economic product that should be made available to all, like water or food. While the purely economic perspective focused on the market being the thing which needs protection, guaranteed availability as a public service is here what needs to be ensured. This view is also particularly prevalent in the development literature as some scholars see access to energy in the household as a determining factor in allowing for growth and development (Davidson, 2003).

3. *ENERGY AS A HARD POLITICAL FACTOR*

The third approach is energy viewed as a tool for hard power. As mentioned earlier in the introduction, energy is a prime mover for how many machines are actionable. It also predetermines industrial capacity, hence how many weapons and crafts a given state can produce and how many of these machines it can utilise simultaneously (Valentine, 2011). According to this view, what is protected when discussing energy security is not the energy itself but what Joffre would call a nation's freedom of action and ability to manoeuvre. As such, the more energy an armed forces possess, the easier it will be for it to pursue strategic objectives. The most famous illustration of this belief was Operation Tidal Wave conducted by Anglo-American air forces during WW2. Aimed at destroying German synthetic fuel plants, the objective was to reduce the amount of oil German armed forces had at their disposal.

The second aspect of energy as a tool for hard power is the view of energy as a weapon. In essence, energy also measures how much destructive force one can impose on an adversary at any given time. As such unlocking new energy carriers also entail unlocking new weapons with more significant damage potential. The most telling example of this is the debate around nuclear proliferation, in which energy used for civilian purposes can also predetermine what rank in the geopolitical food chain a nation is situated.

A preliminary conclusion we can draw from the question of the referent object of energy security is twofold. First, it appears that the competing answers to what are we trying to secure, though different depending on who is asked, do not necessarily contradict each other and are to some degree complementary. Typically, an economic risk can easily translate into a political and hard power risk if left unchecked, as energy availability affects industrial capacity, which

implies consequences on the broader economy and social stability. Second, those competing definitions also suggest that to a tremendous extent, vulnerability is a social construct which is very much dependent on the field in which one evolves or the priorities a society allocates to a given issue.

B) FROM WHAT?

1. DISRUPTIONS IN SUPPLY

The first significant indicator or threat model is the one posed by low availability (Sovacool, 2011). What is entailed by this threat is that fundamentally the risk is not gaining access to a given energetic resource either due to scarcity as not every energy exists in sufficient quantities to make it economically or energetically viable. In this instance, the issue is first foremost geographic as the goal is to secure a given area due to its role as a strategic point or due to the quantities of a given energy carrier present in that zone. The second issue is technical as the availability of energy is also directly correlated to energy efficiency from extraction to end uses in a given system. The question of geographic access and systems efficiency tends to transcend most definitions of energy as pretty much every definition needs to encompass both factors. Generally, increased availability offers more leeway to face shocks, i.e. a short-term reduction in availability or stresses, a predictable long-term disruption to the energy system (Cherp and Jewell, 2013). The metric often used to measure availability is the energetic return on investment. Measured in how many barrels of oil can be produced per barrels consumed.

The second significant indicator is the question of the reliability of the energetic system. As energy systems are often very complex pieces of engineering with multiple moving parts, they can also be prone to accidents or

natural threats such as extreme weather events. Hence, it appears necessary to secure the reliability of the system by ensuring its reliance in the face of unplanned accidents. The term traditionally used to measure increased reliability is the idea of robustness which can be measured in the reduction of the probability for a system failure in the energy system.

2. SOCIAL UNREST AND ECONOMIC HARDSHIP

Viewing energy primarily as an economic product hence begs the question of affordability. If the desired outcome is ensuring the largest possible access to energy products, there should be provisions put in place that can act as guardrails if the market is upset by unforeseen circumstances. This is typically what has been enacted with the formation of the IEA in the latter part of the 20th century, with the mandate to counterbalance the power of the OPEC. Similarly, the concern of market prices also permeates with questions regarding development challenges in low-income countries. Indeed, electrification through renewable sources has been framed as the most cost-effective way as it does not require considerable investment into a large electric grid (Seriño, 2021).

Similarly, viewing energy as an economic product which should fall under the scope of goods protected by social welfare also begs the question of how are needs constructed within a given society and how to fulfil these aspirations (Jancovici, 2019). To a non-neglectable extent, material and to a certain extent social status is partly correlated by the amount of energy and machines an individual has at its disposal. In essence, the amount of energy depending on income varies considerably. As such, viewing energy as social welfare good entails the question of inequality.

3. *RIVAL COERCION*

In line with the view of seeing energy fundamentally as a hard power issue, issues should be mentioned regarding the question of the "oil weapon" and of nuclear deterrence.

Since the 1970s and the realisation of the vulnerability associated with a concentrated oligopolistic market of producers through the OPEC, a considerable amount of energy has been spent attempting to uncover if oil can be an effective way to coerce states. Moreover, much literature has been devoted to determining which part of the supply chain is most vulnerable. The reason for focusing on oil is that it is the energy used primarily for the goal of mobility. As such, for modern mechanical wars, it is a necessary carrier (Kelanic, 2016). Second, the international oil market is far more flexible than coal, gas or electricity. Even though a considerable amount of 'hardening' has been implemented to improve the resilience of the oil supply line, to date, there has been no clearly successful uses of oil to force policy upon a country. Moreover, the current structure of the international oil market seems to be pointing towards a more multipolar system with an increasing amount of producers. However, the possibility of such a threat being enacted remains critical, especially for revisionist states that do not have easy access to oil (Leung et al., 2014).

The second issue regarding hard power and energy is the question of nuclear proliferation. Whilst it is true that it does not strictly concern the field of energy security and energy politics, it remains something which should be considered. This is mostly because nuclear energy has several very attractive characteristics, making it an interesting energy source for countries wishing to develop their energy independence while simultaneously limiting their CO2

emissions. However, nuclear energy has a high capital cost as well as a complicated political framing and debates around radioactive waste its safety. It remains the most energy-intensive carrier currently in use. Hence in a world increasingly concerned with GHG emissions, nuclear will most likely become an ongoing debate in the near future. The risk becomes whether such a carrier breeds the possibility of seeing more and more nuclear-capable states in the next century (Solingen, 2018). Thus far, the current consensus is that the extension of civilian nuclear energy does not necessarily lead to proliferation. However, the question should not be dismissed in an increasingly multipolar and unstable international system.

A preliminary conclusion can be drawn from this discussion is that the three main threats discussed when considering energy security are the threat of low availability, the threat of low affordability, lack of reliability and the potential for rival coercion.

C) HOW AND AT WHAT COST?

1. HOW?

What the literature seems to mostly agree on regarding to proven methods to ensure energy security is either diversification or demand reduction. Both these methods correspond roughly to an evident idea through either proposing more supply or curbing demand.

Diversification can be understood in two different ways. The first and most evident is energy source diversification (Fergin, 2021). In essence, the goal is to increase the number of redundant supply chains within a given energy system so that the system can keep running in the event of a shock or stress.

To an extent, this has been accomplished in France with the ambition of making the French electricity grid supplied by 80% of nuclear energy. By diminishing reliance on imported coal, gas and oil, the overall system became more resilient and less affected by shocks. Moreover, energy diversification also entails becoming more resilient to stresses for the same reason.

On the other hand, diversification of supply entails multiplying the suppliers of a given energy carrier to reduce the vulnerability if this actor is either hostile or is faced with an unplanned event that might question its supplying abilities (Stirling, 2011). This is part of why the US, following the oil shocks of the 1970s, attempted to develop its domestic reserves of shale oil to become less vulnerable to foreign operations.

The second aspect is through deficit reduction or reducing demand. This can be achieved by lowering need for one energy carrier, improving energy efficiency or reducing demand for all energy carriers.

When attempting to reduce demand for a single energy carrier, the available means are also to be found in diversification but through manipulating demand not supply. In essence, this entails putting in place infrastructures which reduces demand for one carrier. For example, this can be achieved when choosing to improve a railway system for goods and people. By diverting traffic from motor vehicles such as cars and trucks, the amount of oil required to ensure this system's resilience is reduced.

The second aspect of improving energy efficiency is quite evident. By reducing the amount of energy required globally, in theory, the total of energy needed should be reduced. This reasoning was applied with a moderate degree of success after the oil shocks of the 1970s, most notably in cars. The goal was for manufacturers to make the most energy-efficient vehicles to offer more mileage per litter. There are currently some debates about applying the same

reasoning to other sectors, such as the housing sector, in order to fight climate change.

Finally, there is also the complex and somewhat controversial question of regulating social demands and expectations. Climate activists have most notably argued this approach in support of 'degrowth'. In essence, the idea is that it will be necessary eventually to consider how to envision energy usage and energy expectations and that fundamentally, growth might contradict our possibilities to become more energy secure. Understandably, this causes considerable amounts of debates not only in the developed world, where growth is associated with much of the positive aspects of the modern era, both also in the developing world, where the idea of regulating expectations is very controversial in light of how northern countries consumed large amounts of energy during the previous century (Jancovici, 2019b).

2. AT WHAT COST?

The question of what cost is also of prime importance. Every energy used at a sufficient scale poses unacceptable consequences in terms of social and ecological acceptability. The most evident uses are fossil fuels, posing health, climatic and environmental risks. However, the same could be said about renewable energy as not only does their use transfer dependencies from energy security to material security, but overextension might also lead to land usage conflicts and water availability issues (Jancovici, 2019b). As such, over-reliance on one source of energy might also generate the "not in my backyard phenomenon" by which consumers are open to the production of renewable so long as they do not suffer the negative aspects of said production.

The second central question regarding unwanted externalities is that of climate change. There is an ongoing debate questioning the nature of the threat posed by climate change to energy security (Luft et al., 2011). This is primarily because climate change and the fight against it can be both a force in favour and against energy security. Typically, while switching to renewables is an improvement regarding GHG emission, since they are intermittent energies, they require another carrier to pick up in case of the absence of wind or sun. Usually, this is accomplished through natural gas, which implies some form of dependency if the consumer is not also a producer. In essence, this occurred when Germany decided to shut down its nuclear power plants following Fukushima, which helped catalyse dependence on Russian gas.

The third difficulty is whether climate change itself should be considered a risk to energy security. When considering potential threats to energy security caused by climate change, a considerable debate revolves around second or third-order effects but not necessarily direct causation. As such, some scholars have argued that with the increase in droughts, water management will be an increasingly critical and tense factor to energy security as water management is a necessary feature of energy extraction and usage for several technical reasons. However, what is causing the threat to energy security is not climate change per se but one of its consequences. Hence, if considering second-order effects of potential threats to the energy system, setting the boundaries and modelling the energy system becomes exceedingly tricky and loses its analytical value.

This debate is still very much open, and no suitable solution has been found for the moment. Hence, the thesis will mention some of the potential second-order risks of climate change but will not dwell on them.

To conclude and sum up this debate, a preliminary definition of energy security we can use : *Energy security is the securitisation of energy systems from shocks and stresses by ensuring the affordability, reliability, availability*

and acceptability of the energy carriers composed by it through diversification, demand reduction, increased robustness and protection from hostile coercion. This definition is not final since each of the operating elements is subject to much debate internally. However, it will remain our working definition for the subject at hand.

D) KELANIC'S THEORY AND OIL SECURITY

Thus far, the debates outlined in the previous paragraphs have focused on energy security as a whole regardless of which energy carrier is studied. While each carrier has its own set of technical challenges which are not necessarily transferable from one carrier to the next, the theoretical considerations remain similar though the constraints vary. While each carrier merits attention due to the different uses they entail, this thesis will focus on oil and oil security.

This choice is explained first by the critical nature of oil for the uses of mobility and hence for the armed forces. Oil will still remain the primary mobility carrier in the foreseeable future. Second, since it is the most internationally traded energy commodity, its oil value on the global market tends to serve as an indicator for trading other energies such as gas. Third, the believed or actual vulnerability of societies to oil is still a defining factor in several security strategies around the globe.

Among theories dealing with the specificity of oil security, the one selected as the lens of analysis for analysing oil security is the theory proposed by Rosemary Kelanic in her book *Black gold and blackmail: oil and great power politics* (2020). Her theory suggests two variables which will be used in this dissertation. The first is petroleum deficit which is calculated by determining the amount of oil needed by a country minus the available oil in the country.

The second is the susceptibility of threats to oil imports which is a subjective evaluation of the risks of foreign disruptions a country might face.

To influence the first variable, countries can choose to either reduce their deficit by augmenting the amount of oil present in the country or reduce the amount of oil needed by diverting needs to other energy sources. Similarly, to minimise threats to oil imports, states can either choose to be self-sufficient in terms of oil needs, assume indirect control of oil sources through a range of actions taken in either diplomatic, economic or military operations or assume direct control of oil imports by securing vital trading routes or production sources depending on the available means of the sending state.

Kelanic's theory is somewhat of a blunt instrument as it nullifies much of the complexity behind oil and the broader energy security debate by not differentiating the different steps in the global oil supply chain nor taking own a critical outlook which could question how the vulnerability is built through discourse and appreciation of a situation. Nevertheless, it provides value through ready-to-use and easily understandable appreciable variables.

CHAPTER 2: UNDERSTANDING DECISION-MAKING AND PUBLIC POLICY

The need to understand how decisions are taken, enacted and why is necessary for practical reasons as knowledge on the process is needed to improve governance and explore the morality of leadership and the nature of power. Since Aristotle's *Athenian Constitution*, there has been an intellectual adventure across several fields and centuries to comprehend decision-making and public policy. It would be far too long and tedious to attempt a comprehensive overview of the question. Nevertheless, for the purposes of this thesis, to understand contemporary decision-making in the oil security policy field, two deep-cutting trends must be contended with: the growing complexity of governance as well as the subsequent need for specialised organisations and agents in dedicated technical fields.

Decision-making and governance have become increasingly complex as the increasing sophistication of knowledge breeds the need for more specialised organisations, institutions and experts to respond to each policy field. The typical example of the need for more and more specialised organisations and their accompanying expertise is the emergence of Space travel and NASA. This activity would most likely not have emerged without a dedicated group of specialised technicians and their accompanying resources to accomplish this purpose. The complexification of policy is also particularly prevalent in energy governance as not only does the progressive industrialisation of societies lead to the multiplication of energy carriers, but it also leads to the complexification of end uses.

Consequently, most states have developed private and public enterprises to act as their agents in the energy sector as most political organisations tend to

delegate these technical matters to detached organisations. This detachment is due to the particular requirement of the energy sector which to some extent behaves as a market for some carriers such as oil and gas. Hence, even though the states maintain a form of control over national enterprises, due to the essential nature of energy commodities in any industrialised nation, these companies are also incentivised to be financially and commercially sustainable. Good financial returns on energy companies through higher production not only allow for cheaper access to energy carriers for the principal but also increases energy security by reducing the risk of foreign economic entanglement in a vital sector for the economy.

To properly understand the role of decision-making in energy security, it is necessary to use a framework that can adequately assess the different agents in the decision-making network and encapsulates how these different agents lead to a specific policy decision. To that effect, this dissertation will use the theoretical models proposed by Graham Allison in his seminal work *Essence of Decision: Explaining the Cuban Missile Crisis* (1999)

A. ALLISON'S ESSENCE OF DECISION AND ORGANIZATIONAL PROCESS MODEL

1. ALLISON'S ESSENCE OF DECISION

In this book, Allison develops three core arguments:

First, analysts tend to use implicit analytical models without necessarily realising it, which predeterminism their line of thought and how they analyse policy issues. In essence, they try to ask simple questions such as "*What happened? Why did it happen? What will happen?*" without considering how

those questions are asked frames the issue and hence the available number of policy answers.

Second, the most commonly used model to explain decision-making is the unitary rational actor model (Model I). The model is drawn from classical realist thinkers of foreign policy analysis such as Raymond Aron and John Mearsheimer. In essence, they assume decision makers are perfectly rational with complete control over the organisation they lead and that given the same amount of information and the same parameters, leaders obey a logic of consequence in which the desired end goal is the search for the most value-maximizing outcome.

Third, at least two other models can help explain the decision-making process. The first is the organisational process model (Model II) and the governmental politics model (Model III). Allison illustrates both models by using the image of the chess game. While Model I assumes a classical opposition between two players with complete control over their pieces. Model II on the other hand, proposes that each chess piece represents an organisation under the state and has a degree of autonomy. In this instance, the player is mostly there to limit the amount of drift from the original policy object organisations were given. Model III finally posits that there is more than one player on each side of the board constantly bargaining what the next should be.

2. *ALLISON'S SECOND MODEL*

Allison's second model is beneficial for our purposes first and foremost because it deals effectively with the question of expertise, specialised organizations and how they affect the decision-making process.

The subject of the analysis in Allison's model are organisations or groups of organisations defined first by a predefined mission statement as it is meant to give capabilities and knowledge which would otherwise be unavailable to the government. This mission statement implies that each organisation has factored problems and factored power to determine which issues they are meant to tackle. Consequently, because of the division of labour implied by different missions, each organisation develops its own culture, operational objectives and special capabilities over time. These organisations develop standard operating procedures which allow them to deal with routine policy issues and some freedom of action in dealing with crises. The accumulation of these SOPs constitutes a repertoire of actions which define the organisation.

The object of the analysis is to understand how these organisations, their cultures and SOPs influence the decision-making process behind oil security strategies. In practice, this implies understanding the culture and SOPs of each organisation with a particular focus on the history of each of these organisations, their missions, how the pursuit of operational objectives changed the way they interact with the broader decision-making network and how these missions evolved overtime. Following this identification of the organisations, the next step is to map out the decision-making network by identifying the key stakeholders in the oil security debate. How do the SOPs and culture of the organisations interact in a complex environment and produce policy decisions such as papers, investments, or foreign policy actions

B. ADVANTAGES AND LIMITATIONS OF GRAHAM ALLISON'S MODELS

1. THE CHOICE BEHIND ALLISON

Allison's Essence of decision offers some tools that respond to some of the imperatives outlined above to understand the decision-making process of oil security.

First, Allison's analysis, contrary to more classical forms of public policy analysis, considers not only ideational factors but also material ones. Namely, it provides a more robust framework to analyse how both factors intersect in human decision-makers (Hudson, 2005). As such, in Allison's original writings, the available material capabilities of both the US Navy and the Red Army predetermined the appropriate actions to undertake and how they are undertaken. In essence, it draws from more classical international relations theories such as realism which emphasized hard power factors whilst also considering advances in institutionalism and public policy theory.

Second, Allison's models are more readily suited to frame policy questions by considering not only the domestic environment of a policy issue but also the foreign environment. As illustrated in the author's analysis of the Cuban missile crisis, the double perspective of internal and external affairs is necessary to analyse energy security policy (Hudson and Day, 2019). The ease and distribution of energy resources globally is essential when considering energy policy as it predetermines the number of available policies the decision makers can have at their disposal. Moreover, oil, as one of the most internationally traded commodities and energy carriers, is very much subject to geopolitical modifications.

Third, Allison's models and propositions also have the very beneficial virtue of differentiating between the logic of consequence and logic of appropriateness. In essence, looking into organisational process and governmental politics questions if a specific policy decision was taken with the hopes of achieving the desired end goal or was taken because the constraints and rules of the government the principal acts with are bounded by the different branches and agents which compose the decision-making network.

2. *Benefits of the organisational process model*

Beyond the usefulness of Allison's considerations in general, the specificity of model II makes it an attractive analytical model while considering the challenges of the current era.

First, the organisational process model has the great strength of being scalable. In essence, it can be applied to the smallest units of governments at the local level to the national if not international level. Each organisation requires a division of labour between different priorities and specificities to provide services and capabilities which could not exist. Moreover, due to the increasing complexity of society and collective action, any organisation requires dedicated and specialised services to provide and answer those needs. What makes his scalability particularly interesting is that it also allows for a better understanding of political threats to the greater policy system by giving the observer indicator into how to analyse different echelons of government or its affiliates. In essence, it also for a systematic review of a given policy issue by allowing the observer to determine which part of this system should be observed.

Second, it allows for a level of granularity in analysing the decision-making process. It provides an interesting model to investigate how groups collectively undertake decisions and the process behind them. In essence, identifying the different echelons of government and studying their interactions at different scales permits a more in-depth analysis of threats to the decision-making cycle.

Third, the organisational process allows for a differentiation between the principal, in this case the State, and the agent, in this instance the various organisations which are stakeholders in the energy policy decision-making process. This entails an imperative necessity when discussing energy and liquid fuel security since energy is a very technical field requiring dedicated specialists and organisations to properly tackle the various challenges associated with energy production, transmission, distribution, etc. Hence, understanding decision-making within this particular field is necessary not only to map out the various agents of the state in this domain but how these agents compete or cooperate to enact or oppose policy decisions from the principal.

C. CRITIQUE AND LIMITATIONS

Essence of decision is not without its critique and has been subject to considerable adjustments, which also limit the scope of the usefulness of this theory.

1. THEORETICAL LIMITATIONS

Model II and III in Allison's original writings envision different organisations which compete for resources and, to a certain extent dominance over similar

fields of policy. In practice, it is questionable whether this is a necessary feature of statecraft, as even organisations with influence over a similar field of policy might not necessarily enter into a form of competition. This entails that organisations might be willing to cooperate to save a dominant position within the broader decision-making network (Wood and Waterman, 1991). Consequently, this might suggest the possibility of cartelisation of different organisations or groups of organisations to survive more effectively within a policy environment and curb the influence of the decision-makers.

Inversely, the division of labour between organisations depending on their policy objectives and priorities is far from clear. In practice, many organisations often struggle for dominion over the same field of policy and even extend their domain of action in pursuing operational goals. For instance, during the Vietnam War, there was a regular opposition between the state department and the DoD on the objectives and means that should be deployed to ensure victory in this conflict. Moreover, this opposition remains even to this way illustrated by the way different branches of the US government approached the problem of stabilisation of Afghanistan following the 2001 invasion (Whitlock, 2021).

The analytical line between Model II and Model III is not as clear-cut in practice. This is primarily due to the fact that each leaders of an organisation are also part of the broader bargaining for decision-making (Jones, 2010). As such the difference between organisations attempting to secure resources and its leaders trying to weigh in the decision-making process is not fundamentally opposed, nor is it analytically clear cut. Hence, analysing the role, culture, power and operational objective of organisations might be very much dependent on their leaders. Moreover, this entails a second difficulty: determining the degree to which leaders are influenced by the organisation they govern or vice versa.

To reuse Allison's metaphor, the chess game obeys preordained and defined rules in which organisations and leaders move. However, we can legitimately question the degree to which these rules are set and agreed upon by all the stakeholders involved. Moreover, it is also possible that these rules are changed by endogenous factors or exogenous factors such as a radical shock or stress emerging unannounced. Hence, the degree to which the identified cultures and norms are permanent and how they might evolve remains somewhat of an open question (Jones, 2010).

2. *Practical Limitations*

First, collecting sufficient data to determine the organisational culture and how it translates into policy with a reasonably high degree of confidence is challenging. To provide a full identification and account of the role and shape of the organisations requires an in-depth look not only at available open-source documentation but also accounts of former members as well as observations done without the knowledge of the observed.

Second, determining which organisations are part of the organizational process those which are not is somewhat of an arbitrary distinction. The frontiers between different organizations as they linked officially through institutional links or unofficially through personal links of key figures requires some degree of arbitration. Moreover, it begs the broader question of how to measure influence of other personal factors in the organizational process

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

Several research designs exist and have been applied to examine the role and function of energy security and the links to public policy. However, to answer the research question as presented above, the selected approach is the extreme case study method defined as case studies which present an atypical and unique setting to study a phenomenon (Flyvbjerg, 2004). Using this approach, the dissertation will employ documentary research through the lens of Discourse and thematic analysis with the help of SWOT approach to provide an operational understanding of the case study selected. In this instance South Africa since the publication of the 2007 energy security master plan – liquid fuel, until July 2022.

A. THE CASE STUDY APPROACH

The choice of selecting the extreme case study method is explained by the fact that it is the most suited to limit the number of intervening variables. As mentioned earlier, most national energy security objects and subjects are part of a far larger web of interlocking dependencies and a network of relations which spans across the fields of policy, environmental concerns, strategy, and economy to name a few. Moreover, energy security is often not a neutral phenomenon. It is dependent on other strategic alignments with sometimes a delicate balance between selected dependencies among friendly countries and potential power competitions which can be subject to strategic asymmetry.

Hence the selected case study should attempt to limit as much as possible the possibility for foreign entanglement.

To study this case study, two key variables have been selected. The independent variable is the organisational decision-making process of the chosen country. This variable will be the topic of most of the research done here. The dependent variable will be the policies and actions undertaken by the government to reduce a petroleum deficit. In essence, the case study will uncover how the organisational process translates into real-world policy.

1. ADVANTAGES

First, case studies are very efficient at providing answers that seek to answer operational questions because they are context-dependent. While context-independent knowledge is essential to provide theoretical frameworks, it is its applicability to real-world issues which give it value and substance. Hence by answering such as 'what' and 'why' the subsequent answers will provide a baseline for more sophisticated theoretical concerns (Thomas, 2011).

Similarly, single case studies research design allows the possibility to explore multiple narratives to study the correlations of two different variables. This can be accomplished through immersion into the specific case to provide a full grasp of its uniqueness and its similarities with other works done in the past. Incidentally, this is most likely why *Essence of decision* has focused on a single event, the Cuban missile crisis, using two different perspectives and three analytical models. They provide quality through the quantity of information which can be explored and analysed in-depth for a specific policy issue.

2. *LIMITATIONS*

Despite the benefits of the single critical case study approach, it carries several risks that might question its ability to uncover ontological realities.

First, there is a risk of confirmation bias the author might have towards validating preconceived hypotheses formulated in the research design. This is particularly the case when using a single critical case study research design as one risks only selecting a case study that validates the predetermined hypothesis.

Second, the ability to generate context-independent knowledge should be well understood. Conventional wisdom regarding case studies seems to imply that they do not present a sufficient number of occurrences to develop a large enough sample size which should enable the possibility of theory formation. In practice, this is somewhat questionable as most cases represent a 'black swan' occurrence to some degree. In other words, most cases present some uniqueness which limits its generalisation potential. This fact, however, should not obscure the need for a more extensive set of cases to provide a clear differentiation of imminent factors from transcendent generalisations. Hence, any findings uncovered at the end of this case study require confrontation with other research and cannot be considered final.

B. RESEARCH DESIGN

1. SELECTING SOUTH AFRICA

For the purposes of this case study, the selected case study is South Africa from the publication of the "energy security master plan – liquid fuels" until today. There are several reasons which justify this choice for the search for the most extreme case study format.

First, as mentioned earlier, the limited amount of potential foreign entanglement makes it an interesting case study. Despite being part of the African continent, South Africa was relatively isolated from other developed nations of the 20th century, especially in the energy sector. This isolation was due partly because of the distances separating the country from the global north. It is also due to no small part of the Apartheid policy which led the UN to impose an oil embargo on Pretoria during the second half of the 20th century. Hence this led the nation to position itself on the entire energy value chain by developing nuclear energy and through advances in the Fischer-Tropsch process.

Second, despite being rich in mineral resources, South Africa has comparatively very little oil and gas on its soil. This scarcity entails that to transition towards combustion engines using liquid fuels, the country had to deal with a considerable amount of petroleum deficit which it needed to alleviate through diverse means.

Third, South Africa has the benefit of being an intermediate power on the global stage. In practice, this entails that the country is not a 'price-taker' on the global strategic alignment market nor a 'price-maker'. In other words, the country has sufficient resources and know-how to not be completely

dependent on the outside while not having too much hard power at its disposal that it can impose its will unchecked by other great powers. In essence, South Africa is a regional power which cannot act purely on its own.

2. *Boundaries of the case*

To examine the South African case study, it appears necessary to determine the spatial and temporal boundaries of the case. What seems to be the most self-evident place to start the case study is the 2007 energy security master plan – liquid fuels. This choice is justified by the fact that this represents the most recent solidified policy document that deals with liquid fuel security since the end of Apartheid. Moreover, it is in direct continuation with the 1998 energy policy white paper and constitutes one of the rare official documents which considers the issue of oil security.

The question of the geographic range of action and the exact end date of the case is a bit more challenging. Since the end of Apartheid, international sanctions against Pretoria have been lifted, and the country has gradually integrated into the global economy. Hence determining which foreign policy decisions should be included in the analysis requires some prior thought. It seems that the most appropriate way to deal with this issue is to focus on decisions which affect oil security as a first-order consequence. In other words, focus only on decisions which have a direct effect on oil security regardless of the localisation of where the decisions are meant to be implemented.

The second question of when to stop the analysis is somewhat unresolved as recent years have seen the corruption scandal around President Zuma which also included two significant public energy companies Transnet which deals with energy transfers, and Eskom, which is the largest South African

electricity provider. As such, it appears necessary to include in the analysis this factor as it could provide interesting elements which Allison might not have encapsulated in his original writings. Moreover, the recent history of the covid pandemic and the war Ukraine have created new parameters which warrant a deeper understanding. Hence, to study the South African case study while also including the fallout from President Zuma's corruption scandal, the end date selected is July 2022.

C. DATA PROCESSING

1. DATA COLLECTION

The primary data collection method for this case study is documentary research. The main source of data will be whatever available documents can be found. The definition retained of a document is "[a] *text that can be published or unpublished, written, oral and virtual and may reside in either the public, private or virtual domain*" (Fitzgerald 2007, p. 281, quoted in: Tight, 2019).

The choice behind this method explained is by three factors. First, the stability provided by documents which entail they can be verified and falsified if needed either by the author or peers. Second, the ease of access which characterises most open-source documents especially in the era of massified internet connexion. Due to the extreme development of high-speed internet, it has become far easier to access a virtually unlimited amount of documents online. The cost of accessing open-source document documentation is practically non-existent.

Third, the scale of available documentation is virtually limitless as there has been a constant and exponential growth of accessible data for the last 20 years. Moreover, many public organisations and companies provide access to online records. Similarly, websites such as “The Wayback machine” or the “Internet archive” offer internet records, hence providing a way to trace back modifications.

It should be mentioned that documentary research can be both quantitative and qualitative. In this case, the accent is put on the qualitative aspect of documentary research as the goal is to find the correct information, not to multiply incoming sources. The choice behind using a qualitative approach to documentary research is primarily because when attempting to understand a single extreme case study, the objective should be to offer the most detailed account of a narrative within the case. This narrative is often better explored by precise, traceable and falsifiable documents and sources rather than a large sample of differing documents (Tight, 2019b).

This method does have a few clear limitations.

First is the scale of available documents. There is a constant growth of available documentary data, so it is virtually impossible to cover all available information. While the limitation posed by too many sources is constrained by the use of a qualitative approach to documentary research, it does entail that some narratives may remain underexplored or unknown to the observer. Hence, the risk is closer to a form of data saturation.

Second, critical information is not necessarily available through open source as secrecy is sometimes vital to carry out sensitive policy decisions. This is particularly the case in certain critical areas of public policy under the broad umbrella of security. This limitation is unsurmountable until documents are declassified after several decades.

Finally, documents which are not peer-reviewed or loosely verified are sometimes misleading or outright counterfactual. Hence there is a genuine debate regarding data quality assessment.

To alleviate these issues in the most resource and time-efficient way during the data collection process, the documents' validity, authenticity and credibility will always be considered. In other words, what will be questioned is: does that document inform the case study? Is this document actually what it presents itself as? How credible is the data contained in the document? Beyond this questioning, the goal is to collect data which can be both contradictory once their quality is proven and also adopt a critical posture towards their analysis (Bell, 2014).

2. *DATA ANALYSIS*

Regarding data analysis two methods have been selected: Thematic Analysis and Discourse Analysis.

In this case, Thematic analysis is defined as: "[…] *the analysis of qualitative data that involves identifying themes or patterns of cultural meaning; coding and classifying data, usually textual, according to themes; and interpreting the resulting thematic structures by seeking commonalities, relationships, overarching patterns, theoretical constructs, or explanatory principles.*" (Mills et al., 2010).

The use of some form of thematic analysis is necessary to uncover which words and vocabulary are recurrent from the organisation to the policy proposal and implementation. This should provide a coherent narrative on how an organisational process can translate into policy.

Discourse analysis, in this instance, is defined as the analysis of narratives and communications and how they shape the understanding and meaning of reality. The latter is necessary to have a critical understanding of how a policy issue is shaped and carried out in the real world. In practice, this entails questioning the designated audience of a document is and why the document was written. Moreover, it involves questioning how the formulation and framing of certain issues influence the broader policy-making structure (Burnham et al., 2008).

Hence, when performing Discourse Analysis, special attention must be brought to the context of the studied text by asking Who is the author? Why was the text written? For what purpose? And which audience? But also the broader context of the research done around the subject of the study. Most of the organisations, events and/or their interpretation have already been examined in the past and already have narratives and analytical models attached to them done by previous research. Hence, they influence the ways in which discourse analysis has been carried out and should be examined.

In practice, qualitative approaches of Discourse Analysis remain often to the judgement of the observer. As a way to alleviate the risk of implicit bias when carrying out DA, interpretations of the data should be clearly stated in the case study so that it may be falsifiable by future research.

3. *DATA CLASSIFICATION*

Despite Allison's framework and model being well suited for analysing organisations, it lacks actionable intelligence which might make data collection and analysis quick and efficient without going into too much detail. Since part of the goal of this thesis is also to offer new ergonomic forms of public policy analysis which is easily transferable and applicable and able to

rapidly identify vulnerabilities and advantages, the SWOT analysis method will be used. The goal of using the SWOT analysis methodology is to be able for the researcher to rapidly identify the positives and negatives which are internal to the organisation under observation, the positives and negatives external to the organisation and how these factors influence its decision-making process (Namugenyi et al., 2019). Similarly, the SWOT analysis will also be applied to South Africa's liquid fuel policy to better understand its saliant points. The SWOT analyses will be carried out using a double perspective of how the studied organisations perceive the energy policy of South Africa and their involvement as a full SWOT analysis for most of these organisations would have been redundant and out of the scope of this paper.

The SWOT analysis does, however, have some clear limitations which should be contended with. Namely, there are real issues in categories of the collected data within the SWOT matrix. In essence, being able to differentiate what it is inside or outside the scope of the organisation is somewhat challenging and in practice often falls upon the organisation itself. In other words, it is often up to the studied organisation to determine which areas are part of an internal resilience issue rather than an external force. The second issue is that of the weighing of the collected information. The matrix does not necessarily allow us to appreciate the importance of the different collected information in the analysis. Hence, a critical element necessary to understand a policy decision might be put at the same level as a minor element (Helms and Nixon, 2010).

Since the limitations outlined above are not critical to the core of the case study, they will be mostly bypassed through the discourse analysis achieved in the body of the dissertation as the confrontation of the different SWOT analyses of each organisation should make themes emerge naturally.

CHAPTER 4: SOUTH AFRICAN ENERGETIC AND POLICY PROFILE

This chapter aims to provide an overview of the necessary elements to grasp the particularities of the South African (SA) case study. Namely, its goal is to first lay out an energetic and policy profile of the country by uncovering the broad objectives of Pretoria's energy policy, its oil security policy and provide some key numbers of the country's energy consumption. Following this first endeavour, the chapter will outline the main approach which has been used to describe South Africa's energy policy system: the Mineral Energy-Complex (MEC) by giving an overview of its definitions, components, consequences on the broader policy-making environment and on the case study.

A significant point should be outlined as it has profound implications for the research. The South African energy policy rarely discusses crude oil proper and often prefers the use of liquid fuels to orient policy and decision-making. This is mainly because South Africa had to develop a diversified, liquid fuel industry to continue to provision its mobility sector under the apartheid era. Hence, discussing when discussing oil security in South Africa it is necessary to take a broader scope to encompass all liquid fuels which primarily entails examining crude oil, refined liquid petroleum products as well as liquid fuels created through the Fischer–Tropsch process such as Coal-to-Liquid (CTL) and Gas-to-Liquid (GTL). Therefore, this research will focus on liquid fuel security policy.

Due to its particular history, rich mineral endowment and large reserves of coal, the South African energy policy has been the topic of a considerable amount of research. Two seminal works should be mentioned here as they

have provided much of the framework for analysing the country. The first is the book by Ben Fine and Zavareh Rustomjee, *The Political Economy of South Africa: From Minerals-Energy Complex to Industrialisation* published in 1996, which first proposed the MEC as a model of understanding. The second is a thesis written by Andrew Marquard, *The Origins and Development of the South African Energy Policy,* published in 2006.

Fine and Rustomeje's key arguments can be summarised as three fundamental propositions.

First, the Liberal and Marxist interpretations of SA's industrialisation and the role of apartheid fall short of providing a credible and viable model of understanding. Whilst the former tend to emphasize how apartheid disrupted the expected path of industrialisation as it distorted free market ideals, the latter considered it a defining feature as they believed it mirrored a form of class struggle proper to the country.

Second, the role of the financial institutions, the mineral industry and the energy industry should not be underestimated as they are linked through their productions and outputs. Considering an essential part of the SA industrialisation process is the extraction of mineral resources, an analysis of the country should integrate the 1) role of the financial institution providing funding for the mines, 2) mineral, energy & their industrial subsidiaries accomplishing the transformation along the value chain 3) the role of the state as an arbiter.

Third, these three groups should be understood through the MEC, which is both the conglomerate of the different groups outlined but also a set of relations and a political system of domination within the country.

Conversely, Andrew Marquard's key propositions have been to propose an identification of the critical stages in the development of SA's energy policy using different theoretical frameworks whilst operating a distinction by type of

energy carrier and by historical phases. Among them, the author utilises Allison's theoretical models to uncover the different organisational processes of stakeholders who participate in the energy policy decision-making process.

The author concludes that there is a degree of logic of appropriateness which characterises model II through of operational objectives of the liquid fuels sector tasked with securing the supply of the South African state. Namely, following a principal-agent dynamic, the liquid fuels industry was successful in creating a parallel decision-making network over which it had a considerable amount of control and influence. This network was also able to uphold itself through a high level of secrecy and created an organisational culture that might still survive today.

A. ENERGETIC PROFILE OF SOUTH AFRICA

1. THE SOUTH AFRICAN ENERGY SYSTEM

South Africa is a country well-endowed in coal and other rare and precious minerals. As such most SA's energy generation and industry have historically revolved around coal and mining. According to the 2019 report of the Department of Mineral and Energy, SA's primary energy supply is 69% coal-based, 14% crude oil, 11% renewable and 3% Natural gas and 3% nuclear. Conversely, SA's final energy consumption that same year was 25,95% coal, 39,36% Oil and other products, 8,46% biofuels and waste, 23,29% electricity, 0,18% renewable and 2,76% Natural gas (IEA, 2022). By sector, a majority of the country's energy is destined for industry (52%), followed by transport (19%) and residential uses (8%) (DMRE, 2019a).

In terms of liquid fuels, the country produces around 30% of its consumption, with another 70% being imported (Sonjica, 2007). These 70% are an aggregate of different metrics as even though the country imports 99% of its crude oil mainly from Saudi Arabia (43,2% of crude imports) and Nigeria (32,59% of crude imports) and 88% of its gas from Mozambique it produces 66% of its petroleum products due to its large quantity of refineries (DMRE, 1998). Hence an exact breakdown of the primary energy carriers needed to arrive to these 70% is something that only the DMRE knows exactly, as neither the energy report nor the energy balance explicitly outline liquid fuels as a category.

This breakdown illustrates a few key elements. First, the incredibly high dependency on coal within the broad energy mix as it constitutes an important part of the final energy consumption, most of the electricity production and a valuable source of oil and liquid fuels for mobility and transport.

Second, it also illustrates the primary importance of industry as a consumer of energy, an importance which is also illustrated by the high percentage of industry in SA's GDP (29% in 2017) (CIA, 2022). Hence, it also demonstrates that the South African economy is highly energy intensive.

Third, it is also apparent that SA has an extremely high demand for oil and liquid fuels while having very little indigenous resources present in the country. Hence, not only does this present a clear vulnerability to the broader energy system, it implies that the South African state must find resilience and robustness strategies.

2. *Objectives of the energy policy 1998*

Prior to the end of Apartheid, the goals of the energy policy were primarily centred around providing electricity to the minority white part of the population and ensuring the continued industrial development of the country through electricity-intensive industries, most notably mining. As such, before 1996, only around 55% of the population of South Africa had access to electricity (World Bank, 2022), thus prompting a fundamental reshaping of the energy policy objectives culminating in the 1998 white paper on energy policy which still serves as the primary general policy orientation to this day.

The documents outline five critical objectives for SA's energy policy.

First, increase access to affordable energy services. In practice, this entails providing electricity to the vast majority of the population excluded from the development process of the 20th century.

Second, improve energy governance. As a fundamental reshaping of some of South Africa's institutions occurred, the new government attempted to profoundly reform the decision-making process by improving transparency

and reshaping the governance and regulatory role of the state. One of the major policies which emerged out of this policy was the desire to break the monopoly granted to the Eskom on electricity generation by moving towards a free-market approach of electricity planning.

Third, the new government upheld previous commitments to uphold the industrialisation and development of the economy by providing a greater supply of energy to the industry sector.

Fourth, the 1998 white paper is also the first to consider the health and environmental impacts of energy generation and consumption. As such, one of its key objectives is to promote the progressive use of renewable energy as a way to electrify part of the population.

Fifth, securing supply through diversity. This objective is imported from previous governments' energy security policy and primarily entails securing different and varied sources of suppliers mostly in the oil and gas sector. The diversification of energy carriers was not at that time a primary objective.

Broadly speaking, this new impulsion of the South African energy policy was a very mild success. While there has been considerable strides in electrifying new parts of the population to the point where 84,4% of the population had access to electricity in 2020 (World Bank, 2022), it came the new energy policy generated many structural problems which continue to this day. By forbidding the Eskom from creating new capacity to promote the emergence of independent energy providers, a chronic underinvestment in electricity capacity led to regular load shedding which persist to this day (Trollip et al., 2014). Moreover, the immediate need for electricity increased the amount of coal used for electricity generation.

3. *Objectives of the 2007 energy security master plan – liquid fuels*

The energy security master plan – liquid fuels published in 2007 was the defining document for the oil and liquid fuel security. What is notable with this document is that it provides a clear definition of what is entailed by energy security for the South African government. Namely, it considers energy security to be : "[…] *diverse energy resources, in sustainable quantities and at affordable prices, are available to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions among economic sectors.*" (Sonjica, 2007).

To achieve this policy objective, South Africa considers a 'central planning' approach to the issue to be the most effective. It should be noted that what is entailed by SA's definition of central planning is not a government-oriented global policy movement but the participation of a maximum amount of stakeholders in the debate (DMRE, 1998). While there is government involvement in the policy planning process, the drivers of the operational accomplishment remain the private or public enterprises.

The security of supply approach used in SA's energy security definition comprises two other operational objectives and sectors that Pretoria believes should be promoted: production and transport of energy. As such, the production side considers the necessity the need for diverse sources of energy, while the transportation side is concerned with the ability to find different international suppliers.

While this document remains the most recent document to focus on liquid fuels development explicitly, the need for an update of this policy became

pressing due to two key events since 2007. First, the 2008 financial crisis and its aftershocks had devastating effects on South Africa's economy, namely because even though the country is industrialised to some extent, it still requires an important influx of foreign capital to continue the development of the majority of its disenfranchised people. This lead to a continued load shedding schedule from Eskom, prompting the government to restart a planning and policy process in 2012, culminating in the Integrated Resource Plan (IRP) and the Integrated Energy Plan (IEP). Second, new climate considerations through the Paris accords have prompted a reshuffling of international finance priorities, creating the need for a policy adaptation.

B. THE MEC

1. PRESENTATION AND ORIGINS

The MEC is a term first coined by Ben Fine and Zavareh Rustomjee. Broadly speaking, it is an intellectual model of analysing the South African energy policy network which considers multiple overlapping policy networks in the energy, financial, mining and state sectors. It also considers how these different overlapping policy sectors influenced the broader development and industrialisation of the country from the 19th century to this day (Fine, 1996).

A central feature of the MEC is the concept of linkage and agency. In essence, each of the different stages of the mineral extraction process is linked through the outputs and inputs by creating an extensive value chain acting as one system with its own policy networks. Moreover, each actor in this value chain has a degree of agency from control authorities mainly because they possess skills and knowledge which make them experts in their respective fields. As such, in the absence of control authorities, they form a solely dominant policy

network over industry, finance and energy, which is beyond the scope of the central government.

Another key element to grasp is that due to these linkages relative independence of the MEC it created a distinct culture which prevails to this day. Namely, part of this culture includes a very high degree of secrecy in matters pertaining to oil security or to the desire to remain independent and occupy a dominant position in the policy network of SA.

The origins of the MEC can be found in the proximity of industrial elites in the energy and mining sectors. Most of the country's industrialisation was achieved through the extraction of precious and rare minerals such as gold and diamonds but also platinoids, chromium and steel. However, these types of mineral exploitation often require deep mining shafts and have an extremely high capital investment and energy needs. Hence, companies like the Anglo-American corporation needed to attract foreign investments and guarantee access to cheap energy (Fine, 1996). This was accomplished through the Industrial Development Corporation and the Eskom whose leadership had been in proximity as both organised had the same founder Hendrik van der Bijl who also created Iscor ltd, the national steel company until it was privatised in the 1980s. Later, the IDC and Eskom would subsidise and create some of the largest companies in charge of coal mining and oil extraction, such as Sasol or the Centra Energy Fund.

2. *CONSEQUENCES OF THE MEC*

The consequence of the MEC is far-reaching on both the domestic and international stage.

On the domestic side, the particular nature of the mineral exploitation in South Africa entails a considerable amount of electricity and labour. As such, the organisation of labour and its control methods gave the structure of the broader South African society. In practice, this is illustrated by the liberal use of black migrant workers in the mines to provide the necessary labour force. This migrant work was partially guaranteed by a selected electrification of the different areas of the population. In practice, Eskom excluded black townships from electrification to limit their development and force a constant flow of workers in the mines.

Similarly, as a way of limiting the worker's influence in the mines and ensure that strikes would limit the impact on exploitation, the mineral, industrial and energy companies not only developed more sophisticated forms of automatic control but also automated parts of the extraction process (Froestad et al., 2018).

The MEC also promoted a culture of gatekeeping in politics whereby political leaders coordinate with energy and mining industries to retrive economic benefits from political capital. Indeed, due to a rapid accession to power in 1994 with a clear lack of cadre in the country, many joined the ANC to achieve material prosperity through political positions. This sentiment was illustrated by ANC members who: "[…] *complained that the organisation had become a sordid 'pyramid scheme' to 'get rich quick'. One ANC activist, for example, bemoaned how 'we are no longer revolutionary politicians, we are professional politicians' going into politics to make a living.*" (Beresford, 2015). Consequently, to survive after democratisation in the 1990s many several union leaders and ANC became extremely wealthy through the Black Economic Empowerment scheme such as the current president Cyril Ramaphosa and current energy minister Gwen Mantashe (Beresford, 2015).

On the international scene, the MEC gained even more influence following the Oil embargos of the 1970s and onwards. As such, this branch of the industry became a critical part in the country security policy with often very little political control and to some extent pursued its own objectives. For example, Sasol originally designed as a public enterprise aimed at perfecting the Fischer-Tropsch process to offer more independence in the liquid fuels sector for South Africa, its privatisation in the 1970s to finance the refinery Sasol III means that today it still enjoys a substantial amount of freedom for the State (Marquard, 2006: 247). The advantages and financing offered by the MEC today entail that Sasol is on of the major companies in the world able to offer partnerships in the construction of CTL and GTL in the USA and China, adding a new agent of influence abroad for Pretoria.

This overview implies a few questions which should be examined in the second part of the analysis in the following chapter.

The first question which needs to be answered is which organisations should be included in the decision-making process? The available literature and data at this stage indicate five groups: public enterprises, private enterprises, government departments and agencies, financial institutions and industrial mining conglomerates.

Second, it appears necessary to take on a broader scope to examine SA's liquid fuels policy by incorporating other energy carriers and uses. Indeed, as is illustrated by the term liquid fuel, South Africa's oil sector incorporates several different energy carriers such gas or coal, through the Fischer–Tropsch. Hence, the scope of the analysis will also be broadened to incorporate some of the key organisations and agents which have an active role in the extraction and production of those carriers.

CHAPTER 5: ORGANISATIONAL PROCESS OF LIQUID FUEL SECURITY IN SOUTH AFRICA

A. SOUTH AFRICAN ORGANISATIONAL ECOSYSTEM

The South African decision-making network is complex and possesses a rich ecosystem of organisations and actors. Since it would be too long to go over all of the principal organisations in detail, the following section will attempt to synthesise by organisation type to make the findings more readable and accessible. Each organisation will be presented according to its mission, history, operational goals and the challenges it faces

Public enterprises

Two public enterprises need to be outlined when discussing the energy policy network of SA. First, the Central Energy Fund (CEF), and second the public utilities company Eskom.

The CEF was initially established in the 1950s and is currently a diversified state-owned energy company. Its core mission is to drive South Africa's presence in the international energy market, be a catalyst for growth and allow access to affordable energy in South Africa (nationalgovernment.co.za, 2022). Historically, the CEF was one of the critical actors in charge of ensuring security of supply for oil and liquid fuels, mostly through the procurement and strategic stock maintenance accomplished by one of its subsidiaries, the Strategic Fuel Fund (SFF). The CEF also had the crucial role of subsidising and funding projects to improve the production of synthetic fuels and finance a South African liquid fuels industry (Marquard, 2006: 247). Currently, the fund

has five major subsidiaries: PetroSA (the state-owned oil company which provides 70% of the fund's revenue), the African Exploration Mining and Finance Company (AEFMC), iGas (state owned gas company), Petroleum Agency SA (PASA) and the SFF. The fund is facing significant challenges as PetroSA's financial stability (news24.com, 2022) and ability to provide a constant supply of oil and liquid fuels are severely put in question mainly because their primary source of oil and gas from Mozambique has been reduced, and the difficulty of opening new fields both because of the pandemic, local instability in Mozambique and chronically low investment (CEF, 2020). Moreover, the issue of corruption in the CEF is also of great concern (Ndenze, 2021; Skiti, 2019). Hence, in an attempt to stabilise the financial returns and solidify the CEF, the government will merge three of its subsidiaries (SFF, PetroSA and iGas) into one (ParlyReportSA, 2020).

Eskom has somewhat of an infamous reputation in South Africa. The country's electricity provider was initially created in 1923 before bearing the role of electricity provider to the entire country has the principal mission of providing cheap and reliable electricity to the country's growing industry at the beginning of the 20th century. Only with the end of Apartheid has Eskom's mandate increased and was charged with providing all of the nation with a reliable supply of electricity (Marquard, 2006: 122). Since the end of apartheid, however, the public utility has been plagued by chronically low investments due to an expressed desire from Pretoria to liberalise and open the electricity generation market to independent power producers (IPP) (Yelland, 2020). Consequently, Eskom has been unable to diversify its production, which remains primarily coal based. Regular load shedding severely hamper and limit SA's potential for growth (Eskom, 2020). Ramaphosa's government announced in 2019 that the public utility company would be progressively broken up into its three branches (generation, transmission and distribution). Throughout the modern history of SA, Eskom has been one of the key players in the country's energy policy due to its original ability to have a complete

vertical and horizontal integration of the electricity market. It was effectively the state's agent in most energy policy matters (Marquard, 2006: 405). Moreover, the leadership and expertise at Eskom regarding industrial development had historical ties to the Industrial Development Fund (IDC), which meant it had privileged access to decision-making circles early on and retained this access and dominant position until 1994.

Finance institution

In the finance sector, the IDC remains one of the key organisations at the heart of the South African industrial and energy complex. The self-financing national development finance institution was created in 1940 and was the original financer of two key enterprises in SA's energy production: Sasol and the SFF. Moreover, in an attempt to remain independent and at the heart of SA's industrial complex, the IDC became tightly linked with Eskom, whereby the Electricity Amendment Act of 1964 effectively turned the electricity provider into an agent of the IDC (Marquard, 2006: 122). The original mission of the IDC has remained the same since its creation: to "*[...] maximise our development impact through job-rich industrialisation*" (www.idc.co.za/about-us/, 2022) this objective is now supplemented with goals of inclusivity in SA towards historically marginalised groups. Organised by strategic business units (SBU), the most notable event has been the recent creation in 2020 of an energy SBU aimed at providing funds to Independent Power Producers (IPP) (www.idc.co.za/energy/, 2022). The historically powerful basic metals and mining SBU has recently focused on financing minerals and metals for the uses of new advanced computer technology and renewable energy. What should be noted regarding the IDC is that its energy growth and consumption perspective relies heavily on new energy carriers with a vested interest in disengaging SA from coal. The agency also identifies several vital weaknesses mostly centred around a sub-optimal organisational culture within the IDC. Similarly, this weakness is supplemented by the institution's low and volatile

portfolio. Interestingly, the main threat outlined by the IDC is the rising unemployment and regular load sheddings in SA, which limit economic development (IDC, 2022).

Political parties & unions

At the heart of the energy policy side in the purely political field, two organisations must be addressed: the African National Congress (ANC) and the National Union of Mineworkers (NUM).

Unsurprisingly, the ANC remains the key political party in South Africa despite its loosing grounds in previous elections against the Democratic Alliance and the Economic Freedom Fighters. Since it would be too long to go over the complex and rich of Nelson Mandela's party in great detail, a few elements will be outlined. First, the ANC has been at the centre of some considerable turmoil since Jacob Zuma and the Gupta gates revealed the significant amount of state capture orchestrated with the knowledge of some of the party's higher-ups (Vice News, 2021). Second, regarding energy policy, the ANC cadre has overall agreed with some of the propositions made by the IDC and other private and public enterprises (Sasol and Anglo-American plc, among others) about the necessity to continue the Renewable Energy Independent Power Producers (REIPP) policy and to progressively switch from coal and oil to renewables and gas seeing them as potential barriers against some of the major challenges of the country such as unemployment, poverty and health (Businesstech, 2022). Finally, it should also be noted that the current president Cyril Ramaphosa is the country's second richest after his brother-in-law, both of whom gained ownership of very lucrative mines under the Black Economic Empowerment scheme, which aimed at putting blacks at the head of some of the major corporations in SA (BBC News, 2019; Hû, 2021).

The other political organisation which should be mentioned is the National Union of Mineworkers (NUM). This union has over 300 000 members and was also of the key organisations behind the end of Apartheid as it was able to effectively paralyse the pre-1994 government through strikes which halted coal production and electricity production (Hû, 2021). Moreover, several current and important ANC heads started their political careers within the NUM, most notably former president Jacob Zuma and current Energy minister Gwen Mantashe. The union still holds considerable power and opposes some of the predictions proposed by the Integrated Resource Plan (IRP) to reduce coal consumption based on a need for development and the perceived threat of western imperialism through climate colonialism. The union also fears the presence of foreign capital from funds such as the world bank to privatise SA's energy sector under the radar (NUM, 2022, 2018, 2017).

Government Departments

On the administrative side of the equation, South Africa's progressive desire to break state monopolies also extended to the pyramidal structure of the state prior to 1994. However, the key ministry which still holds a considerable influence on energy policy is the Department of Mineral Resources and Energy (DMRE), even though local and state administrations are being progressively granted more freedoms.

The DMRE was recreated by the merger of the Department of Energy and the Department of Mineral Resources in June 2019, following Jacob Zuma's corruption scandal. The limited role and power of the DMRE illustrate the neo-liberal inspiration nature of the SA energy policy system in which the public sector acts mainly as a regulator and a promoter of investment but with very little capacity to finance and directly influence the energy production sector. Currently, the department's main role is primarily planning and forecasting the evolutions of the energy sector (www.energy.gov.za/files/au_frame.html, 2022). The latest predictions of the

department envision the need to continue the exploitation of coal while at the same time reducing its relative use in the broader energy mix. Inversely, it sees the underdeveloped energy infrastructure of the country along with the depleting hydrocarbon resources and geopolitical instability as a key risk factor for the coming SA energy policy framework (Damba, 2016).

Private enterprises

Two private enterprises play a key role in SA's energy policy system: Sasol and Anglo-American Plc.

Sasol, being the world's 7th largest coal mining company, is one of the country's primary private enterprise of the SA's energy policy network. Initially financed by the IDC and later privatised in the 1970s to help fund the Sasol III CTL refinery (Marquard, 2006: 247). Its mastery of the Fisher-Tropsh process made it one of the agents of the states in matters pertaining to Liquid Fuels security. Currently, Sasol has operations perfecting sliquid fuel synthesis domestically and abroad, most notably in China and the US. Today, Sasol is not formally integrated into the liquid fuels process and is curiously not even consulted in either the IRP or the IEP, having only signed a memorandum of understanding with the DMRE (Sasol, 2021). What is more interesting and unique is that despite seeing the rebound of oil prices as a potential opportunity following the covid19 pandemic, which marked historically low demand and growth, Sasol aims to close its CTL refineries by 2050. According to the chemical enterprise, the justification behind such a move is to focus more heavily on Hydrogen as a potential alternative to hydrocarbon liquid fuels for future mobility to remain in line with the Paris accords (Creamer, 2021; Steyn, 2018). The company remains vigilant as the current evolution of the energy mix proposed by the IRP and IEP might put Pretoria in a position to import more liquid fuels in the coming decades.

The Anglo-American corporation (or Anglo-American plc), despite not being involved in the energy sector per se, is a significant player in SA's industrial ecosystem. Parent company of the famous De Beers diamond mining company, it is the world's largest Platinoid producer and exporter (Anglo-American, 2021). Created in 1917 with the help of IDC, it currently sees the progressive shift from coal to other renewables and hydrogen energy carriers as a massive opportunity where its metals and know-how can effectively be a key driver in the transition. This is particularly well illustrated by the development of Anglo-American with the blessing of the SA's government of the first hydrogen trucks used for heavy mining operations (AngloAmerican.com, 2022).

B. SA'S LIQUID FUELS SECURITY POLICY, A SWOT ANALYSIS

1. PRESENTATION OF THE LIQUID FUEL POLICY

Having a clear understanding of SA's contemporary liquid fuel security policy is somewhat difficult because a new Energy security master plan - Liquid Fuels should be published in the next few months of 2022. However, as the public consultations and state agents are available through open sources, one can determine what this policy might look like. This investigation can mainly be achieved through two documents: the 2019 Integrated Resource Plan (IRP) whose goal is to plan and lay out the use of resources for the future electrification and development of the energy grid in SA until 2030. Second is the 2016 Integrated Energy Plan (IEP) which outlines possible scenarios and hypotheses for the future of SA's energy sector. It should be noted that this plan is not a policy per se but a basis for drafting future executive decisions

and laws. Additionally, the examination of both documents will be supplemented by analysing primary sources such as integrated financial and performance reports of the companies presented above as well as parliamentary hearings, policy documents for the ANC and NUM and secondary sources from the media.

Broadly speaking, SA's liquid fuel security policy remains primarily a security of supply approach centred around reducing the petroleum deficit. The South African government and energy policy ecosystem do not perceive thus far the need for direct or indirect actions to secure access to petroleum imports mainly because Pretoria currently faces almost no external threats or adversaries, barring the rise of an Islamic insurgency in the north of Mozambique. Moreover, despite importing the vast majority of crude oil and petroleum products from Saudi Arabia and Nigeria (40% of imports in each case), the liquid fuels strategy does not treat such high levels of dependence as a vulnerability. Pretoria fears the bottleneck is mainly the lack of infrastructure needed to continue supplying its growing economy and population (Damba, 2016; DMRE, 2019a).

Hence, the security of supply approach was manifested through expanding existing petroleum and gas import and refineries. All scenarios proposed in the IEP anticipate the need for an additional 200 000 to 250 000 barrels per day (bblpd) of GTL until 2050 with an additional 75 000 bblpd of CTL liquid fuel capacity. Simultaneously, energy actors and agents hope to exploit the estimated 242-billion cubic feet of gas anticipated by the $1.344bn of the failed project Ikhwezi. The country has a small part of the total 3 Tcf of contingent offshore gas reserves at its disposal though with varied commercial applicability (PASA, 2012). Additionally, there were plans by PetroSA to add another 400 000bbl refinery in the eastern cape operated by PetroSA. The DMRE, through its 'security of supply' scenario, also anticipated the need for

an additional 200 000bbl of crude oil refineries in the event of the need for more significant energy imports (Damba, 2016).

Similarly, a large part of the liquid fuel policy of SA is centred around the reduction in the quantities of hydrocarbons needed to run the economy through greater use of renewable energy and the development of new types of energy carriers for mobility. In its base case scenario, the IEP hopes to achieve à 20% penetration of electric vehicles in new sales per annum. Likewise, the IRP envisions a reduction of coal use in electricity production from 90% today to 58% of the total electricity production mix, bringing it to 33GW compared to 37GW for coal in 2019. At the same time, renewable projects for South Africa envision bringing renewables into the electricity mix to around 39% of the total electricity production mix (DMRE, 2019b). These changes in the primary electricity energy production mix have a very real influence on the Liquid fuel security policy as they add more hydrocarbons available for CTL and GTL while providing a more robust system for import terminals such as Mossel bay.

Hence we see two of the parameters anticipated by Kelanic's theory by augmenting the amount of oil available in the country whilst simultaneously diversifying the energy carriers used in the broader energy system.

South Africa is also trying to gain access to new oil and gas reserves in the Mozambique canal by constructing new gas and oil pipelines. Currently, the CEF holds a 30% equity stake in ROMPCO, a joint venture pipeline company with Sasol and the national Mozambiquian oil & gas company to import gas from the Rovuma basin as well as the temane gas fields (https://www.rompco.co.za/, 2022). This venture is the only instance in which the second side of Kelanic's theory regarding the securitisation of energy sources can be applied to South Africa, as not only did the State's agent use

economic power to secure a stakeholder in the oil and gas projects of the area but the SANDF have recently deployed troops in the north of Mozambique to help combat the ISIS created insurgency (Defence committee, 2021).

The following section hopes to provide a SWOT analysis of SA's liquid fuel security policy as they are interpreted and understood by the different agents and actors of SA's energy policy network. This analysis is not an official policy declaration, but a synthesis and amalgamation of the key agents and actors in the industrial and energy sector.

2. *SWOT ANALYSIS*

Strengths:

South Africa still has at its disposal large quantities of readily available coal. Current estimates believe that the country has around 300 billion tonnes of proven coal reserves in the world, making it the 7th largest reserves in the world, enough to supply the 200 million tons of coal used for of electrical production for several decades and maintain the current output of 160 000 barrels a day of CTL at Sasol's Secunda plant in the event of necessary security of supply scenario by which the global environment is unfavourable for imports of liquid fuels, crude oil or oil products. Moreover, the country still has most of the technical and technological knowhow through Sasol and the future South African petroleum company to synthesise liquid fuels through coal and gas (Damba, 2016). The PASA also considers exploiting some of the oil and gas reserves off the coast of SA, which would currently amount to 25 000 bbpd of oil depending on the oil wells' commercial viability and the oil price per barrel (Petroleum Agency SA, 2017).

Finally, the REIPP has had some degree of success in electrifying the SA electricity grid with other primary energy sources than coal. The main advantage of this electrification is that it diversifies the energy mix and

provides more potential coal for CTL in the event of the "Security of supply" scenario.

Weaknesses:

The recent protests and riots following Jacob Zuma's no-confidence vote from the ANC illustrate a very volatile internal domestic political situation whereby liquid fuel and transport companies can find themselves the target of riots.

The vast problem of unemployment within the country makes the threat of political instability even more present. Around 30% of the population is currently undeployed, among which nearly 60% of those aged between 18 and 25 (Vice News, 2021). This unemployment feeds into another key weakness of SA's energy policy system: a chronic human resources problem.

Most companies point to difficulty providing reliable and competent upper management as several young graduates attempt to leave the country (Eskom, 2020; IDC, 2022). The reasons for this departure are somewhat contentious as some point to the BEE scheme, which tends to promote and entertain incompetent leadership at the head of major corporations (Beresford, 2015). However, the exact dynamics of this upper management problem remain debatable. What is more certain is that the human resources problem also exists at the lower end of the structure as the unions and workers also have a considerable amount of power and influence over the energy sector as they can sometimes cause load shedding events through organised strikes.

The nexus of all these issues lead to the severe problem of financial returns for the agents of the state in charge of liquid fuels security as most public enterprises are currently being restructured to improve governance and financial solvability. This includes Eskom, which will soon be broken up into three enterprises and the CEF's subsidiaries which will be merged into the South African National Petroleum Company (kamau, 2020).

Finally, the Zuma and Gupta leaks also emphasise a chronic problem of corruption and state capture which the energy sector is also particularly subject as several key leaders in the energy sector such as Nkululeko Poya, appointed as one of the heads of the CEF and interim chairman of PetroSA despite being face with criminal charges linked to nepotism and corruption involving current energy minister's son Zuko Mantashe illustrate how such ties might lead to sub-optimal energy policy (Skiti, 2019).

Opportunities

Despite these challenges, SA can take advantage of several opportunities. One of which is the lowering cost of renewable energy since for the last 20 years the production cost of wind turbines and PV has been drastically reduced primarily due to the development of Chinese industries in the sector (Jancovici, 2019a). The development of hydrogen technology is also a critical driver which many actors in SA may enable a transition of the energy sector and increased liquid fuel security.

Moreover, SA is particularly well placed within this market as SA is still a significant producer of some of the rare earth materials needed to produce these technologies, such platinoids, PGM and nickel, among others (Anglo-American, 2021). Moreover, SA's highly developed finance and banking sector make it a very attractive destination for foreign capital.

Threats:

The country still has considerable threats to its liquid fuel security policy, mostly illustrated by Mozambique's dwindling gas resources in the absence of new fields development. This reduction in available and easy to access gas has partly driven PetroSA's bad financial performance these recent years (CEF, 2020).

Similarly, since SA still depends on imports for over 70% of its liquid fuels consumptions the country is heavily vulnerable to very high and fluctuating oil prices, which profoundly affect the developing economy and the disenfranchised.

A very critical threat has also emerged that in what project Ikewzei which was meant to extract gas for the refineries of Mossel bay, Egen and Natref have yield results which are far below what was hoped Indeed, the original project had expected to yield : "*242-billion cubic feet of gas through five wells at a budgeted cost of $1.344bn but only yielded 25-billion cubic feet through three wells. The final cost was $1.22bn.*" (www.enca.com, 2016). Combined with the decreasing gas imports from Mozambique, South Africa is now in a position requiring it to gather more capital to explore some of the contingent resources thought to be existing in the country. However, the commercial viability of such projects remains in doubt as they are highly dependent on international oil prices and a positive energetic return on investment.

Interestingly, the SA government and energy policy network adopt a human security approach to security problems and attempt to focus on development to ensure its security (Ministry of Defence & Military Veterans, 2015). What is also very noticeable is that the few state agents which outline security risks in their integrated reports such as Transent, AEMFC and PetroSA seem to perceive the main security threat is not foreign hostile action but domestic instability which might pose a real risk to SA's liquid fuel energy system most through attacks on refineries, pipelines, trains and communications systems for political and criminal motives (AEMFC, 2019; Transnet, 2021).

C. INFLUENCE OF THE ORGANISATIONAL PROCESS

1. *THE ROLE OF COAL IN THE ENERGY MIX AS A DRIVING FACTOR*

Each of the key organisations and the SWOT analysis of SA's liquid fuels security policy have outlined a number of key elements which illustrate how each of these organisations attempts to secure their oil needs mostly by demonstrating what goal this need fulfil. Unsurprisingly, the key question in all of the organisations outlined is the common goal of industrialisation and development which remains the principal objective of all stakeholders involved in the process. What is much more noticeable and vital in this process is the securitisation of oil demand, and the political justification is cut across between the two conflicting roles of coal in the country.

The organisations which would be traditionally interpreted as being part of the MEC (Anglo-American, Sasol and to some extent Eskom) which are more mature seem to wish to take advantage of the opportunities offered by renewables and hydrogen technology to separate the energy mix from coal to ensure greater energy independence. This progressive wing seems to continue very neo-liberal market approach to the energy market developed by the ANC in the 1998 white paper. This is particularly well illustrated by the breaking up of Eskom as a public utility and the consolidation and potential privatisation of the CEF. This group tends to wish to rely on oil and gas imports for liquid fuel security and diversification of energy carrier demand to limit exposure and increase security. What is somewhat questionable is that some of the key leaders in the ANC, not least of which Cyril Ramaphosa, still have ties with the MEC due to their ownership of some of the biggest mines in South Africa.

Inversely, the NUM and the more left-wing politics such as former president Zuma and the EFF interpret the switch to renewable and hydrogen as a form of climate colonialism as much of the profit of this transition will benefit organisations which are already well integrated into the global

financial sector and have historically been a part of the 1991 industrial ecosystem. They seem to interpret the ANC's neo-liberal policies and climate voluntarism as a way to break the unions by reducing their ability to act collectively within a single company or organisation. They emphasise the fact that coal is still necessary to SA if it continues to want to expand access to electricity. Moreover, since coal is cheap and available in SA, the NUM interprets imports from foreign countries as a way to remain dependent on outside forces.

For the moment, the former organisations which are part of the MEC seem to have gained the upper hand in discourse and policy as even the DMRE's IEP and IRP envision a progressive phasing out of coal even when it comes to liquid fuel security policy, preferring the use of imported oil and gas which is theoretically less critical in terms of CO2 emissions despite the associated risks of fluctuating oil prices.

The question of energy efficiency is also notably absent from nearly all of the discourse regarding energy, development and industry. None of the documents studied for this Thesis, whether from the DMRE, the agents of the State or private enterprises, mention the very energy-intensive economy of SA.

2. *The new MEC*

The above elements outline that the organisational culture created during the apartheid era regarding industrialisation is still very much alive today and has morphed into other questions regarding the adaptation of climate policy and market integration. In essence, the MEC is still a relevant framework for analysing SA's energy policy network. Private enterprises such as Sasol and Anglo-American, with the help of the IDC and permissive regulations from the government, have adapted their mining operations in the hopes to continue

having a dominant position in the industrial and energy system while still benefiting from foreign capital. The cadres of the ANC trained in exile have adopted most of the economic paradigms of neo-liberalism now occupy a dominant position both in the political system and the mining industry (Hû 2021). At the same time, the CEF and Eskom appear to be in the early stages of privatisation which might entail that the control of the MEC originally designed through state control is currently being reorganised through private ownership with the help of gatekeeping politics. The problematic question becomes if there is indeed a will to maintain control over the labour force by breaking miners' unions through a switch to different energy carriers, which might be less labour intensive and less centralised. This element remains speculative as Gwen Mantashe, Minister of Energy, has had contradictory behaviours regarding the role of clean energy in the country where on the one hand, he accepts foreign investments to promote the end of coal in the country while on the other continuing to support coal mines (van Diemen, 2021). What is more certain is that Eskom, the AEFMC and Transnet have often accused unions of being the heart of the country's energy challenges. Hence, there may be a strategy to change the labour structure through a 'new MEC' centred around clean energy and rare earth materials; further monitoring and long-term observations of the effects of the IRP, IEP, REIPP, and their subsequent development are required to provide a definitive answer.

CHAPTER 6: DISCUSSIONS AND FUTURE RESEARCH

South Africa's liquid fuel policy presents at least one of the strategies used by states to secure their oil needs because it gives the example of security of supply approach through two main carriers. First, by guaranteeing a constant supply of energy carriers achieved by the classic means of diversification by multiplying energy suppliers and through the decompartmentalization of energy supply chains through CTL and GTL refineries. Second, through the transfer of dependency from energy carrier to material and mineral security, emphasising the need for an energy transition and greater use of hydrogen mobility in a sector where the country can ensure greater independence through favourable mineral endowments.

The case study also illustrated the complicated nature of the construction of an oil need as it seems to be built by two different elements. The particular nature of the South African context entails that the element which needs securitisation in the energy value chain is the nexus between development to ensure stability and development to ensure security of supply. The framing of the issue by some of the agents of the state entails that the primary goal of the energy policy is development, but the goal of this development seems to be opposed in between those who wish to take advantage of the country's particular context and 'leap-frog' over coal and those that want to see to full utilisation of all available energetic carriers.

A. SENSITIVITY AND VULNERABILITY OF THE SOUTH AFRICAN ENERGY SYSTEM

1. THE NEED TO STUDY THE DECOMPARTMENTALIZATION OF ENERGY SYSTEMS

The South African case study seems to confirm previously outlined elements in the earlier part of this thesis around the decompartmentalization of energy systems in policy and physics. The history of SA meant that very early on Pretoria needed to consider ways to use a diversified energy mix for many different uses through this imperative became a leader in CTL and GTL technology. Hence, discussing oil and petroleum products as an individual carrier might become less and less of a valid analysis by virtue of the several interlocking systems which require a systematic analysis rather than a component analysis.

Demand-wise, SA also illustrates the risk of a cascading failure of the energy system and the place liquid fuel has in this system. Since June/July 2022, Eskom announced stage 6 load shedding entailing that the public utility company intends to alleviate 6GW of electricity, implying rolling blackouts. Traditionally, individual generators, batteries and invertors would mitigate the blackouts in small businesses and medium to high-income households. However, with the war in Ukraine and the aftershocks of the covid19 pandemic, the value chain of the battery and the increased cost of oil and gas have put a serious strain on the entire population by combining both a major shock and stress to the grid. Moreover, as electricity access becomes unstable, the ability of infrastructures including oil import terminals and refineries to effectively supply the system becomes compromised creating a feedback loop (Mossel Bay Advertiser, 2022). The subsequent question then becomes if the vulnerability relationship between liquid fuel security and other components of

the energy security as a whole are perfectly equal or not. In other words, does a failure of the liquid fuel system in an energy system carry the same risks as a failure of the gas or electricity system?

The question of the relative sensitivity of the liquid fuel security policy in relation to broader energy security policy also remerges within the working definition of energy security provided in the first chapter. Suppose Energy security is the securitisation of energy systems from shocks and stresses by ensuring the affordability, reliability, availability and acceptability of the energy carriers composed by it through diversification, demand reduction, increased robustness and protection from hostile coercion. In that case, the question becomes the degree to which each operative word or action affects each other and the relation each component has with each other. In other words, does an increase in availability positively or negatively affect acceptability? Is this relation perfectly symmetrical? What parameters make this relation quantifiable and measurable to be confronted with other case studies?

2. *Energy as a tool for social control*

The second takeaway we can draw from the case study is that it allows us to observe at least three mechanisms of the role of energy as a factor for social control. First, the historic role of energy as a "stick". By choosing to restrict access to energy commodities to entire communities in the country during the apartheid era and by developing an electricity-intensive industry while at the same time creating unequal geographic access to energy and developing automated labour control methods through electricity, the history of the South African energy grid illustrates how energy can be used as a constraint against a population to control labour. Second, the role of energy as a carrot as policies

since the end of apartheid have consistently attempted to expand access to energy as much as possible. While there is certainly a human security goal attached to it by attempting to promote development and hence ensure the safety of individuals and communities, the securitisation discourse around energy as a way to ensure social stability in the event of load shedding and restricted access to liquid fuels should also be accounted. In other words, expanded access to energy diminished potential internal threats to the state. Third, this case study also points to how energy also profoundly influences the structure of the labour market in a given country as fossil fuels such as coal and oil often require oil and rig workers to keep the system running. While other energy carriers have workers operating machinery, there is yet to find an example where workers in the renewable or nuclear sector have effectively paralysed a country. Hence, the debates around the use of coal in South Africa also concern the relative power of mineworkers in the country, as the end of coal in the nation would entail a significant loss of influence for the NUM. This brings about a second set of questions about the nature of the states which are the main producers of hydrocarbons. Hence it might appear necessary to question the correlation between the type of energy carrier produced and relative democracy levels and labour rights protection.

B. THE LIMITS TO MODEL II

This case study has also illustrated some additional difficulties regarding the organisational process model. If some of the problems and challenges identified with Allison's model were already well identified, such as the prohibitively high amount of data required to identify an organisational process correctly, it also has emerged that the question of organisational culture is somewhat of a loose term in practice. Namely, identifying an organisational culture beyond being a practical challenge for a researcher is a

theoretical difficulty which is somewhat similar to challenges identified by the strategic culture literature (Johnston, 1995; Lantis, 2009).

The definition of an organisational culture and its impact on decision-making can at least entail three very different understandings that all have their own consequences. First, it can be considered a set of beliefs and ideas informed by other real-world variables such as geography, history, and available tools. In this instance, determining culture implies a holistic approach to the subject of the study by multiplying the number of variables required for consideration rendering the organisational process model practically inefficient. Second, it can be seen as a tool for political instrumentality of the leadership to justify a specific action. In this case, determining the degree to which the logic of appropriateness still applies to the organisational process is somewhat questionable as it would limit the degree to which organisations can truly constrain their leaders' actions. Third, if organisational culture is simply an intervening variable in behaviour which is the approach implied by Allison, measuring culture might make the study of an administrative process closer to anthropology than political or security studies. Moreover, determining if actions are the consequences of culture or inversely if the actions illustrate the culture makes the study of the organisational process somewhat improper for a fuller analysis.

Allison’s organisational process method remains well suited to study the energy security policy of a country such as South Africa, namely because the role of the State in the country is far more limited than in nations with controlled economies and directly commanded enterprises. For the rainbow nation, the energy policy implementation is achieved through several loosely controlled public and private enterprises acting as the state’s agents. Hence, getting an in-depth look and understanding of the dynamics at play for energy policy in the country requires a comparison and analysis of the components and the relations between those multiple actors.

C. REFLEXION AND FUTURE DIRECTIONS

A personal element which emerged towards the end of this paper and limit the findings of this thesis is a clear anchor bias. The available literature on the South African energy policy system and the subsequent political evolutions of the country since 1994 all point towards the existence of the MEC. Thus far, no other models have contested this approach effectively since it was first formulated in 1998. In the absence of another competing theory which could explain the precise nature and role of energy in the industrial development of South Africa, questioning the findings proved to be extremely difficult. Whilst creating an entirely new model of analysis would have been outside the scope of this paper, a competing model appears to be necessary to understand and predict the evolution of the SA energy policy system in light of the new parameter of climate change and climate diplomacy. South Africa being the second economy in sub-Saharan Africa and the only genuinely industrialised nation in this region, as well as the highest CO2 emitter on the continent, it appears necessary to update the MEC model by incorporating the climate change variable in future analysis.

In that regard, this paper has attempted to provide a few paths which might allow for an update of the MEC model. These paths would entail questioning the role of labour structures in climate protection energy security policies and the subsequent power dynamics these policies entail. In practice, this would mean examining research questions such as: how do climate-induced energy security policies affect labour structures in South Africa? This could be accomplished by determining the nature and structure of labour in a transitioned energy system. Moreover, future evolutions and studies on South Africa's energy system imply understanding the role of international finance institutions and their links with the agents of the South African state and how they influence the decision-making structure of the state. Hence, it also

appears necessary to examine further the role of international financial institutions in the energy transition in the case of developing nations and their links to local elites.

This in turn brings about a third question about the securitisation of energy policies and the use and abuse by foreign agents of international capital to achieve a strategic objective. The case study illustrated the important amount of state capture and creation of unofficial links forged through political and interest groups. The presence of several leaders having started their political careers in the NUM along with many ANC cadres in exile having adopted the neo-liberal views of the international institutions which protected at the time questions if unofficial proximity cannot be used to accomplish a political objective by foreign actors. In the case of South Africa, the desired reduced dependence on coal for power generation will make the country less energy independent if the supporting structures to replace this power generation are not in place. Moreover, as the South African policy network illustrates, there undoubtedly exist elite industrial policy networks which have a considerable influence on the conduct of the energy security policy. In light of the evolution and development of hybridity by Russia, as illustrated by the Gerasimov doctrine and China's three wars doctrine as well as Beijing's use of capital to secure foreign assets, it might appear necessary to consider how foreign actors can infiltrate and infiltrate foreign industrial elites to provoke a new vulnerability in the energy system thereby linking both countries.

CONCLUSION

South Africa is facing a complex energetic situation exacerbated by a complicated domestic context. The country illustrates one of the strategies used by states to secure their oil needs by exemplifying a security of supply strategy aimed at ensuring a constant provisioning of energy carriers to the broader system. This strategy is manifested by the continued development and exploitation of offshore oil and gas reserves off the coast of South Africa. Similarly, it is expressed by the import of gas from Mozambique and the development of new GTL, CTL and crude oil refineries in the country. The particularity of SA is the expressed desire to use fossil energy carriers as liquid fuels as much as possible by diverting electricity production from coal and gas to renewable energy. Through this transfer and decompartmentalisation of energy supply chains, Pretoria hopes to increase its resilience in the face of fluctuating oil prices and continue its development and democratisation of energy access.

What is notable in the organisational process which leads to this strategy is the double function development holds for the stakeholders of the debate. The first function is development to ensure the supply chain's security through expanded energy access to the population with the hope of reducing inequality and insecurity. As the goal is to ensure human security, providing energy commodities serves both as a way to protect the South African population and limit the risk of criminal or political instability, which might question the system's resilience. The second function is the use of development as a way to increase energy security by accessing and developing new energy supply chains.

It also appears this strategy is not without opposition within the energy policy network. The determining factor in SA's energy policy is and remains the role and usage of coal in the energy mix. There is an expressed desire by the government, its agents, and parts of the private sector to reduce coal usage, as is illustrated by the 2019 IRP and the 2016 IEP. Nevertheless, considerable opposition persists from the NUM and the more left-wing elements of the polity to continue coal exploitation, to accomplish development, and fight perceived climate colonialism imposed by foreign financial institutions. According to these organisations, the proximity of the government and private enterprises to international financial institutions questions the actual motive of pursuing an active climate policy. The NUM reading the true intentions of these organisations to be to maintain a foreign dependency on from the global north through capital, break the mining unions by reducing coal usage, and maintain SA energetically dependent by excluding coal from the energy mix. If it is true to some extent that gatekeeping practices by the ANC have raised doubts about the motivations of adopting this strategy, having a definite understanding of the intent of the organisations within the decision-making process remains speculative.

What may be challenging for the country long-term is the absence of debate around energy efficiency and energy intensity of the industrial sector which is the primary consumer of energy in the country. In a situation where scarcity will become a parameter to contend with, the question of energy consumption and the sobriety of the economy will most likely become more pressing in the coming decades.

Pretoria is facing several deep structural challenges which will directly impact the security of supply strategy it has adopted that may further challenge the weaknesses and gaps of its approach.

There is a chronic unemployment and development problem in the country since the end of apartheid in 1994. With over 30% unemployment including 60% youth unemployment, the social situation is of growing concern as poverty and lack of access to opportunity question the ability of the state to provide to its citizens. With democratisation, the expectation and aspirations of the previously disenfranchised population is high, forcing the government to develop, expand and grow its economy to a rapid pace probably beyond what it can offer.

This ability to develop and stabilise the situation is severely hampered by a chronic energy crisis since the 2008 financial crisis. Low investments, an unreliable power grid, and to some extent a human resource challenge have led Eskom to enter stage 6 load shedding in June of 2022. The resolution of the crisis is still uncertain as despite an increase of renewables in the energy mix, Eskom needs to double its energy generation capacity whilst at the same time reducing the share of coal in power generation. With the covid pandemic and war in Ukraine, soaring oil and gas prices have also impacted individual oil generation capacity and ability for the economy to function due to higher mobility costs. Hence, energy will remain a critical factor for the country for the foreseeable future.

The particular nature of the organisational process of South Africa's energy and industrial sector helps to understand the challenges the country is facing regarding energy security.

Public enterprises such as Eskom and the CEF, plagued by low financial returns and weak operational performance, are attempting to adapt to the new energy environment by reducing coal usage in the electricity production mix and developing gas infrastructures. Inversely, private enterprises such as Sasol and Anglo-American plc, with the help of the IDC,

are transitioning to new climate imperatives and finance environment by switching their priority to renewable energy and new energy carriers. In the middle of both elements, the DMRE attempts to keep a role as a central of planning authority and to direct the organisation ecosystem towards common security of supply goal with limited success due to crumbling energy infrastructure. Thanks to IDC and the government's permissive regulations, private enterprises such as Sasol and Anglo-American have adapted their mining operations to continue having a dominant position in the industrial and energy system. Moreover, mining companies such as Anglo-American are trying to use their hegemonic position in the critical materials needed for renewable (such as platinoids or nickel) to continue occupying a vital position in the policy system.

These elements seem to entail the MEC is still a very relevant framework as companies such as Eskom have in the past blamed the NUM to be partly responsible for load shedding events. Hence, the idea that there is a will to maintain control over the labour force by breaking miners' unions through a switch to different energy carriers that might be less labour intensive and less centralised must not be dismissed. Moreover, the framing done by the MEC around the securitisation of development and the protection of the energy system from criminal activity and political instability point to the role of energy as a necessary tool for social control. First, its historic role as a 'stick' to maintain the dependency of black workers and force the control of labour within the mines before the end of Apartheid. Second, its role as a 'carrot' to promote development and ensure stability through greater energy access and increased industrialisation. Third, its potential role as a driving factor to determine the structure of the labour market. Choosing to promote certain energy carriers which require less labour upstream affects the types of jobs present in the broader economy and the relative importance of labour organisations.

South Africa's future is deeply tied to its ability to resolve a structural and chronic energy crisis. If the riots following the dismissal of president Zuma are any indication, there is still a high likelihood of continued political instability in the near future. The lack of energy access as a vital commodity will question the continued existence of the post-Apartheid constitution. Moreover, the conflicts around the role of coal in the energy system, the progressive decompartmentalization of energy supply chains, and the cascading failure of different energy carriers due to rising market prices lead to the question of the relative sensitivity and vulnerability of the various components of the energy supply chain in relation to each other.

First, in a practical sense, by asking to what extent does a failure of the liquid fuel supply chain affect the electricity supply chain or the broader system? Is this failure perfectly equal at all times? What are the parameters which influence this relation?

Second, from a theoretical perspective, the case study also questions to what extent the operating elements of the definition of energy security influence each other and the parameters of this relation. In essence, to what extent does an increase in reliability affect affordability, acceptability and availability? What are the driving factors which determine this relation?

The case study also illustrated the continued existence and importance of an energy-industrial policy elite which has a considerable influence over the policy agenda and framing of the issue. Since these elites have also been trained in exile during the height of the neo-liberal era in the international organisations, this approach has been reflected in the energy policy making. This has been expressed primarily through minimal government intervention to drive energy projects and the extensive use of public and private enterprises

to fill respond to the energy crisis. As the world is becoming more multipolar and the discourse dominance of international institutions are being called into question by revisionist states through the extensive use of information warfare, it might appear necessary to consider the delicate question of the securitisation of discourse. In other words, how can discourse be used to provoke a change in energy policy and thus generate new strategic alignments? As is illustrated by the new geopolitics of energy following the conflict in Ukraine, the emerging security themes and discourse seem to entail that the fight against climate change through renewable energy has become a fight against Russia to reduce European dependency. Future research should continue to explore the effects of such a discourse switch.

All of the elements above entail that to pursue the comprehension of the role of energy and oil for the coming decades requires an understanding of an ever-increasing complex energy system with several second-order effects. Moreover, this evolving complexity might require to anticipate not only the current organisations and stakeholders of the debate and policy process but also those that might emerge from the realignment of energy policy.

The South African case study also demonstrates the difficulty of the issues that lay ahead regarding energy security and the double carbon constraint. For the next few decades, the challenge will be to propose an energy transition in a global economy with a growing demand whilst at the same time willingly refusing to use traditional fossil energy carriers. This mission is immense and will most likely require further questioning of the nature and objectives of development as well as the expectations and aspirations of populations, not only in the developing world but also in historically powerful industrialised states. If we intend to uphold climate commitments to ensure a liveable future for future generations in which societies as we know them to continue to exist,

it is advisable to consider both discourses as it is manufactured from ‘above’ and discourse as broader society interprets it.

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