A comparative analysis of State-Owned Entities' responses to the energy crisis in South Africa and Nigeria

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DECLARATION

I declare that this dissertation is my original work, and as such, it has not been submitted in full or partially to any university for a degree. All contributions and sources cited in this study have been duly acknowledged through complete references.

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A journey of a thousand miles begins with a single step, and I am glad you all have been a part of mine. God bless you all, and to God be the glory for seeing me through.

DEDICATION

I dedicate this work to all my family members; may this always be a reminder that if you can dream, you can think it, and if you think it, you can achieve it.

ACRONYMS

4IR	Fourth industrial revolution
ANC	African National Congress
API	Application Programming Interface
BASSREC	Basic and Social Sciences Research Ethics Committee
CEO	Chief executive officer
CIS	Commonwealth of Independent States
DHET	Department of Higher Education and Training
ECN	Energy Commission of Nigeria
ESKOM	Electricity Supply Commission
EU	European Union
GDP	Gross Domestic Product
HSSREC	Human Social Sciences Research Ethics Committee
IMF	International Monetary Fund
IPP	Independent power producers
IRA	Independent regulatory agencies
LA	Latin America
ME	Middle East
MISO	Midcontinent Independent System Operator
MNCs	Multinational corporations
NDP	National Development Plan
NEPA	National Electric Power Authority
NERC	Nigerian Energy Regulatory Commission
NERC	North America
NERSA	National Energy Regulator of South Africa
NESCO	Nigerian Electricity Supply Corporation

NNPC	Nigerian National Petroleum Corporation
NREEEP	National Renewable Energy and Energy Efficiency Policy
NTCSA	National Transmission Company of South Africa
NUMSA	National Union of Metalworkers of South Africa
NWU	North-West University
PHCN	Power Holding Company of Nigeria
POE	Privately-owned entities
PPP	Public-private partnership
RDP	Reconstruction Development Plan
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAA	South African Airways
SABC	South African Broadcasting Commission
SDGs	Sustainable Development Goals
SOE	State-Owned Enterprise
UNDP	United Nations Development Programme
USA	State of America
WAAC	West African Airways Corporation Nigeria

TABLE OF CONTENTS

LIST OF ANNEXURES

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Energy supply is integral to African countries' socioeconomic development and emancipation as they strive to catch up with the developed world. However, energy poverty and the lack of meaningful responses towards the energy crisis seem challenging. The energy crisis, as the focus of this study, refers to the insufficient production and supply of electricity by state-owned enterprises (SOEs). Therefore, the energy crisis disrupts economic activities, households, and industries. The cumulative impacts of the energy crisis include disrupted essential services, economic growth, and lack of technological development. Countries like South Africa and Nigeria suffer from low economic growth due to the energy crisis, among other reasons. South Africa and Nigeria are the leading economies on the African continent and should lead the energy generation frontier, even to the extent of competing with other global actors and supporting the development of other African countries. Nevertheless, due to corruption, lack of maintenance and political interference, among others, they are unable to do so.

This study uses agency theory (principal-agent interests) to argue that policy inconsistencies and a lack of political vision have hindered and led to shirking by SOEs regarding their primary mandate to ensure the security of supply. The significance of this study lies in the fact that, despite vast literature about the energy crisis in Africa, there is little attention given to the response measures by SOEs in South Africa and Nigeria in solving the issue. Hence, this qualitative study sought to gain an in-depth understanding of South African and Nigerian SOEs' responses to the energy crisis. A case study design was employed using Eskom in South Africa and NESCO in Nigeria to understand these entities' responses to the energy crisis in their respective countries. Accredited journal articles, reports, and books were analysed to understand the phenomena under study. The study's findings suggest that there have been responsive measures by SOEs in both countries, especially with Nigeria having undergone privatisation. However, factors such as political interference, corruption, maladministration, and lack of maintenance inhibit the energy supply. Therefore, the study concludes that SOEs require strategic measures to curb the energy crisis and tackle the abovementioned factors that lead to this issue.

Keywords: State-owned entities, Eskom, NESCO, energy crisis, governance, and the political economy of energy.

CHAPTER ONE

UNDERSTANDING SOE RESPONSES TO THE ENERGY CRISIS IN NIGERIA AND SOUTH AFRICA

1.1 BACKGROUND TO THE STUDY

The concept of corruption relates to the violation of formal administrative rules, introduction and implementation of laws that enrich office bearers while disregarding public welfare (Kurer, 2005). Corruption relates to the violation of administrative rules when the expected end is to ensure private gain for self, close friends, family, and so forth (Liu, 2016). And the overall consequence of corruption is a disrupted social system and public order (Kuere, 2005). It leads to social inequalities where those who derive benefits from unfair exchange and allocation of public resources get to enjoy a better quality of life while the marginalised are poorer (Liu, 2016).

> *"Political interference is as much about doing the right thing as it is about serving one's own narrow interests. It is about getting around a system in order to help constituents and country; it is about acting to good form and meeting other people's expectations; it is about survival: and it is about ambition, power, and personal advance" (Hodder, 2009:778 quoted in Batalla et al., 2018:268).*

The above excerpt proves that corruption and political interference have resonance, and that the latter is the driver of the former. Political interference is about the interface between the political sphere and bureaucratic (Batalla *et al.,* 2018; de Visser, 2010). Hence the subversion of administrative rules and introduction of unfair laws are at the core of corruption. The above quotation from Hodder captures the core of what political interference is about. That is, illegitimate, illegal actions by politicians or interest groups to influence government processes and programs. This is where a politician could tell public officials what actions to take, contracts to allocate to whom – even when such instructions violate formal rules, standards, and practices of the government. Batalla et al. (2018) noted that the idea of executive discretion [what others may understand better a prerogative] encourages political interference. Prevost (2019) makes it clear how executive discretion operates in cases where political and bureaucratic executives [ministers, mayors, directors, and managers] overturn or delay decisions of state agencies. And it is often decisions based on the best judgement or best practices in response to real life events.

Mngomezulu (2020) argued that such political interference leading to the suppression of decisions of state agencies also leads to executives determining the appointment of people who are not suited [incapacitated, unskilled, without merit] to occupy public office. Instead, people who are loyal and with long service to the dominant political party and its factions get to occupy strategic positions in government organisations. These are people who also favour the governing party, allocating public resources and project to their strongholds, in addition to frustrating or ignoring efforts to prosecute the misappropriation of public finances (Mngomezulu, 2020). This political dominance is what de Visser (2010) operation state agencies by remote control. And agents who resist such control eventually create mistrust and alienation between themselves and their principals (de Visser, 2010). Hence political appointments are the norm in state agencies where the executives get changed with each change of a political administration or once the agents begin to disagree with the principals on strategic decision options. Whereas the popular view is that political interference lead to inefficiencies, Willner (2001) argued that it could yield favourable outputs and employment when channelled properly.

A state-owned enterprise (SOE) is a business entity under the government's control or in which it has majority ownership (Fourie, 2014; Lin *et al*., 2020). In this regard, the study focused on SOEs responsible for electricity production and supply in Nigeria, i.e., the Nigerian Electricity Supply Corporation (NESCO) and Electricity Supply Commission of South Africa (Eskom) in South Africa. An energy crisis refers to the inability to meet high electricity consumption and poverty demands due to limited production, soaring prices, and regular electricity supply interruptions in society (Pimentel *et al*., 1973). Another view treats energy as a finite resource where unregulated consumption may lead to the depletion of energy sources; a world without energy would result in a crisis. Therefore, the energy crisis could refer to societal issues, particularly those concerning powering industries and households (Bartlett, 1978; Qureshi *et al*., 2016). An energy crisis, as the focus of this study, refers to SOEs' insufficient electricity production and supply.

These electricity production and supply challenges range from economic growth to lack of technological development and social enhancement, limiting Africa's potential to generate sufficient and sustainable energy (Wolhuter, 2019). The energy crisis

causes countries like South Africa and Nigeria to suffer from low economic growth (Patel, 2008). South Africa and Nigeria, being the economic superpowers in Africa, should be leading and taking centre stage in energy development in the continent (Eberhard, 2008b). South Africa and Nigeria, like other countries, are also seeking to attain a stable energy supply from SOEs. Uganda is the most stable in energy production and supply on the African continent compared to other countries (African Development Bank, 2021). Although Uganda does not have the same population number as South Africa and Nigeria, it efficiently serves electricity to its consumers. The measure of energy supply stability is guided by the load shedding/reduction cycles or power outages implemented by the government. Uganda is not a leading country in terms of its economy compared to Nigeria and South Africa, but it is the most stable regarding energy supply in Africa. The African Development Bank (2021) notes that political interference in the appointment of SOE board members contributes to the instability of the energy supply in most African countries because, at times, board members may not be aware of what they are supposed to do in the entity or deliberately crumple it due to personal ambitions that brew corruption.

The SOEs should be leading organisations in the fight against underdevelopment and promote the economic advantage of their countries by ensuring a stable energy supply (Hopkins, 2012). The failure of SOEs to ensure a stable energy supply for years has led to South Africa and Nigeria suffering and underperforming in their economic development, hence the urgent need to respond to the energy crisis. Scholars such as Emovon et al. (2018), Eberhard (2008b), Pretorius et al. (2015), and Festus and Ogoegbunam (2015) allude to the energy crisis in South Africa and Nigeria. They argue that lack of electricity has a negative economic impact and forces people to use more wood and other toxic resources, leading to environmental degradation. Due to power cuts, the industries perform periodically and at minimal capacity, causing low production levels.

Furthermore, harvesting wood kills wildlife, compromises wildlife habitats, and contributes to increased carbon emissions due to burning, further exacerbating global warming. Eberhard (2004) and Daw and Gibbs (2017) document that fossil fuel production includes adopting coal and gas production to procure electricity at a large scale, which becomes dangerous to the environment. Although it is challenging to

calculate fully the costs of load shedding on the economy, Mahlaka (2021) notes that South Africa loses R700 million per load shedding stage per day and R60 billion to R120 billion annually. Load shedding cost the South African economy R50 billion in 2008 (NERSA, 2008). Similarly, Udegbunam (2021) notes that Nigeria loses US$29 billion annually due to poor energy supply. Ateba et al. (2019) allude that the persistent power cuts in Nigeria and South Africa pressure businesses to run at a bare minimum capacity, if at all. This significantly inconveniences business owners and their employees because several companies face closure or retrenching due to low production (Ivwurie and Ocholla, 2016). Businesses also lose profits from purchasing from alternative electricity sources or private electrical supply entities (Isa, 2019).

Figure 1.1 below shows South Africa's electricity production and supply over ten years (2010 to 2019). South Africa’s energy production for the mentioned (2010 to 2019) past ten years has been unstable, reaching the highest production level of 23,100 GWh in 2012 and the lowest level of 19,300 GWh in 2019. Furthermore, what is also significant in the case of South Africa is that electricity production has been declining over the past months. Electricity production in South Africa reached 20,098 GWh in April 2021, compared with 20,466 GWh in the previous month, which shows a constant decline in those months. Since the establishment of Eskom in South Africa, electricity has assisted it in being fully industrialised and increasing economic production (CEIC Data, 2021a).

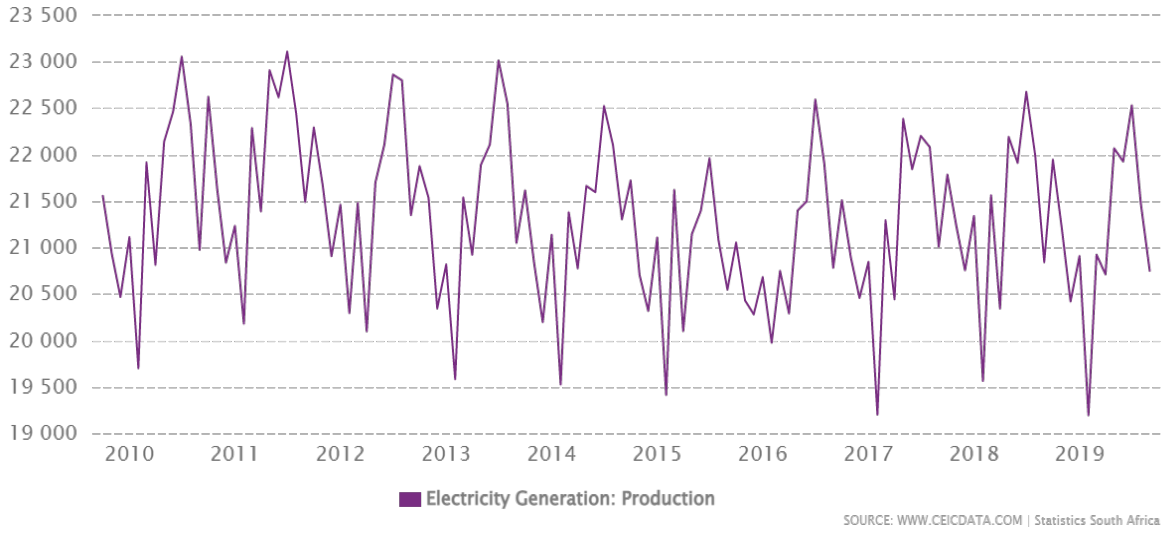

Figure 1.1: Electricity generation in South Africa (www.ceicdata.com)

Figure 1.2 below shows Nigeria's electricity generation and supply over ten years (2010 to 2019). The Nigerian trends show much instability in energy production. Like South Africa, Nigeria also saw a steady decline. The electricity production in Nigeria reached 8,089 GWh in December 2020, compared with 9,436 GWh in the previous quarter, vividly showing the constant decline in Nigeria's electricity production. As a developing country, Nigeria relies heavily on electricity for business operations and economic growth. Therefore, rolling blackouts and load shedding inhibit its economy's potential growth (CEIC Data, 2021b).

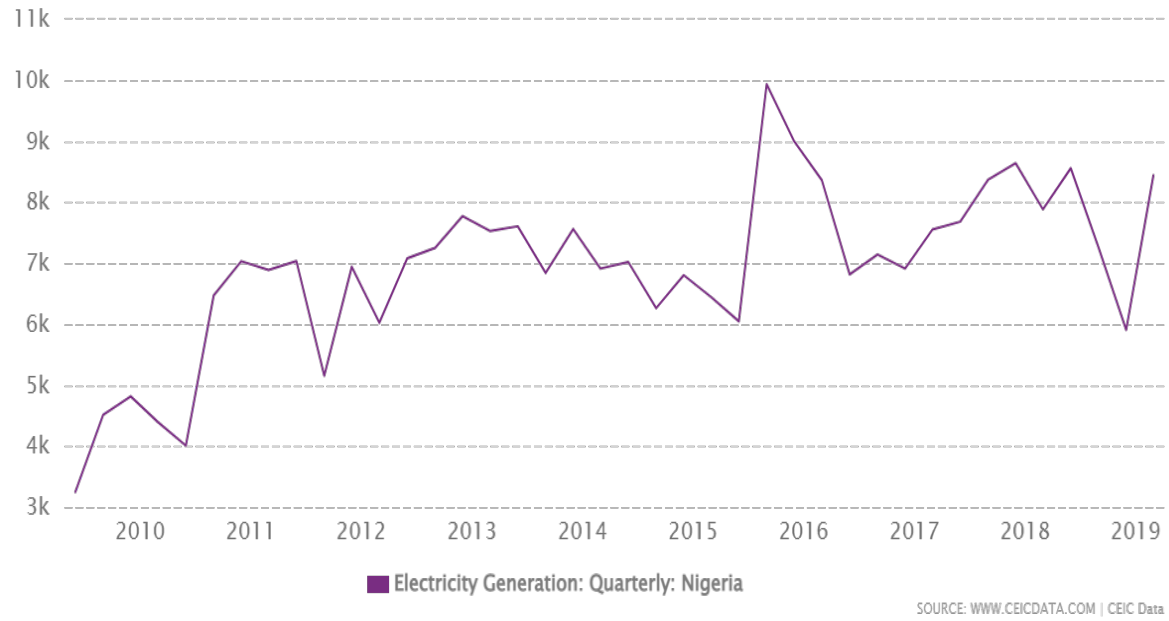

Figure 1.2: Electricity generation and supply in Nigeria (www.ceicdata.com)

The driver of the energy crisis in Nigeria and South Africa can be attributed to challenges such as political intervention, deterioration, and lack of infrastructure (Gift *et al*., 2020). Nepal and Paija (2019) further assert that the lack of technological development or enhancement hinders strategies for producing power. Political intervention has been one of the significant obstacles to development across the globe, either in developed or underdeveloped countries (Masike and Vermeulen, 2022). Political intervention can be understood as the ability of political elites to interfere with the day-to-day running of organisations such that they hijack their operations and dictate the organisation's mandate. The lack of infrastructural development worldwide has been associated with industrialisation and economic growth. Hence, economic development in most African countries is associated with low infrastructural development (Tartibu and Kabengele, 2018). Similarly, Edomah

(2018) notes that the slow development of the continent also inhibits the growth of technology, leaving no reliable technological alternatives to produce electricity.

The concept of response can be an action or inaction that an institution or person does to react to a specific situation. The study adopted a response as a concept to understand what SOEs have done to address the energy crisis in South Africa and Nigeria. Although the study recognised that to deal with constraints on the power grid, utilities typically resort to load shedding, reduction, and power cuts, it took the view that these responses are consequences or rather indicators of the energy crisis (Eberhard, 2008b; Festus and Ogoegbunam, 2015). In South Africa, the government has developed measures to allow independent power producers (IPPs) to produce about 100 MW (megawatts) of power. This will ease the pressure on Eskom and allow the utility to function without experiencing a crisis, leading to fewer power cuts. In addition, the state has also sought to invest in nuclear energy to produce power and limit future power cuts (Pretorius *et al*., 2015).

Similarly, the sector has also made means of renewable energy by investing in technology that allows renewable energy production, such as solar, steam and wind energy production, instead of burning fossil fuels. Yetano et al. (2020) note that besides investing in renewable energy, Nigeria has developed a five-year electricity plan, prioritising combating the energy crisis and aiming to increase energy access by 45% by 2030. In this regard, the government has emphasised the need to build more gas and solar power plants by 2030. The Nigerian government also plans to understand the energy demand by profiling customers' demands to forecast and avoid future energy crises (Emovon *et al*., 2018). Of late, the government has also adopted a metering policy to regulate customers who buy power so that those who do not can be cut off from the grid (Iwayemi, 2008). This ensures that the government can preserve energy for the paying customers to ensure growth and energy reserves and assist in the energy crisis.

1.2 PROBLEM STATEMENT

There is a general problem of SOEs shirking their responsibilities in the face of a widespread energy crisis. "Shirking is simply failing to work and is often associated with laziness and general inactivity" (Baker, 2007). Lack of accountability and

mismanagement are the significant causes of corruption affecting the efficiency of SOEs in Nigeria and South Africa (Salakhetdinov and Agyeno, 2020) instead of advancing SOE mandates and responding to the energy crisis. Managers in these entities collaborate with politicians for private interests to enrich themselves, not the SOEs. Hence, selfish agendas and interests lead to the downfall of SOEs (Salakhetdinov and Agyeno, 2020).

For political reasons to avoid public backlash, SOE managers responsible for management have not prioritised revenue collection to ensure a sustainable electricity supply; hence, states have set up public energy-provision companies (Hopkins, 2012). Eisenhardt (1989) explains that proponents of the agency theory suggest that agents act within the principal's interest on a contractual basis, yet this does not seem so in the effort to respond to the energy crisis. Agents do not seem to consider the interests of principals while performing their duties other than their own. Thus, SOEs in Nigeria and South Africa lack the generation and financial capacity to provide sufficient energy to the economy because the government does not have long-term solutions to the energy crisis (Emovon *et al*., 2018). Selfish agendas amongst SOE agents seem to take centre stage instead of mandates to respond to the energy crisis.

Furthermore, the lack of accountability and proper management are significant causes of corruption affecting the efficiency of SOEs in Nigeria and South Africa (Salakhetdinov and Agyeno, 2020). Instead of advancing SOE mandates, political elites working in these entities seek to enrich themselves, not the government. Hence, selfish agendas and interests are the main drivers of corruption, leading to entities' maladministration and the downfall of SOEs due to poor performance (Salakhetdinov and Agyeno, 2020). In addition, the SOEs responsible for energy production in South Africa and Nigeria have not used the opportunity presented by new technological advancement to exploit alternative energy sources. As a result, these SOEs lack the competitive edge to lead or remain on par with IPPs in the modern energy transition environment (Okoro and Chikuni, 2007; Giwa, 2010; Nel, 2015). Furthermore, there are sufficient scholarly contributions to the energy reforms of South Africa and Nigeria, but scholars have yet to systematically study SOEs' responses to the energy crisis in the respective countries through a comparative analysis.

1.3 GENERAL RESEARCH QUESTIONS

Therefore, the primary research question was: What are SOEs' responses to the energy crisis in South Africa and Nigeria? Answering this question required assessing the efficiency of the SOEs' responses and roles regarding the energy crisis to suggest suitable corrective measures.

1.4 SPECIFIC RESEARCH QUESTIONS

The following questions were asked to develop a comparative analysis of South African and Nigerian SOEs with specific reference to the energy crisis:

- What constitutes the energy crisis in South Africa and Nigeria?
- What are the principal-agent interests in SOEs related to energy security?
- What are the main factors that hinder SOEs' growth in sustainable energy supply?
- What is the impact of energy shortage on economic development in Nigeria and South Africa?
- What measures can address the energy crisis in both South Africa and Nigeria?

1.5 RESEARCH OBJECTIVES

In comparing SOEs' responses to the energy crisis in Nigeria and South Africa, the study effectively:

- Explains the energy crisis in South Africa and Nigeria.
- Validates the principal-agent interests in SOEs related to energy security.
- Identifies the main factors that hinder SOEs' growth in sustainable energy supply.
- Describes the impact of the energy shortage on economic development in Nigeria and South Africa.

- Suggests measures to address the energy crisis in both South Africa and Nigeria.

1.6 THEORETICAL FRAMEWORK

The agency theory is concerned with depicting and explaining the relationships between the principal (owner/shareholder) and agent (CEOs/managers) in SOEs (Mitnick, 1975; Eisenhardt, 1989). In addition, Eisenhardt (1989) further asserts that the principal relies on the manager to implement prudent financial measures and execute decisions that sustain corporations. Hence, Mitnick (1975) notes that conflict of interest threatens SOEs and the harmony of the relationships between the principal and the manager. The agency theory justifies the relevance of SOEs in economic activity and energy security because there is no economic development without energy availability (Panda and Leepsa, 2017). Public ownership is a fundamental principle that shapes contestations about SOEs and their competitive nature (Tao and Zhu, 2001; Stan and Bruton, 2013). Public ownership is essential when SOEs consider the pay-as-you-use principle versus the political preference for free services and excuses for poverty and unaffordability. This affects SOEs' ability to perform effectively and efficiently discharge their duties. Therefore, agency theory is suitable and applicable to analyse the claims of sabotage to power plants, overdue construction projects of power plants leading to rolling load shedding, and the contestations against unbundling Eskom as an organisation. Furthermore, managers play a significant role in ensuring stability and provision in solving the energy crisis and responding to issues created by energy poverty.

Mitnick (1975) and Eisenhardt (1989) agree "that managers in a corporation may follow a personal agenda instead of working on behalf of and for the interest of the principals (the state) who own the company". Ding et al. (2015) add that these personal interests include the need to enrich oneself and friends with business opportunities from the corporation. Meanwhile, the government appoints SOE managers, and in most cases, these appointments are based on political affiliation rather than merit (Sun *et al*., 2002). Hence, the owner and the principal agent are often from the same political party. For instance, in South Africa, the minister of enterprises is a member of the

African National Congress (ANC), the current ruling political party. Therefore, most of those who will serve on the SOE board will be members of the same political party or be intricately connected with its leaders. This appointment is based on political friendship (Masungwini, 2021) and political principles protecting agents deployed to SOE leadership despite the poor performance of those organisations because of this. Sun et al. (2002) found that agents prefer personal gains over organisational successes. In a way, the dominant interests are of the agent, not that of the principal (the state), and self-enrichment supersedes public good and service.

Similarly, in Nigeria, Governor El-Rufai removed several political appointees from office (Maishanu and Agency Report, 2021) to reduce corruption, improve public service, and protect the mandate of SOEs. Therefore, the agency theory depicts how personal ambitions lead to the demise of SOEs and limit the capacity of states to supply energy and respond to the crisis. Lastly, applying the theory to the study made evident the relationship between the principal/owner and the agent and its impact on SOE responses to the energy crisis.

The theoretical argument informing this study was that SOEs in Nigeria and South Africa do not have long-term solutions to the energy crisis due to the lack of leadership capacity to overcome socioeconomic barriers in the energy sector. South Africa and Nigeria are facing an energy crisis, and the SOEs responsible for power production are under immense pressure to ensure adequate energy supply. Selfish management with personal ambitions and corruption is why SOEs in Nigeria and South Africa fail to achieve their power supply mandate (Pretorius *et al*., 2015; Festus and Ogoegbunam, 2015). Not only that, but the failure to introduce new energy sources to make the power grid capacity sufficient is also a dominating factor in both countries (Emovon *et al*., 2018; Eberhard, 2008b). For comparison, first-world countries such as the United States of America and China have resorted to sustainable energy. Therefore, the solutions to the energy crisis that the government should implement include focusing on sustainable ways to produce energy and adopting a policy of meritocracy when appointing executive members to serve on SOE boards.

1.7 RESEARCH APPROACH AND DESIGN

The research followed a qualitative method for in-depth analysis of the energy crisis in Nigeria and South Africa (Bhandari, 2020). Qualitative research helps understand experiences, attitudes, and opinions that can improve the efficiency of SOEs in the global environment of energy transition (Pathak *et al*., 2013). The study employed a case study design focusing on South Africa and Nigeria's energy sector SOEs. Baxter and Jack (2008) note that a case study design approach ensures the study focuses on its context. Furthermore, Crowe et al. (2011) note that a case study research design generates a rich, in-depth understanding of a complex issue to bring it into a tangible everyday life context. Therefore, a case study design helped validate the principal-agent relationship, explain what prevents SOEs from ensuring energy sustainability, and describe the impact of the energy crisis in Nigeria and South Africa. Moreover, this type of research design was suited to a study of two or more phenomena, such as this one with Eskom and NESCO, to understand the complexities of each better (Zainal, 2007). Zainal (2007) argues that a case study design is beneficial when there is a need for an in-depth understanding of a phenomenon.

1.7.1 Literature study

South Africa and Nigeria are among the fastest economically developing countries in the world and depict a reasonable growth rate (Ayadi and Ayadi, 2008). To maintain growth, they depend on the contribution of citizens and entities in sectors that are most important to economic growth, such as the energy sector. Despite being one of Africa's foremost and fastest-growing economies, South Africa has failed to be a leading energy producer (Ayadi and Ayadi, 2008; Ndako, 2010). Similarly, Nigeria has abundant oil and natural resources; energy should be one of their last crisis issues. Eskom and NESCO are the two public utility grids supplying power in their respective countries (Babatunde and Shuaibu, 2009). Established in 1923, Eskom is the sole power generating and supply agent in South Africa (Woode-Smith, 2019; Murphy, 2011) and is one of the largest power producers within the Southern African region. Eskom compares with other large global entities worldwide, such as EnergyAustralia Investments (Pty) Ltd and State Grid Corporation of China (Watt *et al*., 2011; Yi-chong, 2018). Moreover, it compares with the abovementioned corporations by producing the biggest turnouts in sales and power generation capacity (Eberhard, 2008a). However,

the recent Eskom reports and the dominance of load shedding in South Africa have shown that Eskom is falling short and cannot fully discharge its mandate. This has led to the power utility moving from the highest sales producer and highest power-producing entity to just producing under the bare minimum, much to investors' unhappiness (Trollip *et al*., 2014). Investors concluded that South Africa is under a power supply crisis, and load shedding leads to financial losses for corporations (Goldberg, 2015; Pretorius *et al*., 2015). Therefore, Eskom does not only affect the social lives of South Africans, but it further affects economic stability. The failure of the power utility has tremendous effects on the energy crisis (Nowakowska and Tubis, 2015). Although there is vast scholarly attention on the energy crisis of South Africa from scholars such as Trollip et al., (2014) and Pretorius et al. (2015), this attention is exclusive to the comparison between South Africa and Nigeria.

NESCO was founded in 1929 as Nigeria's first integrated utility company (Fabiyi *et al*., 2016). The power utility has grown over the years and established itself within the local government sphere (Mackintosh, 1965). Initially, NESCO was meant to supply power to the mines in the Benue-Plateau area of Nigeria. However, the persistence and consistency of energy supply led to growth in the capacity of the SOE (Kennedy-Darling *et al*., 2020). Like Eskom, NESCO, as a power utility, plays a significant role in Nigerians' economic and social emancipation (Oruwari and Otombosoba, 2021). Hence, when it is not discharging its mandate and playing its role in this regard, it contributes to the demise of the different native communities of Nigeria. Understanding that Nigeria has abundant oil, the power utility could seek other measures, such as oil consumption or utilisation, to ensure a stable power supply, but that has not been the case (Fabiyi *et al*., 2016; Kennedy-Darling *et al*., 2020). To this extent, NESCO’s energy supply within Nigeria is undependable and uncertain.

SOEs are an integral part of ending energy poverty. Countries such as Australia, Germany, America, and China primarily invest in SOEs to foster growth and increase capacity to provide energy (European Commission, 2016; Lo, 2021). Similarly, even African countries seek to invest in SOEs to limit the energy poverty prevailing throughout the continent. South Africa and Nigeria have invested in their respective SOEs (Eskom and NESCO) to ensure they play a role in energy production. Oluwatosin (2020) and Ting and Byrne (2020) argue that the role of these entities is

to assist the government in providing energy to society adequately. In addition, they also have a role to play in assisting the government in getting more revenue, which can be redirected to other sectors of society, such as social welfare and infrastructural development. Over and above that, being established in highly divided country such as South Africa due to racial barriers, uequal oppoporties and access to economic emancipation, the entity has a social and economic responsibility (Sarkodie and Adams, 2020). Ye et al. (2018) comment that the power utility provides monthly subsidies to those who cannot afford it. Hence, in South Africa, Eskom provides approximately one hundred units of energy to those in need monthly. In Nigeria, divisions are based on ethnic balances and access to economic opportunities among other factors. Like South Africa regarding establishing SOEs to ensure that they provide free electricity meters for the poor communities as a government measure to provide intervention and ensure energy justice (Dahunsi *et al*., 2021).

Privately-owned entities are in a quest to provide competition in energy production and supply. Amongst their role in providing competition, IPPs have taken the niche the government fails to address (Salci and Jenkins, 2018). Private entities such as City Power, Sasol, Exxaro, Acea SpA, EnergyAustralia Investments, and the State Grid Corporation of China exploit the local, continental, and international energy-producing spectrum. The gap of being unable to provide stable energy due to the power grid's inability to capacitate the nation, corruption and maladministration are reasons for this gap (Okoro and Chikuni, 2007; Giwa, 2010). IPPs then become the answer to solving the energy crisis, particularly between the haves and the have-nots, as they respond to the energy crisis by adopting measures which address the crisis. Although this may lessen the pressure on the government regarding energy provision, they will also lose a significant number of customers as many will now use privatised energy suppliers (Zeng *et al*., 2017).

In political studies, the agency theory focuses on the principal and agent (Tao and Zhu, 2001; Stan and Bruton, 2013). These issues arise due to supply chain management and economics, which occurs when one person makes decisions on the entity's behalf (Stan and Bruton, 2013). Furthermore, these decisions may have a tremendous negative or positive impact on the entity affiliated by the individual/principal or manager of other people or entities. Henceforth, the study

deduced from the core of the agency theory that these managers, in most cases, may seek to foster their agenda as opposed to those of the organisation (Sheikh *et al*., 2018). Their selfish agenda may lead the cooperation or the entity to collapse due to looting, which causes maladministration and chaos in the entity (Sheikh *et al*., 2018). Over the years, the commonness between Eskom and NESCO has been the employment of managers appointed based on political and religious affiliation, respectively (Masungwini, 2021; Sun *et al*., 2002), which has led to corruption and maladministration being central to the energy crisis. Maintenance at the two power-generating giants was neglected, leading to poor energy production (Aliyu *et al*., 2018). In addition, corruption funds meant to expand the capacity of the entities were being looted by political elites and managers of these entities (Maishanu and Agency Report, 2021). This was made easier as many of them were friends at the social, religious, or political levels of affiliation. The negligence and selfish ambitions of the managers of Eskom and NESCO brewed the energy crisis. Infrastructural decay due to minimal maintenance and looting are among the biggest challenges that have led to the energy crisis, as depicted by the agency theory.

Responses to the energy crisis in Nigeria and South Africa vary. Through its Department of Energy, South Africa allowed the operation of independent power producers to alleviate energy poverty. Furthermore, the Department of Mineral Resources and Energy has adopted new mechanisms, such as nuclear energy production through the Koeberg nuclear power station (Sarkodie and Adams, 2018; An and Mikhaylov, 2020). This will not only strengthen the ability of South Africa to produce energy but also strengthen its relations with Russia (An and Mikhaylov, 2020). And Mikhaylov (2020) assert that the Koeberg power station was established to explore new energy means by the South African government and reduce energy supply constraints. President Ramaphosa also announced the unbundling of Eskom, which is one of the means for the entity to resolve the energy crisis (Kumar, 2019; Lawrence, 2020). This will ensure that the entity operates efficiently and allow the manager to manage it properly at fewer costs and operations. Kumar (2019) further asserts that Eskom will become a three-phased entity with generation, transmission, and distribution phases. This process is expected to be fully completed in December 2022, and the government believes this is a good attempt to resolve the energy crisis (Lawrence, 2020). However, this has not been fully implemented. On another note,

this energy crisis is brought about by ghost grid users who steal energy from the power line, and Eskom consistently seeks to cut these users from the system (Shokoya and Raji, 2019). Similarly, Dahunsi et al. (2021) note that Nigeria has also tried to alleviate the energy crisis by rolling out new meters, which assist the government in tracking electricity users. Such methods assist the government in removing those who are not paying for electricity and ensure that they are cut off from the power grid or pay as per energy prices in Nigeria (Dahunsi *et al*., 2021). Therefore, this will relieve the pressure on the system, hence providing for those who pay, thus solving the energy crisis (Shokoya and Raji, 2019; Dahunsi *et al*., 2021).

In addition, the government has adopted renewable energy methods to assist in the energy crisis (Olatunji *et al*., 2018; Amir and Khan, 2021). This ensures that the existing power stations do not take strain as the government would need to build new infrastructure to produce energy. What is most notable from South Africa and Nigeria is their quest to address corruption within the energy sector (Mykhalchenko and Wiegratz, 2019). However, the constant political interventions prevent these SOEs from running independently and efficiently (Olukoju, 2004). Hence, Andrews and Nwapi (2018) state that political intervention and corruption can be attributed as a contributor to the energy crisis. Hence, the response by the government to deal with corruption is one of the actions of overcoming the energy crisis. Moreover, the government is also seeking to build new infrastructure that will assist in energy production (Edomah, 2018). This will increase the power-energy sector SOEs' capacity and ability to function efficiently. Hence, the current rolling blackouts and load shedding are because the SOEs seek to maintain infrastructure and energy-generating units (Tartibu and Kabengele, 2018).

1.7.2 Empirical research methods

The study used document reviews as the primary data source to explain SOEs' responses to the energy crisis in Nigeria and South Africa. Clarke (2020) refers to document review as a research technique that relies on various texts and sources the researcher replicates to create new and better content, ideas, or theories. This process systematically provides rich insights into the comparative analysis of South Africa and Nigeria with specific reference to the SOEs and energy crises. This study dealt with qualitative and not numerical material, which helped provide a narrative and in-depth

understanding of principal-agent relations in SOEs. These materials are available from the North-West University library repository, Google Scholar, LibGenesis, Science Direct, the NERSA website, Eskom's website, and the NESCO website, allowing for a reliable comparative analysis of the response of SOEs in South Africa and Nigeria regarding the energy crisis.

Descriptive content analysis of the energy crisis in South Africa and Nigeria, including the responses by SOEs in their respective countries, will assist in generating solutions. A descriptive analysis focuses on the characteristics of phenomena (Nassaji, 2015; Grbich, 2012). Hence, this study focused on a) the characteristics of the energy crisis, b) the SOEs' roles in energy security and their impact on economic growth, and c) the nature of the agents/interests in the energy sector.

1.7.3 Population and choice of study material

The purposive sampling of SOEs responsible for power generation in Nigeria and South Africa guided this research (Suen *et al*., 2014). Selecting South Africa and Nigeria, being significant economies in Africa, helped to understand the energy crisis and its impact on economic development, hence their selection for the case study. A purposeful sampling of case studies (SOEs responsible for energy supply in Nigeria and South Africa) was used due to its strength in identifying and selecting information-rich literature on comparative analysis of Nigeria and South Africa. A document review process also does not present ethical concerns as it relies on public documents and reports.

1.7.4 Dissemination of findings

Collaborating with the supervisor, the researcher disseminated findings and specific study chapters through publications in accredited Department of Higher Education and Training (DHET) journals, seminars, and conferences. The final report translates into academic articles, the first explaining the influence of principal-agent interests regarding SOE responses to the energy crisis, and the last provides the impact of energy shortage on growth and development in South Africa and Nigeria.

1.8 ETHICAL CONSIDERATIONS

The researcher complied with the official research design process, including ethical approval from the faculty higher degrees committee. Furthermore, the researcher complied with the institution's regulations concerning data analysis and dissemination of results by avoiding falsification, fabrication, exaggeration, manipulation, or plagiarism of data (Sieber, 2012). Honest conduct, reporting, and publication of the findings were essential in keeping with the North-West University academic guidelines. This study presented no risk to participants because the researcher did not interact with people for interviews nor solicit access to privately stored documents. The documents used in this study are in the public domain, meaning there was no need for special requests from people or organisations. Therefore, the study presented no risk in its method or findings. Moreover, the researcher had no conflict of interest regarding monetary support or ideological persuasion in selecting the topic and conducting the study.

1.9 LIMITATIONS OF THE STUDY

As this was a desktop study, the researcher was not privy to actual material conditions in Nigeria but relied on published documents. However, the physical absence from Nigeria does not invalidate this study's views and conclusions because the research consults institutional reports from reputable organisations. The organisations include the African Centre for the Constructive Resolution of Disputes, African Development Bank, and the International Energy Agency, Academic Institute of Excellence, World Bank, NESCO, National Electric Power Authority Nigeria, Department of Energy South Africa, Eskom, European Commission, International Monitory Fund, Electricity Corporation of Nigeria, NERSA (National energy regulator of South Africa), and OUTA. Reports compiled by the above sources usually inform public opinion and policymaking processes in selected countries.

1.10 SIGNIFICANCE OF STUDY

The study compared two large African economies, South Africa, and Nigeria. This comparison depicts the energy challenges that each country is confronting, and the responses implemented to alleviate them. Furthermore, the study describes the most challenging factors hindering SOEs’ growth and efficient energy supply strategies. The

study also builds a case for the role of SOEs in ensuring security of supply in the energy sector. Although there is existing scholarly literature on South Africa and Nigeria's energy sectors, there is little focus on how SOEs respond or should respond to the energy crisis. Little scholarly attention has been afforded to a comparative analysis between South Africa and Nigeria regarding SOEs' response to the energy crisis. Hence, this study focused on the role and ability of SOEs in South Africa and Nigeria to supply energy in a manner that drives positive economic growth. Furthermore, this depicts the importance of energy demand meeting supply to ensure sustainable growth in the economy and energy sector. Similarly, comparing South Africa and Nigeria gives a view of developing and underdeveloped countries, which is significant as it demonstrates the importance of energy reform, energy provision, and sustainable response to the energy crisis.

1.11 CHAPTER LAYOUT

Chapter One: Understanding SOE Responses to the Energy Crisis in Nigeria and South Africa

This chapter presents the background of the study regarding the comparative analysis of state-owned entities' responses to the energy crisis in South Africa and Nigeria. This chapter presents the research problem, research questions and objectives, the aim of the study, and lastly, the significance of the study.

Chapter Two: Principal-Agent Interests and the Role of SOEs Related to Energy Security

This chapter describes principal-agent interests in determining the role of energy sector SOEs in times of energy crisis and transition. The content is based on the theoretical framework and literature review. The reflections include agency theory and the politics of energy. The theoretical underpinning is a foundation for the descriptive analysis of empirical evidence.

Chapter Three: The Main Factors that Hinder the Transition of SOEs to Sustainable Energy Supply

This chapter provides a systemic analysis of content and presentation of evidence showing SOEs' strengths and limitations and their competitive nature in sustainable energy supply.

Chapter Four: The Impact of Energy Shortage on Economic Development in Nigeria and South Africa

This chapter explains the research methods regarding the document analysis procedures followed. Moreover, it provides a sequential presentation of data collected on a comparative analysis of NESCO and Eskom and how energy shortages affect the economy. The chapter includes analyses of responses to the energy shortages by the SOEs and power consumers.

Chapter Five: Measures to Ensure the Security of Supply in Nigeria and South Africa's Energy Sector

This chapter uses the agency theory and empirical evidence presented in this work to focus on general strategies to resolve the energy crisis in the context of faltering SOEs, the contemporary energy transition, and plural role players in the energy sector like IPPs.

Chapter Six: Study Conclusion and Contribution

This chapter presents the study's conclusion and its contribution to the body of knowledge.

CHAPTER TWO

THE PRINCIPAL/AGENT INTERESTS IN SOEs RELATED TO ENERGY SECURITY

2.1 INTRODUCTION

This chapter presents a theoretical description perusing the issues, factors, and validations of principal-agent interests in SOEs related to energy security in Nigeria and South Africa. In outlining the energy crisis of these countries, the chapter notes the political interventions, disintegrating infrastructure and lack or inability to provide sustainable solutions. These are crucial factors integral to the study as it sought to understand better the principal-agent interests' role in energy security SOEs. Therefore, the point of departure for the chapter is to discuss the agency theory and its core principles succinctly and show how it was applied to the study. In addition, the study analysed the necessity of having SOEs in the energy sector and included the influences of political intervention and disintegrating infrastructure on the ability of SOEs to provide sustainable solutions to the energy crisis.

2.2 UNDERSTANDING THE AGENCY THEORY

The agency theory (in some instances referred to principal-agent theory which will be used interchangeable in this study) notes that if there is any form of conflict between the agent and the principal owner, the entity will not perform well due to underlying management issues. Coined by Ross (1973) and Mitnick (1973), the agency theory came about to understand the relationship between the agents (managers) of corporations and their principals, also known as owners (Pierce Jr, 1989; Nielson and Tierney, 2003; Shapiro, 2005). The principal-agent theory was later embraced by scholars for its core principles of depicting, explaining, and resolving the dynamic relationship problems between principal owners and their agents or managers (Eisenhardt, 1989; Tan, 2014). The scholars also highlighted the ripple effects of institutional decision-making in the principal-agent theory.

Eisenhardt (1989) and Tan (2014) further note that there are three primary relations within the agency theory: shareholders and company executives, investor and fund managers, and board of directors and CEOs (Ross, 1973; Mitnick, 1973). The relationship between shareholders and company executives is informed by having

shareholders as the principals and company executives as the agents. The relationship between an investor and a fund manager has the investor as a principal and the fund manager as an agent (Bowie and Freeman, 1992). Lastly is the relationship between the board of directors (principal) and CEO (agent). All three are important as they depict the relevance of the theory in studying an organisational setting (Shogren, Wehmeyer and Palmer, 2017).

In addition, some leading causes of the principal-agent problem include self-interests, knowledge, moral hazard, and attitude (Ross, 1973; Mitnick, 1973; Bowie and Freeman, 1992). The agents may choose to follow selfish ambitions instead of those of the organisation, which causes the entity not to run efficiently and not succeed. Regarding knowledge, the principal must find as much knowledge about the agent as a lack of information may cause mistrust and hinder their working relationship (Bowie and Freeman, 1992).

Bowie and Freeman (1992) further note that a moral hazard refers to the extent to which the principal and the agent are equally morally inclined and placing the organisation's and employees' needs to ensure a successful organisation (Bhattacherjee, 2012). Attitude refers to the inclination of risk-taking that an agent may have and contributes to the entity's success. However, it is also important to note the aspect of the principals as they may seek to employ a person with either no risks or minimal risks (Shaturaev, 2022). Although the agent may not be a risk taker, they are still expected to grow the entity regardless. These are essential underpinnings of the agency theory, which will assist in understanding its application to the study.

2.2.1 The ripple effects of institutional decision-making in the principal-agent theory

When an individual decides on institutions, it will affect several actors and people (Panda and Leepsa, 2017). For instance, the decision to implement load shedding and power cuts at Eskom or NESCO will affect society and business as both parties would receive enough power to continue with daily activities. For society, electricity is used to cook and boil water for bathing, among other vital activities, so failure to have this resource will disrupt the normal functioning of society’s daily lives. Similarly, businesses use power to produce their products and power cuts will result in periodic working at the firm, thus affecting profit and productivity. Therefore, when an agent

who is a manager at an SOE makes a corrupt decision, it is likely to affect the nation, which is the one that benefits from the entity as shareholders. On another note, the agency theory also deduces that the principal may act against the agent's recommendations, thus causing agency problems (Eisenhardt, 1989; Hall, 1998; Tan, 2014). A principal going against the recommendations of agents ensures that organisational issues are not solved efficiently. Even in the case of the energy crisis over the years, the agents have noted that the two countries would face an energy provision crisis, yet the principals did not take measres to address this in time (Inglesi and Pouris, 2010; Sebitosi, 2010).

2.2.2 Delegation of duty as an expression of the principal-agent theory

Linder and Foss (2015) assert that the agency theory concerns the problems and solutions regarding delegating tasks from owners to managers. Therefore, owners are likely to devise a solution to solve issues arising within the organisation and then delegate to managers to solve the problem (Panda and Leepsa, 2017). Therefore, although owners may delegate specific duties to managers, they still indirectly give managers an idea of how to deal with the problem. However, the solution will fail or not be adopted due to a conflict of interests between the two parties or issues, particularly on the agents' side. This is because agents are supposed to pursue the organisation's solutions as that is their delegated job. Hence, it becomes a problem when owners intervene in the organisation's day-to-day running, causing conflict. Therefore, agency theory views that the principal should delegate duties to the agents in the organisation, and they should be tasked with producing solutions for the entity in times of crisis (Panda and Leepsa, 2017). What is also essential is that agents not only be concerned with solving organisational issues but should also seek to grow the entity. Bhattacherjee (2012) concurs with Panda and Leepsa (2017) that the entity's growth can be in monetary, infrastructural and employee capacity development. In addition, the vision to meet the entity's growth is delegated from the principal to the agent.

2.2.3 Typical owner interests according to agency theory

The agency theory assumptions are rooted in the core of labelling human beings as selfish individuals seeking to attain self-interest (Bhattacherjee, 2012). In addition, the theory further asserts that humans are bound to rational decision-making when

enriching themselves and, therefore, take minimal risks (Poletti-Hughes and Briano-Turrent, 2019). When principals hire agents to make decisions for the organisation, they typically go for more skilled agents with low-risk levels to give the organisation a chance at survival. In addition, Bhattacherjee (2012) comments that ordinarily, principals emphasise their ambitions of having a profitable organisation instead of having an equipped staff member with high morale. The above statement means owners care more about having an organisation generate income for themselves, investors, or board members (Poletti-Hughes and Briano-Turrent, 2019). Hence, they are not concerned with the needs of the employees, and in a case where they are, they only avail minimal resources to the employees through a lack of proper facilities. Furthermore, not offering the agents bonuses as a form of reward does not emphasise the health or growth of the agents but rather the organisation's profitability (Panda and Leepsa, 2017). Hence, the agency theory cements that the goal of the principal/owner is to assign tasks to the agents to yield profits within the shortest period effectively.

2.2.4 Typical agent interests according to agency theory

Contrary to the principal/owner, the agency theory holds that agents seek to complete the assigned task at their own pace, as noted by Bhattacherjee (2012). This means that although they would get the tasks done, they would do so whenever they wanted to do so and not a moment earlier. Furthermore, in doing so, the agents may seek to enrich themselves while they misuse the organisation's resources (Poletti-Hughes and Briano-Turrent, 2019). The agency theory also asserts that while agents may work at their own pace within the organisation, they also seek to avoid taking risks. This means that the organisation's chances of making significant profits are limited as the agents work within their own safe space while interested in personal payments and bonuses at the expense of the organisation (Linder and Foss, 2015). These are then referred to as selfish interests, which only benefit the agent at the expense of the organisation; hence, the goals of the principal and agent are incongruent (Bhattacherjee, 2012), causing principal-agent problems.

2.2.5 Conflict of interests at the core of the principal-agent theory

The theory assumes a conflict of interests between the agents and principals concerning the direction and critical decision-making for the sustainability and operations of the corporation. Agency theory is about determining who should benefit

from the two parties involved in the corporation (Ross, 1937; Mitnick, 1973). The decisions taken by either the principal/owners or the agents should benefit either of the two parties. When the agents make decisions which increase the organisation's sales, they also likely increase their chances of receiving bonuses, which boosts the relationship between the agent and owner.

Similarly, even external parties, such as customers, benefit. Being able to end load shedding successfully will result in businesses and industries functioning at total capacity to increase productivity. Society will also be able to trust the reliability of either Eskom or NESCO such that they will use their services fully, increasing customers to the organisation and thus boosting profits. This is clear as the theory depicts that having a principal-agent problem means the two parties have different ambitions (Ross, 1973; Mitnick, 1973), which could affect the organisation's productivity. Thus, to solve this problem, the theory suggests that the right incentives or environment should be created to promote the agents' growth and how they can benefit from the organisation’s success (Linder and Foss, 2015). These incentives include bonuses to boost employee morale, creating a safe space for employees to thrive and having principals/owners consider agents' best interests.

The theory aims to understand the extent to which agents promote and protect the owners’ interests and how they act when faced with cooperation issues. Do agents use their skills and positions to bring solutions, act upon the owners’ suggested solutions, or focus on the conflict between the two parties (Mitnick, 1975)? Inglesi and Pouris (2010) and Sebitosi (2010) warn that agents’ selfish interests would soon cause citizens to suffer by having to pay the entity's debt, experiencing load shedding, and having deteriorating infrastructure due to poor maintenance. Likewise, Linder and Foss (2015) argue that what is evident in most cases is that the agents act according to their selfish ambitions to enrich themselves. They create more issues for a corporation than responding to the crisis as they disregard their duties and focus on their agenda of either looting or misusing resources. Thus, shifting the focus to a personal agenda inhibits cooperation to solve crises.

2.2.6 Reconciling the principal and agents' interests

The agency theory clearly shows that the two parties have interests in a similar phenomenon. Their shared interest in the organisation is guided by the tasks which the agent and principal assign to one another (Mitnick, 1975). For instance, in an organisation, the goal could be to increase sales and ensure that the organisation is profitable, so the agenda would be to ensure that the organisation is growing. The principal must place resources (employees and offices) for the agent to work in a conjunctive environment to facilitate the growth and success of the organisation. Therefore, the harmony of their relationship determines the success of the possible suggested solutions (either by principal or agent) to a crisis or issue (Crutchley and Hansen, 1989). This statement is supported by the speech of former United States President Kennedy that "It is not about what your country can do for you but rather what you can do for your country" (Holbrook and Hulbert, 2002).

2.2.7 Criticisms of the principal-agent theory

Therefore, applying the theory to the study implies that although principal owners produce solutions to respond to the energy crisis succinctly, agents' selfish agendas/interests impede the success of these solutions (Greiling and Spraul, 2010). These solutions include allowing private entities to produce their power to add to the grid, refocusing on renewable energy as a cheaper energy source, and employing other power sources, such as nuclear and solar energy. Hence, the selfish ambitions which cause the conflict of interest for the agents hinder the success of the entity, as documented by Mitnick (1975), Linder and Foss (2015) and Panda and Leepsa (2017).

In addition, Crutchley and Hansen (1989) document that although there is a business and personal relationship between the principal/owners and agents. Their inability to get along hampers the organisation's success. This makes evident that the selfish interests of agents who work in SOEs, which are majorly owned by the states, hinder their responsibility to give back to the nation, and instead, they take from the state (Panda and Leepsa, 2017). In most cases, agents are corrupt and allow their networks to infiltrate the organisation to enrich themselves and those around them.

For instance, Mandonsela (2019) highlights the Zuma-Gupta relationship as one of those relationships that pursued selfish interests at SOEs. Madonsela (2019) depicts the relationships of political elites such as Malusi Gigaba, Brian Molefe, Mosebenzi Zwane, and Anoj Singh; the entrepreneurs or brokers Eric Wood, Salim Essa, Ashok Narayan, and Iqbal Sharma; and the dealers as examples of principal-agent relations pursuing selfish interests (Swilling, 2017).

Drawing from the above statement, the government under the Department of Energy has not made means or taken steps to prepare for the crisis. The agents hired at the SOE were not so much focused on solving the crisis at this entity. Instead, the CEO would buy coal from his friends at exorbitant prices at the entity's expense while enriching themselves. This has perpetuated the energy crisis and caused others to contribute to the problem, hence the need for an urgent response (Kennedy-Darling, Hoyt, Murao, and Ross, 2008). For instance, failure to maintain the power stations over the years has resulted in generating units being unable to function at full capacity.

In addition, during his tenure as president, Mbeki warned the ANC that Eskom would soon be unable to supply enough energy where needed. Hence, maintaining existing and building new power stations or focusing on other forms of producing power was necessary. Kennedy-Darling et al. (2008) agree with Kamal (2012) that the energy crisis may be caused by the lack of maintenance and proper vision for the power utility to function, severely compromising energy provision for future generations.

2.3 POLITICAL INTERFERENCE IN SOE OPERATIONS AND DECISION MAKING

Selfish ambitions, chasing personal interests, corruption, SOE mismanagement, and conflict between principals and agents threaten energy security (Abotsi, 2015). Political intervention has been one of the foremost challenges to global development, particularly in underdeveloped countries. Political intervention can be understood as political elites' ability to interfere with an organisation's day-to-day running, hijacking its operations and dictating its mandate (Okhmatovskiy, 2010; Lazzarini and Musacchio, 2018). Their intervention may be motivated by the need to enrich themselves or ensure they influence government decisions.

In most cases, they are the cause of SOEs' downfall. Political elites deploy cadres to serve in SOEs without the requisite knowledge, contributing to some SOEs' downfall. Even in first-world countries such as China, challenges with political interventions in developing SOEs are a reality (Zhou, Guo, Hua, and Doukas, 2015). Although this political interference can contribute positively in some cases, such as in China, which has seen a growth in industrialisation, it can be damaging in others. Within China, the agency theory advocates that the incentives placed by the government allow the agents to benefit from the entity; hence, they seek to grow their SOEs (Lin, *et al.,* 43, 48).

For instance, in China, SOE employees are given bonuses and must educate individuals to perform tasks. The negative impact of political interference in SOE operations is seen in the National Energy Regulator of South Africa's (NERSA) (2008) decision to increase electricity tariffs as requested by Eskom due to making losses. This increase is motivated by the lack of profit or productivity within Eskom; thus, increasing tariffs ensures that profits increase, even though these profits come at the expense of citizens because of the increased electricity prices (Amra, 2013). Hence, due to political intervention, the principal-agent relation affects the entity's productivity and the customers entirely.

On another note, the political intervention also opens the opportunity for political patronage and clientelism. Principals can make organisational decisions for agents and are trusted to grow the entity. Agents may use this opportunity to award business opportunities to their political, business, and personal associates in exchange for money or favours. In South Africa, the ANC dominates the legislature, and the minister (principal) of public enterprises is currently a member of the ANC (Bearfield, 2009). Therefore, the minister will appoint loyalists of the ANC to serve on the board of SOEs, such as South African Airways and South African Broadcasting Commission, among others. These are some of the factors brought about by political intervention which also contribute negatively to the growth and development of SOEs. The agents appointed to serve in these entities often do not qualify or have the competency to run such organisations.

Bearfield (2009) alludes that political patronage is noted as the right and authority of a minister to appoint individuals to an office, and in most cases, this is based on

partisan loyalism. These appointments involve positions of authority, such as principal managers or politicians at the highest offices, such as ministers (Hollibaugh Jr, Horton, and Lewis, 2014). Hicken (2011) explains political clientelism as the exchange of resources through political influence in SOEs. For instance, Weingrod (1968) and Arriola (2009) argue that this exchange of clientelism can occur when political elites exchange money for lucrative and influential positions in SOEs (Hicken, 2011).

Whitfield and Therkildsen (2011) concur by noting that the patron-client (principal-agent) relationship is embedded with an exchange of jobs, political favours, and money. Mahlati (2021) notes the Cyril Ramphosa 2017 campaign during the race for the ANC presidential seat as one of the examples of the patron-client relation where those who pledged their vote to Ramaphosa would spend time in luxury hotels while they were also promised money for supporting Ramaphosa's presidential candidateship. This is a significant issue regarding SOEs, as the principals appointed for political favours are incompetent (Weingrod, 1968; Arriola, 2009).

Thus, this cronyism will see these SOEs unable to perform at maximum capacity because the managers do not know what they are doing and exhibit severe incompetence and gross negligence, most evident in the case of the energy crisis in Nigeria and South Africa. Political intervention causes political loyalists to be deployed to Eskom and NESCO, not in the interest of the entity's growth to serve citizens but in the self-enriching interests of the political parties' leaders (Hicken, 2011).

2.4 CHARACTERISTICS OF ENERGY CRISIS AND SECURITY

The energy crisis in Africa is characterised by rolling blackouts, load shedding, corruption, and no clear indication of a new plan to solve the crisis (Weingrod, 1968; Arriola, 2009; Hollibaugh Jr *et al*., 2014; Oyelere, 2014). Aidoo and Briggs (2019) contend that rolling blackouts are now the norm for most African countries. The intentional blackouts (load shedding) are done to avoid a total power grid shutdown. Across the world, scholars such as Liu, Dong, Lohse, and Petrovic (2015) note that these countries have resorted to making rolling blackouts a formal policy to reduce environmental degradation and avoid their electrical systems' total collapse. Furthermore, rolling blackouts are also a means to assist the power-producing entities to cope with the demand (Liu *et al*., 2015; Jaglin and Dubresson, 2016).

Thus, electricity is provided during peak hours to ensure production and industrialisation. Then, in the evening, electricity is cut off to allow the entity to accumulate capacity for the next day. In some countries, such as South Africa, these blackouts do not occur throughout; instead, some areas are more affected than others (Liu *et al*., 2015; Ouedraogo, 2017). Eskom rations the energy supply to ensure that pressure on the system does not lead to dire electrical constraints, leading to total showdown or failure (Jaglin and Dubresson, 2016). Similarly, blackouts are also common for energy providers in Nigeria (Ouedraogo, 2017).

Load shedding symbolises the African continent's energy crisis (Tiwari, Janghel, Jain and Mishra, 2013). Syadli et al. *(*2016) contend that load shedding is also a partial solution power utilities use to limit the constraints of the power system. In load shedding, NESCO and Eskom choose areas that will be offline for a certain period, taking turns to have electricity (Tiwari *et al.,* 2013). With the load-shedding schedule, power utilities schedule different load-shedding stages. During stage one, electricity will only be gone for one hour, stage 2 is for two hours, and stage 3 is for three hours. These stages go up to stage 8, whereby the power constraints will be dire for the system and eventually lead to a total collapse or shutdown (Goldberg, 2015).

Moreover, corruption and having no clear policy direction are also some of the leading characteristics of the energy crisis in Africa. Omoleke et al. (2011) believe that power utility managers take advantage of the lack of accountability they have to provide to the public and use the opportunity to loot and cripple the entities. They procure their selfish ambitions, seeking to enrich themselves and fail to execute their oath of office (Kennedy-Darling *et al*., 2008). Kennedy-Darling et al. (2008) agree with Omoleke et al. (2011) that this includes a corrupt deal with individuals or entities to ensure their circle of influence benefits at the entity's expense. In addition, due to a lack of resources and infrastructure, the deficiency of proper policy direction, energy security, and poverty perpetuate societal issues (Kennedy-Darling *et al*., 2008; Kamal, 2012). For instance, Jamasb and Pollitt (2005) document that countries such as Italy, Germany, the United Kingdom, and France seek to change their power production methods and develop new ways of green energy production.

This is a significant issue for most African countries because new and green energy depends on technological advances, so the lack of this capacity causes policy

confusion (Nwedu, 2021). While focusing on the state of Nigeria, Nwedu (2021) explains that it is still not clear how the government will solve the energy crisis and how the current measures will contribute to the overall solution. Even in South Africa, policy confusion is a considerable obstacle to energy security. Eskom has numerous power stations; out of all these, only one is nuclear (fully technologised) (Blignaut, 2012). However, a coal power station was built after its establishment. The Medupi power station in Limpopo was established to try to combat the electricity crisis in South Africa (Blignaut, 2012; Oboirien, North and Kleyn, 2014). Furthermore, Oboirien et al. (2014) document that this station was said to be the fourth largest coal electricity-producing power station, contradicting the government's plans to move to nuclear energy and other forms of energy production better for the environment (Davidson, Hirst and Moomaw, 2010). Hence, this power station raised many questions as to why the government is investing in coal production when the global targets for reducing coal electricity generation was looming (Davidson *et al*., 2010).

Similarly, continued investment in coal energy production does not align with the South African 2030 National Development Plan [NDP] (Baker, 2015). Fourie (2018) alludes that this policy or development plan seeks to create sustainable, economic, and environmental plans that will be accessible even for the upcoming generation. Baker (2011) further argues that the Medupi power station's establishment was poorly thought through and created a policy confusion crisis. It can, therefore, be regarded as a wasteful expenditure that will not help the energy crisis (Baker, 2011). The South African president has accepted monetary fund injections from international investors to assist the country with shifting policy from electricity generated from coal to a new form that will be more environmentally friendly (Sunday World, 2021).

According to Pollet, Staffell, and Adamson (2015), South Africa still had about two hundred years of accessible coal in 2012, which was going to be a key strategic plan for the government to grow the economy. Hence, the South African government has also invested in the mining sector, understanding its impact on the economy and social lives, therefore playing a strategic and key role in the mission of the NDP in 2030 (Fourie, 2018). Therefore, unclarity around South Africa's policy formulation concerning the economy and energy provision is also a significant obstacle to energy security.

Even in the case of NESCO in Nigeria, corruption has gotten its claws into the government (Nwedu, 2021). Patronage and clientelism have dominated government running for years, and the impact has been economic and social (Oyelere, 2014). Nigerian politicians have sought to ensure that the government structure benefits those in their circle based on religious or political affiliations (Masungwini, 2021; Sun *et al*., 2002). The government has been developing multiple solutions to curb corruption, particularly concerning electricity theft. For instance, Dahunsi et al. (2021) state that the rolling out of the meter boxes will assist the government to keep track of those connected to the grid and use the national energy supply. Moreover, this will assist with the illegal connections constantly stealing power from NESCO and ensure that even the employees stop illegal connections. Similarly, Dahunsi et al. (2021) note that what is also noticeable is that the employees were also taking bribes to pursue illegal connections. Therefore, rolling out the new meters will also assist in curbing this corruption (Dahunsi *et al*., 2021).

Nwedu (2021) believes that the reality of rolling blackouts and load shedding are significant characteristics of the energy crisis in Nigeria as well. The same factors contribute significantly to the energy poverty currently experienced in the country as they contribute to the negative or insufficient energy supply (Nwedu, 2021). This will indirectly have dire and negative consequences on the growth and sustainability of the economy (Patel, 2008). The disruptions in energy supply will result in slow production and industrial growth, causing a negative economic downturn (Patel, 2008). Therefore, adopting meritocracy to appoint executive members who serve on SOE boards would mitigate corruption and help solve the energy crisis, ensuring a sustainable economy and environment (Sun *et al*., 2002).

Similarly, even internationally, some utilities use rolling blackouts to curb energy supply and address demand challenges. In the United States of America (USA), the Midcontinent Independent System Operator (MISO) company has warned that the power grid is under severe pressure (DiSavino, 2022), meaning that the power utility would resort to rolling blackouts and load-shedding stages to ensure that the grid does not collapse. The operator indicated that the power grid supplies about forty-two million people. These communities include central societies of the USA from Minnesota to Louisiana and the Canadian Province of Manitoba (DiSavino, 2022). Therefore, this

evidence from the literature depicts that rolling blackouts and load-shedding stages are a reality in developing and developed nations. Recently, the invasion of Russia into Ukraine has worsened the quest for acquiring a stable energy supply in Western states. The United States has reported that it anticipates a cold 2023 winter season and energy supply will be limited. The power grids of the US are currently strained with low fuel, gas, and coal supply. Wade, Malik, and Saul (2021) agree with DiSavino (2022) that the energy crisis in Europe and Asia seeks to advance to the US. These are well-developed countries with world-class utility infrastructure, such as MISO in the USA, Enel in Italy, and General Electric in Pakistan, among others, yet they are also depicting signs of energy emergence of energy scarcity (The Local, 2022).

2.4.1 Change in greenhouse gases

The contemporary arguments in energy security propose moving away from traditional energy production [fossil] methods, particularly coal production. Ouedraogo (2017) alludes that African countries such as South Africa have many coal reserves, making it a logical choice for electricity production. However, this hinders the goals of green energy and sustainable energy production (Ouedraogo, 2017). Thus, this hinders the United Nations 2030 Millennium Development Goals (MDGs) meant to sustain the environment and build greener economies, as Lei et al. (2019) have documented. In addition, even the African Union Agenda 2063 regards the electricity supply. The agenda demands ending electricity production from burning coal (Omisore, 2018).

Omisore (2018) further notes that there is a need to address the challenges of the environment and economic growth as this will cause an interruption in the mining sector, as it is the most significant economic contributor in the African continent. Therefore, the change in greenhouse gases may cause energy poverty to increase within the continent, particularly in South Africa and Nigeria, because many people live in poverty in Africa, meaning most cannot afford energy. Energy will be generated from solar systems, wind turbines, and other means, and these resources are expensive for the government to procure, so they will only be directed to those that can afford to buy and in the urban areas. Those in the rural areas will suffer and be unable to buy or procure energy; therefore, energy poverty will increase. Several first-world countries have sought to offer South Africa a R131 billion fund to assist Eskom in the transition from the traditional method of energy production (Sunday World,

2021). This aligns with the United Nations' Sustainable Development Goal 7 (SDG7), which seeks to eradicate all energy production methods that pose a danger to the environment and future generations.

Furthermore, the traditional methods of energy supply harm the environment and are noted as contributing factors to energy poverty as they are not explored fully as means to produce energy (Ouedraogo, 2017). Hence, the failure to develop new ways to supply energy with insufficient grid capacity is also a dominating factor. Hence, first-world countries such as the United States of America and China have resorted to sustainable energy (Lei *et al*., 2019). Therefore, focusing on sustainable energy production is part of ending energy poverty as the world seeks to transition to greener energy production methods. However, the world remains divided around the issue of the transition from coal production and greenhouse gases to alternative means, such as nuclear and wind energy production (Bu *et al*., 2022). Sunday World notes that global investors have alluded that greenhouse gases are the best solution to the energy crisis while ending environmental damage and saving it for future generations.

2.4.2 Deteriorating infrastructure and energy crisis

The lack of infrastructural development worldwide has been associated with a lack of industrialisation and economic growth (Srinivasu and Rao, 2013). Hence, Olaseni and Alade (2012) assert that economic development in most African countries is associated with infrastructural development, particularly SOEs. Due to the structural adjustment, Africa's circumstances and history have left most African countries highly indebted (Summers and Pritchett, 1993). Therefore, the resources of these developing countries are limited, and they cannot expand other infrastructural development nor maintain the existing ones; hence, most SOEs depend on bailouts and funding (Mills, 2012). While focusing on the Pakistani, scholars such as Kouser and Subhan (2020) agree that for countries to mature economically and industrially, there is a need to invest much capital in infrastructural development. However, in the case of most developing and underdeveloped countries, the focus becomes social and economic development, such that a limited amount of the budget goes towards infrastructural development.

For instance, Naidoo and Maré (2015) focused on South Africa's Reconstruction Development Plan (RDP) and noted it as one of the best in the world. However, due to limited resources, the policy focuses on the social aspect, government building houses for the community and providing social security funds, but less on industrial development. Nellis (2005) notes that although most African countries seek to expand on establishing SOEs, the continent lacks infrastructural development. Nellis (2005) further argues that the low performance of most African SOEs can be linked to or blamed on inadequate or unavailability of infrastructure. Therefore, the energy crisis can be blamed on the lack of infrastructural development in the continent. There are not enough power lines to distribute energy across various communities. While in countries where there are distribution lines, the power stations are not producing enough. Infrastructure development should focus on more power stations so that SOEs can meet the demand and supply of energy (Kanwal, Khan, and Rauf, 2020).

Kanwal et al. (2020) assert that Pakistan's infrastructure does not allow sufficient energy production. In addition to the inadequate and deteriorating infrastructure currently available in Pakistan, energy production is limited, and the energy demand is far greater than the supply. Kanwal et al. (2020) and Nellis (2005) agree that infrastructural development is essential to SOE development. Furthermore, Khan, Akhtar, and Shah (2014) also allude that there may be other energy sources or other means to procure energy. The lack and inability to develop more infrastructure deter the development of SOEs, particularly those dealing with energy supply and demand (Rafique and Rehman, 2017).

Khan et al. (2014) further argue that Pakistan's energy production comes in many forms: electricity, gas, coal, hydro, thermal, natural gas, gasoline, petrol, diesel, solar and wind. However, the lack of proper infrastructural development inhibits this sector's ability to successfully harness the potential of these resources to adequately produce enough energy for everyone (Rafique and Rehman, 2017). Hence, the energy crisis and the lack of infrastructure are overlapping issues regarding the SOEs' growth and development.

2.5 THE ROLE OF SOES IN THE ENERGY SECTOR: A HINDRANCE OR ENABLER OF THE SECURITY OF SUPPLY?

The role of SOE in economic and social development should be to capacitate the state and foster economic growth (Fourie, 2014; Lin *et al*., 2020). Therefore, it can be noted that SOEs are expected to be enablers of economic growth. Fourie (2014) contends that, in most cases, SOEs are established to bring stability and create jobs within a country, although these may have a certain amount of private ownership. SOEs are majority-owned by the government to provide the state with the advantage of decision-making within the entity to ensure these entities contribute to the national economy while taking care of the citizens' social needs (Lin *et al*., 2020). Fourie (2014) also notes that their role is to provide the government with an opportunity to bring welfare to its people by providing jobs or subsidising people who use the entity's product. For instance, qualifying people will be entitled to a certain number of units for free when buying electricity.

Besides subsidising, revenue collection is essential to the government's agenda to ensure service delivery, external monetary investment, and funds for economic and infrastructural development (Fourie, 2015). Hence, SOEs are at the forefront of tax payment and revenue collection. The funds collected from these entities are then expanded to focus on other governmental mandates such as providing social grants, redirecting the funds towards creating employment, and ensuring service delivery, among other services (Fourie, 2014; Fourie, 2015). In addition, it is paramount that the government invest in these entities to depict clean governance in a state of good management and contribute to economic growth (Lin *et al*., 2020).

Therefore, corruption emanating from these entities because of selfish ambitions will decrease investors' confidence in the country (Abotsi, 2015). Thus, there is likely to be a conflict between the agent and the principal. Moreover, the agency theory provides that when there is an existing conflict between the manager and agent, it is likely that the entity will not perform well (Eisenhardt, 1989; Hall, 1998; Tan, 2014). The performance of these entities is measured through less corrupt activities and yielding good profits that contribute to government income.

2.5.1 Energy and the economy

In the contemporary age, economic growth and development depend on factors such as international relations, continental integration, the ability to produce a scarce commodity, and provision, among other factors (Mabeza, 2019). Therefore, energy provision and economic growth are intertwined, as one affects the other. For instance, a country's ability to secure energy and provide for its citizens and the global community improves its global relations and economic growth (Holmberg and Erdemir, 2015). However, most nations have constant conflict because of the vast availability of oil as an energy source. This conflict may be caused by a country's internal battles where elites seek to take captive of this energy source (Hawker, Bell, and Gill, 2017). On another note, it may be external conflict because of super-powerful or first-world nations seeking to neo-colonise smaller ones with this commodity to direct who receives it (Hawker *et al*., 2017).

Hence, the cold war for energy is still a prominent issue affecting the international market system (Lordkipanidze, 2019). Concurring with Lordkipanidze (2019), Chandler (2018) explains that the price of oil barrels, petrol and paraffin are necessary as they directly or indirectly affect energy supply. Therefore, providing energy and having vast accessibility to energy sources such as oil, nuclear, and coal will place a country in an advantageous position to either develop its economy or be a key international player (Lordkipanidze, 2019).

Most key role players are wealthy nations with stable economies with something to offer the global spectrum. Therefore, for a smaller country to have control of energy sources such as those mentioned above will make the international system more open for them and participation in the global energy market easier (Hawker *et al*., 2017). Similarly, having a stable energy supply that exhibits stability and growth over time will encourage society to rely on the energy grid and buy directly from the supplier (Frederiks, Stenner and Hobman, 2015). Nasreen, Anwar, and Ozturk (2017) studied South Asian economies and found that having a stable energy provision also attracts investors into a country, and these investments will be directed to several industries which rely on energy. These industries include mining for underdeveloped nations, which, like South Africa, often rely on mining and agriculture for economic growth. Energy availability is critical in economic development or underdevelopment (Stern,

2019). Stern (2019) concludes that countries with a stable energy provision can build new industrial infrastructures that contribute enormously to the economy.

Therefore, a stable energy supply and constant economic development are intertwined factors that affect social lives, industrial development, stability, and politics (Frederiks *et al*., 2015). Tantamount is that corruption and mismanagement lead to the fall of SOEs and cause a crisis in energy provision that affects not only one part of the society but the vast majority. Nasreen et al. (2017) state that the international community's response to an economy's growth is also affected by the stability of the energy provision in the countries. Taking cognisance that South Africa has been downgraded several times by Moody's and other rating agencies like Standard Spoor, reflecting the views of discontent from international investors (Mugobo and Mutize, 2016). Conversely, literature review evidence indicates a comfortable relationship and link between energy security and economic growth. This implies that the energy future is moving in the correct direction and that by providing stable energy, the economy can grow and influence buyer behaviour, where many citizens buy electricity from the state-owned power utility.

2.6 CHAPTER SUMMARY

This chapter has given an account of the role of the principal-agent interests in SOEs related to energy security by defining and discussing the energy crises in Nigeria and South Africa. The chapter discussed political intervention, degrading infrastructure, and the change to greenhouse gasses/green energy production in outlining the energy crisis of these countries. Furthermore, the chapter discussed the role of SOEs in energy security and economic development. Henceforth, questioning the inability of the power-producing giants to provide sustainable solutions as they respond to the energy crisis.

Through the discussion in the chapter, it can be deduced that a nexus exists between principals' and agents' interest in SOEs. Deducting from the agency theory and existing literature on principal-agent conflict, the two parties have a common interest. Having been influenced by factors such as degrading infrastructure, political intervention, the role of SOEs, the economy, and energy security, there is an interrelation between principal-agent interests in SOEs related to energy security.

CHAPTER THREE

THE MAIN FACTORS THAT HINDER THE TRANSITION OF SOEs TO SUSTAINABLE ENERGY SUPPLY

3.1 INTRODUCTION

The previous chapter touched on the relevance of SOEs in energy security. It noted that SOEs are primary role players in energy production and supply and are enablers of economic growth. Providing energy is one of the core functions of public service, but that does not prevent private entities from playing a role in producing and supplying electricity. This chapter often uses the phrase 'energy utility', which is interchangeable with 'state-owned entity' (SOE). Likewise, 'clean energy' is interchangeable with 'green energy'. This chapter presents a generic discussion about the main factors hindering SOEs' ability to transition to sustainable energy. The first section (3.2) starts by making a case for the relevance of SOEs in supplying sustainable energy as a strategy to ensure their growth in the global economy. The second section (3.3) focuses on the lack of energy infrastructure development and maintenance as a factor hindering SOEs' growth in sustainable energy supply. The third section (3.4) shows energy poverty and insecurity because of a lack of infrastructure development. Principal-agent tensions are at the centre of SOE inefficiencies, mismanagement, and corruption, as presented in the fourth section (3.5), which links to the problem of political interference in SOE operations in the fifth section (3.6). As a result, the sixth section (3.7) shows the inconsistent policy implementation and formulation practices in energy utilities in the energy transition context. The chapter summary incorporates sustainable energy supply to contend with questions of good governance, corruption, infrastructural development, sustainable development, and energy racism, including policy formulation and implementation for sustainable development. These categories also are the challenges that make SOEs in African countries lag in performance compared to those in China and Singapore, which are flourishing with energy security. Therefore, the government must respond assertively to resolve the challenges that lead to poor SOE performance. Good governance is a prerequisite or antidote to the challenges of corruption, poor infrastructure investment, operation and maintenance, and lack of commitment to implement sustainable development policies.

3.2 ADVANCING SOE GROWTH THROUGH SUSTAINABLE ENERGY SUPPLY

Sustainable energy is made possible through renewable energy sources (hydro, solar, wind, geothermal), as Martins, Felgueiras, Smitkova and Caetano (2019:3) allude. Therefore, sustainable energy supply is about the ability of utilities to provide enough energy for all businesses and citizens' socioeconomic needs without causing irreparable harm to the environment (Kuzemko and Britton, 2020). Sustainable energy also implies the ability of SOEs to meet the current generation's energy needs without harming future generations' prospects to access reliable energy supply. This is the conception that United Nations Economic Commission for Europe (UNECE) (2020:3) has in defining sustainable energy as built on "i) energy security, ii) energy and quality of life, and iii) energy and environment". This means that the availability of sufficient energy should contribute to a better standard of living. Talking about sufficient energy has a connotation of abundant energy. An abundant energy supply does not always guarantee a better quality of life. Armaroli and Balzani (2007:54) argue that the abundance of energy often leads to overconsumption of food and unhealthy lifestyles.

It is worth noting that the abundance of energy in industrialised countries often leads to adverse environmental impacts like pollution, which is less sustainable (Pietrzak *et al*., 2021:3). Again, the challenge is balancing energy security and human living environments. Hence, it is essential to note that Martin et al. (2019:3) state that sustainable energy security regards (i) diversifying energy sources, in that fossil fuels are a small percentage of the total energy production; (ii) reducing energy dependence by increasing local energy production and less reliance on imports; and (iii) the depletion of fossil fuels compared to the rate of total energy consumption. This concept resonates with this study because there could be a total blackout due to a lack of diversifying energy sources; hence, the significance of renewable sources. In short, energy sustainability is essential because access to electricity improves human development as energy is a primary input in social and economic activities (Nel & Joel, 2019:3; UNECE, 2020:3). The idea of sustainable energy comes from the principles of sustainable development, whose pillars include social, economic, and environmental security (Nel and Joel, 2019:2).

Environmental security and sustainable energy are based on the recognition that energy sourced from fossil fuels has the most negative impact on the environment, and a diminished environment leads to poor social conditions (Martins *et al*., 2019:3, 4, 6). Odutola (2020:8) states that oil energy sources' negative environmental impact includes mining accidents, deforestation, danger to aquatic life due to spills, and carbon emission due to oil combustion. In addition, the process of extracting traditional resources for energy production harms the environment, quality of life and marine life. This shows why many states and corporations worldwide encourage greener energy production and sustainable power production methods. Hence the implementation of energy saving, energy efficiency technologies, and renewable energy sources by countries worldwide today (Kuzemko and Britton, 2020). Therefore, the role of energy utilities is indispensable in easing the transition to sustainable energy production and supply.

Social security and sustainable energy are important because the environmental effects of fossil energy production negatively impact social security in society, degrading people's quality of life as they develop respiratory illnesses, lung cancer, and damage children's early life development because of gas flaring (Odutola, 2020:8).

Economic security and sustainable energy are about maintaining the balance between socio-economic and environmental interests, a challenge many countries face today. Take Western Macedonia in Greece as an example; enforcing the European Green Deal by decommissioning lignite coal plants has had negative socioeconomic impacts (Ziouzios *et al*., 2021:2-5). Similar concerns about protecting the environment at the expense of socioeconomic needs is a debate associated with the just energy transition policy from coal to renewable power sources in South Africa (Dludla, 2023; Omarjee, 2023).

Table 3.1. below is a framework for sustainable energy supply based on the literature review. The framework will be vital for discussing the study's findings later.

Table 3.1: Framework for sustainable energy supply

Framework factors	South Africa	Nigeria
Economic	They can lower consumer expenses, especially since most are under the poverty line. However, it is expensive and often available to the few.	It is available for the political elites who have the finances to buy.
Social	They will limit smoke clouds for communities near the mining areas, combating related illnesses.	Although the level of accidents and diseases is less, nuclear energy will improve the exposure, especially cancer due to thermal energy production exposure.
Environmental	Sustainable energy supply will help preserve the ecosystem, combat water contamination, and address air pollution. However, other mechanisms, such as wind turbines, may require vast land.	The focus will shift from traditional methods of energy production, which are often harmful to the environment. Particularly for Nigeria, there is vast diversity in their energy production, which will enhance the focus on sustainable means of production.
Energy diversity	Sustainable energy will increase the diversity of energy access, reducing reliance on harmful methods such as coal. This will benefit the economic, environmental, and social sectors.	Sustainable energy will increase the diversity of energy access, reducing reliance on harmful methods such as coal. This will help the economic, environmental, and social sectors. It will also increase the ability of the existing sustainable means of production mechanism.
Energy sovereignty /dependency	Having energy reserves because of energy diversity will increase the sovereignty of the energy access for the state through the power utility.	Having energy reserves because of energy diversity will increase the sovereignty or limit energy dependency of the energy access for the state through the power utility.
Fossil fuel reserve vs energy consumption	There are still vast reserves of fossil fuels that are existing the purposes of energy production, especially coal, which is abundant in South Africa. Reliance is still high on fossil fuel mechanisms: coal (83%), pumped storage (6%), gas (5%), nuclear (4%), hydro (2%), and wind (0.2%). Hence, the energy consumption is so high that it will challenge the idea of sustainable energy production. Fossil fuel reserves are available, but sustainable energy production is challenging due to high energy consumption.	Power generation in Nigeria is from hydro and gas-fired thermal power plants, with the hydro plants providing 2,062 MW and the gas-fired 11,972 MW. This depicts that there is not much reliance on fossil fuel reserves for energy production; thus, sustainable energy will assist the already available sustainable energy production mechanisms.

Table 3.1 above depicts a framework for sustainable energy for Nigeria and South Africa based on the literature review. Hence, it helps understand the objectives of each country to reach a sustainable energy supply and the factors affecting this process.

The rationale for enhancing SOE growth through sustainable energy supply is a relevant global phenomenon. China has relied on international cooperation and domestic private-sector involvement to overcome a lack of funding and technological innovation and to advance sustainable energy supply (Zhao *et al*., 2011:1105-1106). What is interesting about China is that the private utilities took in more international cooperation to produce sustainable energy infrastructure than state-owned utilities (Zhao *et al*., 2011:1105-1109). In Poland, the private sector did not get involved in developing sustainable energy (Pietrzak *et al*., 2021:4). The Polish government launched small-scale renewable energy projects that do not raise public awareness – meaning a lack of knowledge about sustainable energy is a barrier that SOEs should use as an opportunity for growth (Pietrzak *et al*., 2021:14). Consider how the SOEs in China continue to play a crucial role in research and development towards sustainable energy; to this effect, China has become a world leader in wind energy supply (Zhu *et al*., 2022). As Zhao et al. (2011:1105) argue, achieving energy security is challenging without the involvement of SOEs.

Prudent energy security policies would place SOEs as active participants instead of displacing them from the governance of energy supply in favour of private entities. Through the Power Holding Company of Nigeria (PHCN), Nigeria is not ensuring efficient production and investment behaviour despite its enormous subsidies (Oyedepo, 2012). As a result, Nigeria is not maximising in converting electricity from the large quantity of solar it receives. A shift towards renewable energy can help Nigerian society in a significant way. As with the case of Nigeria, SOEs internationally rely on traditional energy production methods that emit high levels of carbon, which is detrimental to the environment and worsens climate change impacts (Martins *et al*., 2019:2). Traditional energy production relying on fossil fuels is the major hindrance to SOEs' sustainable energy supply efforts.

Hosseini and Wahid (2016) further assert that typically, in power generation, these hazardous methods include burning coals and fossil fuels to generate electricity.

These are unstainable and dangerous to the environment as they release toxic chemicals or smoke, affecting the ecosystems and the people.

3.2.1 Energy utilities across the world are embracing the idea of renewable energy

Achieving a sustainable energy supply has always been a quest for various energy-supplying utilities across the globe (Rosewarne, 2022). Utilities worldwide have adopted new power-producing methods to transition from traditional to contemporary, cleaner, and sustainable methods (Priddle, 1999:4; Ahuja *et al*., 2009:11; UNECE, 2020:18). The main goal of these utilities is to ensure energy production and distribution technologies are sustainable economically, socially, and environmentally (Kuzemko and Britton, 2020; UNECE, 2020:3). Seeking sustainable energy development is informed by the desire to adopt innovative, cleaner, and sustainable power producing strategies in the transition from the traditional methods of power production (UNECE, 2020:27, 30). This energy transition also contributes to the sustainable development goals (SDGs) set by the United Nations or the development plans that an individual country may have adopted.

Power generation utilities in countries like Germany, Spain, Italy, and the United States, to name a few, are heavily invested in green energy production (Bachiller, 2009; Hoque and Moll, 2001). Hence, their investment in South Africa to transition from a coal-producing energy method is of paramount importance. The utility responsible for power production in Germany has made tremendous progress in the aspirations to produce power through clean energy methods. In addition, Bachiller (2009), Hoque and Moll (2001), and Fourie (2018) observe that these countries have invested in green energy production, such as solar and wind power, to ensure energy transition. Hence, the first-world nations' energy utilities, such as those in Australia and Spain, are the leading frontiers towards clean energy production (Bachiller, 2009; Hoque and Moll, 2001; Fourie, 2018). To that extent, power-producing utilities such as Iberdrola SA (IBDRY) of Spain and JinkoSolar Holding Co. Ltd. (JKS) of China are some of the leading clean energy-producing utilities across the world, offering products and sharing this ability with the African continent utilities. This means that international cooperation, knowledge sharing, and expertise become essential aspects of innovation in clean energy production (ENECE, 2020:7). Such cooperation is more

meaningful for developing countries in the transition of energy production. High international cooperation could lead to high levels of innovation and efficient business models for energy utilities (ENECE, 2020:7, 18).

Ahmad and Zhang (2020:1975) depict the growth of energy production and supply in first-world countries using international organisations and collaborations such as ECD, G7, BRICS, Europe, the European Union (EU), the Commonwealth of Independent States (CIS), North America (NA), Latin America (LA), the United States of America (USA), Asia, the Pacific region and the Middle East (ME). The international trends show the need to meet the high energy demands in the context of high energy prices (Ahmad and Zhang, 2020:1975). The high levels of industrialisation within first-world countries lead to a high energy supply, which also tends to be expensive makes it important to explore other means of energy production. Henceforth, their clean energy-producing methods are paramount to developing economies as they may be accessible and affordable. This is due to the demand for energy in developed countries (ENECE, 2020:9; Kimaro and Fourie, 2017). On a positive note, state policies in Africa are warming to the idea of renewable energy supply. For instance, South Africa has a 2030 National Development Plan (NDP) towards sustainable social, environmental, and economic development (Fourie, 2018). Similarly, the African Union Agenda 2063 is a vital social, environmental, and economic policy that promotes sustainable development (Kimaro and Fourie, 2017). ENECE (2020:3) notes that sustainable energy security requires energy independence, regional energy interconnectivity, and trade for social, economic, and environmental development. It is about countries being more creative and adaptable in their policy responses to build resiliency against threats like terrorism and climate change, among others (ENECE, 2020). Effectively, national, continental, and global energy utilities are responding to the call to move toward clean energy production. Clean energy, often called green or renewable energy production, implies that energy utilities will use less coal and other environmentally hazardous methods in energy production (Kuzemko and Britton, 2020; Sharifzadeh, Hien, and Shah, 2019).

There are currently opportunities for SOEs to assert their relevance in the energy sector and the growth in the supply of sustainable energy solutions. Energy utilities worldwide are limiting their carbon emissions through sustainable energy production

techniques (Hosseini and Wahid, 2016; Kuzemko and Britton, 2020). Sustainable energy production causes less carbon emission because it burns fewer fossil fuels, which means less smoke or chemical emissions, making it better for the environment. Hence, such methods are often referred to as sustainable energy production. They focus more on preserving the environment or enhancing its integrity. Countries such as Sweden and Iceland are good examples, with less than 40% of carbon emissions, as provided by Martins et al. (2019:5). For instance, the use of wind power does not require a lot of construction work and tall buildings, which leads to little tampering with the land or environment into a greener sphere whereby the emissions do not harm the environment. Some contribute to the growth of the environment as the large area of the environment would remain intact. Using wind power, the government would preserve nature and the environment as they need a large land without tall buildings to disturb the wind required to turn the wind turbines to generate electricity (Hosseini and Wahid, 2016). In addition, using solar panels also requires extensive and undeveloped land, which is sustainable because the government does not have to disturb inhabitants. Hosseini and Wahid (2016) further note that hydropower is a reliable energy source and a measure of sustainable energy production. Sustainable energy cannot be depleted because it comes from nature, wind, water, and the sun. Thus, these sources can continue to supply energy for future generations (Hosseini and Wahid, 2016). The rationale for sustainable energy security is to protect the environment, not pollute it with dangerous substances, and find affordable means of production.

Despite much anticipation around sustainable development and the fact that renewable energy sources present an opportunity to solve both the latter issues such as environmental conservation and high tariffs, nations across the globe are still facing an energy crisis. Thus, Brady and Geets (1994) explain that the energy crisis compels states to use natural resources for energy production, which challenges the idea of sustainable development. Therefore, employment and reliance on natural resources for power production, such as coal, may harm society and the environment because of its ability to emit hazardous emissions which are dangerous to the environment, such as smoke (Sharifzadeh *et al*., 2019). Communities close to the power stations in South Africa, such as those in Witbank and Middleburg, have complained about the

terrible smoke, which has caused harm to some people, resulting in death from illnesses (Du Toit, Horak and Kruger, 1992; Mafamadi, 2018).

Similarly, Obiadi, Obiadi, Akudinobi, Maduewesi and Ezim (2016:207) mention that the Enugu community, located in South-East Nigeria, is one such community close to a power station that is experiencing adverse effects from the station during electricity production, including harmful health conditions over time such as cancer. Even procuring some of these fossil fuels is dangerous for the environment; for instance, cola must be mined from deep within the earth, and the after is not returned to its original condition once all the coal has been removed, leaving a wasteland for future generations. Oil can often be acquired from ocean drilling, which becomes dangerous for sea wildlife. Hence, moving away from these methods to sustainable, more environmentally accommodative methods is considered responsible to the environment and society (Kuzemko and Britton, 2020). This indicates why many nations and corporations across the globe encourage the move to greener energy production and sustainable power production methods. States such as Germany, Spain, Italy, and the United States, to name a few, are heavily invested in green energy production (Bachiller, 2009; Hoque and Moll, 2001). Hence, their investment in South Africa to transition from a coal-producing energy method is of paramount importance.

However, several governments worldwide, especially those from third-world countries, may discourage energy transition, claiming it is expensive. Behuria (2020:1) further states that India complains about the costs of energy transition and its impact on the country, its businesses, and its citizens. Among the other reasons for the reluctance to implement renewable energy sources include government policy as well as the lack of skilled people who would manage and install the needed infrastructure (Adepoju & Akinwale, 2019:72). Although there have been programmes that look to address the shortage, this only comes after there has already been the crisis. Thus, even though the skill development programmes may be there for various people, they have been introduced to manage the energy crisis rather than solve it (Briggs, Atherton, Gill, Langdon, Rutovitz and Nagrath, 2022:4).

The AIE report (2022) mentions the five categories of programmes implemented to address the crisis, and these include clean energy skills training, reskilling for coal workers, retraining of workers in the oil, gas and auto sectors, academic and corporate

programmes, and targeted skills programmes for youth, women, and marginalised communities. These will ensure that while there is a pursuit for clean energy production, human factors and economic development are also intertwined in this vision. For countries such as South Africa, which has abundant coal energy supply, it might not be easy to implement expensive solutions when there is a cheaper and less disruptive method. Hence, the government has made little effort to ensure there is a shift to focusing on greener, sustainable energy, such as a lack of skills for energy transition, the reluctance of SOEs to transition to clean or green energy, the high reliance on the burning of fossil fuels and not embracing the energy transition process. These are some of the main reasons why SOEs, particularly those in developing countries, are not developing sustainable, clean, or green energy production methods.

3.2.2 Lack of energy infrastructure development and maintenance leads to energy insecurity

Sufficient infrastructure is vital for the energy sector to maintain a sustainable energy supply and, thus, energy security for the future. To this effect, regular energy generation and supply infrastructure maintenance should be a non-negotiable priority, primarily to ensure safety in case of explosions and convenience in case of blackouts, which have implications for human health (Anieheobi, 2008). Hydropower, nuclear, and coal-fired plants face challenges due to a lack of maintenance and development. For instance, the Medupi coal-fired power station has had to take down some of its generation plants due to a lack of maintenance (Pretorius, Piketh, Burger and Neomagus, 2015:28). Moreover, Onohaebi and Lawal (2010:31) mention the Sapele, Afam, Delta and Ijora thermal stations which were operating at less than 50% of their installed capacities due to lack of maintenance and proper management. These assertions highlight the impact of poor infrastructure maintenance on sustainable energy supply.

The infrastructure that most African countries inherited was built by colonial regimes, including energy production and supply networks. The post-colonial African regimes have invested little in new infrastructure and have a poor record of maintaining existing ones (Arewa, 2016:108). Hence, in most cases, they are just being neglected and not maintained. Therefore, these are old infrastructures, and lack of maintenance results in them collapsing or deteriorating (Kennedy-Darling *et al*., 2008). For instance, Eskom

has existed since 1934 in South Africa, and NESCO has also since 1929 in Nigeria, which means that their power generation and transmission infrastructure are old and continuing to deteriorate due to lack of maintenance (Shodipo, 2015). Their infrastructure is incredibly outdated, and they continue to deteriorate because of a lack of maintenance. This means that most of the existing infrastructures are old, with little maintenance, and near the end of their life span. Hence, when alluding to the plan to resolve the crisis in South Africa, the electricity minister, Kgosientsho Ramokgopa, notes that the infrastructure is outdated and needs to be revamped (Nethonzhe, 2023). The above-mentioned is what Onohaebi and Lawal (2010) explain as the bane of the electricity crisis in Nigeria: lack of maintenance, which leads to incapacity to supply adequate energy to meet the demand.

Hence, Anieheobi (2008) notes that when these structures are not properly maintained, their operations collapse, putting more pressure on the grid. The pressure on the grid is worsened by the population growth that has caused an increase in the energy consumption and demand, more than the existing power plants can bear (Alam, Fatima, and Butt, 2007:826). Since the grid is under strain, it will cause problems like tripping or exploding transformers that are not meant to supply excessive energy (Anieheobi, 2008; Shodipo, 2015). Francioli (2016) argues that power plants potentially harm the community and the workforce due to them developing critical illnesses (Francioli, 2016; Van Wyk, 2015). In addition, Kumar, Shrivastava, Jain and Patel (2015:149) allude to dangers such as cancer from working at thermal power plants, which some Nigerian workers face. Nkosi (2020:55) further alludes that a lack of investment leads to fixed or constrained budgets, which leads to poor management decisions such as postponement of critical maintenance at Eskom, sometimes resulting in staff injuries. In addition, Nkosi (2020:56) referred to the massive Duvha incident of 2011 as consequences of poor maintenance. The incident led to the damage of turbines of the unit's generation and the damage to the power plant infrastructure. Therefore, structural deterioration is essential and is noted to be a significant contributor to the energy crisis.

The deterioration of most infrastructure can also be caused by the lack of supporting infrastructure developments built over the years (Mills, 2012). Allen et al. (2014) contend that due to migration and population growth, community settlements increase,

and they expect the government to be able to supply them with electricity. Therefore, Eskom and NESCO must expand their electricity network to these areas to ensure these communities can access the power grid. However, due to weak infrastructure, these communities are not appropriately added to the system, causing a lack of energy for this segment of society (Bu *et al*., 2022). Furthermore, due to the lack of infrastructure, power stations cannot be adequately serviced and maintained, worsening an already situation (Bu *et al*., 2022). With enough power stations, the utility could share the load with less functional ones. Therefore, the lack of foresight to plan for subsequent generations and the growth and expansion of the population also becomes an issue in the energy crisis in South Africa and Nigeria.

Currently, uncertainty surrounding the Russian gas supply towards energy production threatens the energy supply for the Western nations. Researchers view this as a measure by the Russian government to punish those who are allies of Ukraine (Cazeres, 2022). Thus, this has seen Germany resorting back to coal-energy production to relieve the pressure on the energy demand (Nimara, 2022:88). Nimara (2022:88) further argues that Russia was the largest thermal coal supplier for Germany; hence, it is suffering due to the ban on all Russian energy products by most European countries. Although this hinders the SDGs of eradicating coal production energy, it is an essential response by the German government to combat its energy crisis (Cazeres, 2022). Therefore, the existence of these coal-energy-producing power stations has become beneficial to dealing with the energy crisis adequately. The German incident is an excellent example of energy security in that too much dependence on Russian gas is not ideal, and it is good news for Germany as it can resort to its coal sources for energy production, which is evidence of having a healthy mix of total energy production sources.

3.2.3 Sustainable energy as a solution to energy poverty

This study argues that energy insecurity is a dimension of energy poverty, a problem that is here to stay and worsened by energy racism. Racism is one of the oldest methods of separating individuals such that there would be specific people entitled to receive public goods as opposed to others (Lennon, 2020:3). This social discourse would give a segment of society a place at the top and the authority to alienate their counterparts (Fakier, 2018). This discourse has spread across different sectors of

society, including the government's provision of services and resources. Hence, Newell (2021) notes that even in the energy sector, racism can also be attributed as a discourse associated with a particular segment of society lacking energy. Energy racism can, therefore, be understood as the energy provision segregation of individuals in society based on race (Fakier, 2018). In addition, even if they receive electricity, communities will still depend on the periodic energy provision. This means that load shedding, reduction, and rolling blackouts would be a reality in these communities (Maggot *et al*., 2022).

Similarly, because of this segregation, they are forced to buy energy at inflated costs, although they receive partial benefits from its provision (Newell, 2021). It is often said that, within the South African context, the country's development, in retrospect, was a vision of apartheid policy, and it did not have inclusivity (Musavengane and Leonard, 2019:134). The apartheid government never envisioned a South Africa where Black and White people coexisted, and most Black communities would not be entitled to government services. This section is about the social aspect of sustainable energy supply. Moreover, it underscores the experiences of deprivation that affect the most vulnerable populations in society.

> *"Energy reinforced the already circulating hierarchies of race, gender, and class that animated the new imperialism, an era of European imperial acceleration that began in the 1870s with the so-called scramble for Africa and lasted until the disintegration of European empires at the end of the Second World War. New imperialism was driven by the desire to put the world to work according to the rhythm and intensity of fossil-fuelled systems"* (Daggett, 2019:108).

The first dimension of energy insecurity is economic energy poverty, and the second is energy racism. There are intersections between the two because one can be energy insecure based on racial and economic reasons.

3.3 RACIALISED AND OTHERED ENERGY POVERTY

According to Bednar and Reames (2020), energy poverty can be understood as the lack of and inaccessible means to reach sustainable modern energy services and products. Energy poverty affects economically marginalised people the most, as is the case in South Africa. Lack of access to energy services for economic reasons is a double blow when coupled with a lack of access due to racial exclusion. Racialised energy poverty is about using racial categories to systemically exclude other

population groups from accessing electricity in a political community, as alluded to by Luke (2022). It is about giving another racial segment of society a top priority regarding the power supply level or quality (Fakier, 2018; Newell, 2021). Where there is a homogenous racial population, ethnic and religious exclusions occur. Luke (2022) further alluded to the segregation of power supply in the US state of Atlanta as the society did not have equal access to power due to geographic location. This is like the study of Das, Martiskainen, Bertrand, and MacArthur (2022) from 2003 to 2008 in Canada, which found discrepancies in energy poverty based on population and geography. There is a triple blow of energy poverty where the economy, race/ethnicity, and geography intersect.

The racial discourse has spread across different sectors of society, including regarding the government's general provision of services where some racial communities receive intermittent energy supply (Newell, 2021). This means that load shedding, load reduction, and rolling blackouts are a reality in these communities (Maggot *et al*., 2022). Similarly, because of this segregation, they are forced to buy energy at high costs, although they receive partial benefits from its provision (Newell, 2021). South Africa's legacy of racial politics also manifested in the power grid designed to support a subsect of society and not the whole society, the White minority (Newell, 2021; Maggott *et al*., 2022:1). The above-mentioned supports the views of Luke (2022) and Das et al. (2022) as they uncovered the racialised supply of energy in Atlanta and Canada, respectively. The scholars allude to the segregation in the power supply between two areas, noting that the unequal distribution caused energy poverty to some members of the society.

Due to only a minority of people having to be served by the power grid during apartheid in South Africa, there were no excessive demands placed on the system to result in power outages owing to infrastructure failings or constraints. In addition, the racialised energy supply's effects were harshest on rural Black residents (Stephens, 2020), even though White residents in rural communities had access to electricity at the time (Ashman, 2021). What is also notable is that the issue of racial segregation of energy provision still prevails even in contemporary African societies (Fakier, 2018; Ashman, 2021). As a result, the modern, inclusive politics of South Africa see the utility trying to

accommodate all residents, irrespective of their racial classification, to access electricity.

An increasing number of people move from rural communities to urban areas (Pateman, 2011). In addition, this migration of residents is often unplanned. The result of unplanned migration into urban areas has led to informal settlements that often use illegal connections, as mentioned by Makonese, Masekameni and Annegarn (2016). These unplanned connections overload the power grid, leading to critical energy infrastructure like substations and local transformers exploding (Maggot *et al*., 2022). This has resulted in an overwhelmed power grid and an inability to ensure a reliable electricity supply to the end users, leading to an energy crisis. Ironically, these people migrating to the urban areas are the previously disregarded Black communities under apartheid or colonial government. They now congest the urban areas previously considered 'White communities' (Sultana, 2002).

Even with the large number of Black people migrating and causing expansion in informal squatter camps and townships, they are still not added to the national grid, or only a small number of these newly formed communities are connected to the grid (Ashman, 2021). However, this does not imply that the government has not been trying to ensure electricity connection to the grid over the years. According to the government's Electrification Statistics for March 2018, while there were 13,745,248 connected to the grid, about 2,208,898 households across the country still live without electricity (DoE, 2018). In addition, most of these households are located within South Africa's Limpopo and Eastern Cape Provinces (the former Bantustan provinces) (DoE, 2018).

Most Eastern Cape and Limpopo households are in rural areas and far from government services. Such energy policies indicate that the government is still behind regarding equal benefits or access to services. There is a segment that receives resources and services as opposed to others, which can be seen to be based on race; hence, more White communities are electrified than others as per the Electrification Statistics for March 2018 (Newell, 2021; DoE, 2018). Thus, the policy vision of Eskom to focus on urban areas can currently be regarded as not fully inclusive, inhibiting growth such that SOEs cannot reach the sustainable development growth plan for solving the energy crisis.

The character of urban planning and its apartheid legacies of separate development has led to townships being regular residential areas where most Black people reside, separated spatially from towns where most White people stay. In other townships, the Coloured people are located roughly ten kilometres near Black residential areas, although the Coloured communities are often far apart from Black townships. Consequently, electricity services are typically worse in Black townships, better in Coloured and Indian communities, and the best in White communities. Thus, a racial demarcation regarding social development and energy supply is formed. Similarly, from the Nigerian perspective, the circular model also depicts the factors limiting or enhancing energy access in that country. Therefore, energy racism can also be noted as one of the main factors hindering SOEs' growth regarding sustainable energy supply. Maggot et al. (2022) depict that South African townships are experiencing high-intensity energy racism and falling victim to load reduction. In Nigeria, factors such as race, ethnicity, and religion play pivotal roles in energy racism and access to energy.

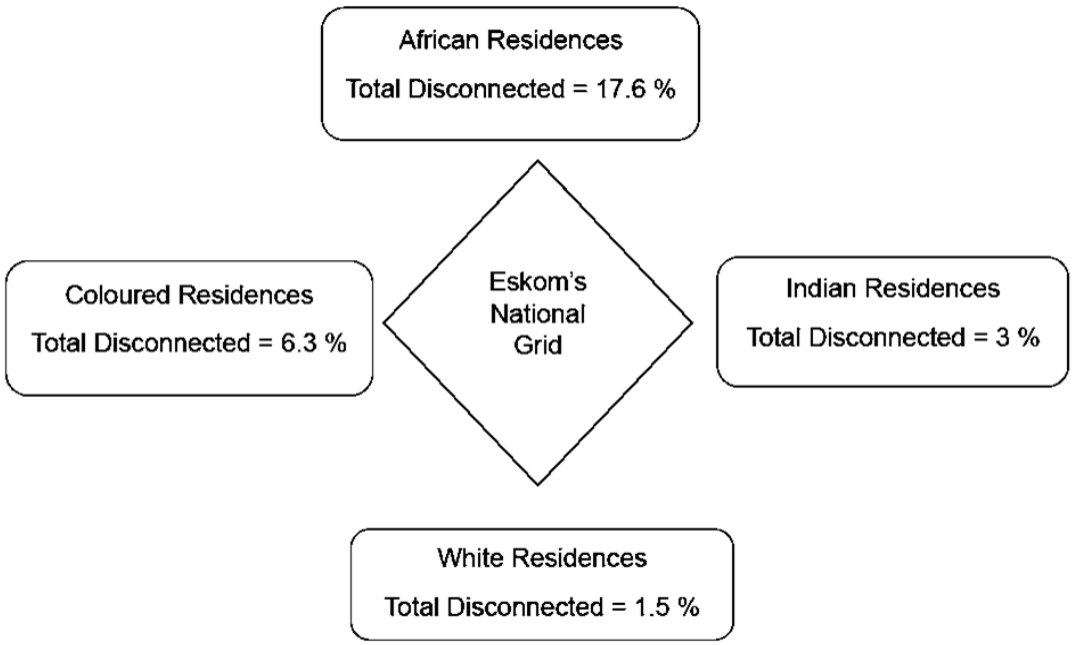

Figure 3.1: A racialised/othered quadrant of energy supply in South Africa (Own construction)

Figure 3.1 depicts a racialised or othered quadrant of energy supply in South Africa. These groups presented are the dominant races found in South Africa. From this premise of the racialised quadrant, about 17.6% of Black residencies are not

connected to the power grid and are the majority regarding race (Roy, 2021). This was followed by Coloureds (6.3%) as the second largest group not connected to the power grid. Third are the Indian residencies, with about 3% not connected to the power grid. Finally, only 1.5% of White residencies are not connected to the grid, even though they are the minority (Roy, 2021). This indicates that there are vast differences in terms of the connections confirmed on the grid, while the majority of Blacks and Coloureds are the ones being marginalised from the electrical grid.

Eskom implements rolling load reduction interventions in Black townships the most, where power cuts could last for months, something that does not happen in towns. Load reduction is the step taken by a power utility to switch off electricity in areas where illegal connections are causing overload to the grid such that they could damage the infrastructure. There is a perception that people in Black townships are connected illegally to the grid (bridging electric meters), hence the prevalence of rolling load reduction in those areas (Maggot *et al*., 2022). Load reduction in Black townships could be an instrument of collective punishment/discipline, although not everyone there is connected illegally to the grid. This inability to isolate customers who cheat the system without negatively affecting law-abiding customers is another hindrance to SOEs' efficiency in service delivery. Maggot et al. (2022) further depict that Eskom and government leaders are still using townships and squatter settlements as a scapegoat, labelling them as the root cause of the energy crisis in the country. Illegal connections, non-payment of bills, and cable theft are reported to be a culture in Black communities such as Soweto. Hence, the municipality and Eskom leaders have coined the phrase '*Soweto Eskom debt'* to emphasise the community's stubborn culture of non-payment. Maggot et al. (2022) view such an assertion as a pure intention to segregate Blacks and Whites and, therefore, may be attributed to having racial sentiments and advancing racialised energy poverty.

According to Johnson, Bottorff, Browne, Grewal, Hilton, and Clarke (2004:253), "Othering is a process that identifies those that are thought to be different from oneself or the mainstream, and it can reinforce and reproduce positions of domination and subordination". In this regard, there are negative attributes to Black townships (othering) in South Africa contrasted to their historical White, Coloured, and Indian communities. As a result, economically progressing Blacks desire to leave the

townships and join the others to escape the poor service delivery standards and problematic or unstable power supply. The focus is on seeing Black townships as a problem instead of working on Eskom's inefficiency; here lies the hindrance of SOEs in providing a sustainable water supply. Similarly, racialised and othering-induced energy poverty in Nigeria results from the colonial government having not invested in the necessary infrastructure to ensure the country's electrical independence (Fakier, 2018).

Figure 3.2 below regards othering in the context of Nigeria, where the narrative posits that the elites are closest to the grid; in other words, they are served better by the grid. It means those close to the core of the national grid are more likely to receive energy than those at the periphery. The grid is othered as the energy supply depends on various factors such as political affiliation, rank, and prominence of businesspersons, which may be of any colour, religious affiliation, or tribal affiliation. In most cases, political elites are the ones making decisions, and they have the most monetary resources; henceforth, they are the ones mostly considered when it comes to energy supply (Ojukwu and Shopeju, 2010:18). While othering based on religious affiliation is to determine those who have access to stable energy supply. Those in the same religious faction/group as those in power tend to receive more public services, including energy access (Orji, 2011). Hence, this can also play a vital role in the election outcomes in Nigeria. Those at the periphery are based on ethnic grouping, as there are those from important tribes such as Hausa-Fulani, Igbo, and Yoruba tribes, which comprise 70% of the country's population (Guler, Boke and Tsado, 2023). Therefore, energy supply in Nigeria depends on this ordering, hence constructing a model such as the one in Figure 3.2.

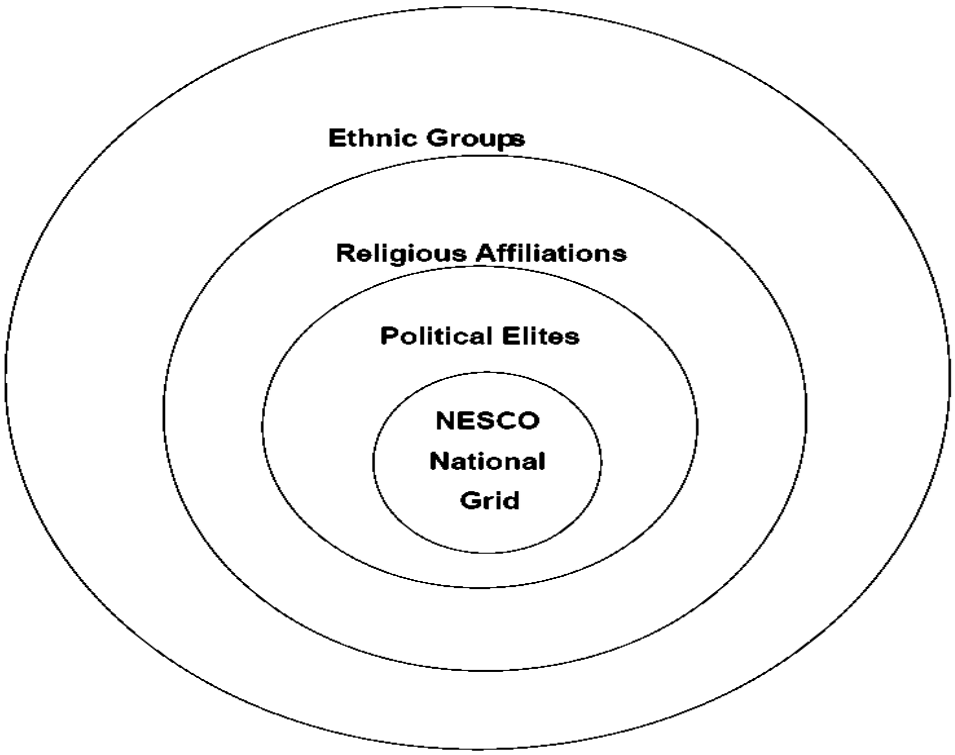

Figure 3.2: An othered circular model of energy supply in Nigeria (Own construction)

Overcoming the racialised and othered energy poverty requires a commitment to egalitarian principles of inclusive democratic societies that do not consider one group as inferior to the other. Access to energy is vital for individual and collective human development. It is immoral for access to energy to be reserved for only a few in society (Sovacool and Dworkin, 2015). Hence, there is a need to ensure that renewable energy technologies are affordable to the least advantaged populations in society to enable a just energy transition. Otherwise, the transition to renewable energy sources will remain expensive and out of reach for most people, as Shahzad (2012) states. It is also worth noting that racialised energy poverty is not a problem of individuals in society but a concern of SOEs in developing countries (such as NESCO and Eskom) that rely on funding and technology transfers from developed countries. Moreover, developing countries rely on private companies (investors) from developed countries to help finance power plants for the energy transition. This study argues that SOEs in developing countries are not developing sustainable means to address the energy crisis for present and future generations. Therefore, Eskom and NESCO must invest more to find sustainable means to produce and supply energy.

3.4 PRINCIPAL-AGENT TENSIONS AT THE CENTRE OF INEFFICIENCY, MISMANAGEMENT, AND CORRUPTION OF SOES VS POES

The problem of SOE inefficiency is caused by politicians who get involved in the day-to-day running of these entities, hindering their ability to operate efficiently with transparency and accountability (Madonsela, 2018). The debate between SOEs and privately-owned entities (POEs) has been among the most interesting arguments raised by scholars (Shirley and Kammen, 2013:251). The case of China shows efficient SOEs perform positively over time and contribute positively to economic growth (Qi and Kotz, 2020:96). This study argues that corruption and selfish interests of the agents at SOEs for South Africa and Nigeria contribute to the principal-agent problem. Every financial year, agents should supply principals with organisational expenditure and profit reports; failure to provide this means that the agents are not efficiently performing their organisational duties (Patel, 2022). In most cases, this is driven by the selfish ambitions of agents to either perform duties on their own time, not perform duties at all, or perform duties for self-enrichment (Madonsela, 2018). Even in the case of Eskom and NESCO, there is a considerable discourse of corruption ravaging the operations of these SOEs. Eskom has delayed releasing its annual report and received harsh criticism from the public accusing it of covering up maladministration and corruption in the SOE (Ensor, 2023; Patel, 2022).

The SOEs have a socioeconomic function to promote the nation’s interests (Bowman, 2020). Countries also use SOEs for infrastructural and economic development, like in aviation (Fourie, 2016), and partner through bilateral relations using SOEs (Davis, Fuchs, and Johnson, 2019:406). It is possible to accept that SOEs have a strategic purpose to stimulate economic growth across various sectors of the economy. Hence, many individuals working at the managerial level within these entities are members of the ruling party to ensure they continue with their affiliated party's vision, policy, and mandate (Mandonsela, 2018). Madonsela (2018) highlights the relationship between political elites, entrepreneurs, and dealers, which, when tainted by corruption and maladministration, often negatively impacts the efficiency of SOEs. Madonsela mentions political elites like Malusi Gigaba, Brian Molefe, Mosebenzi Zwane, and Anoj Singh; the entrepreneurs or brokers, Eric Wood, Salim Essa, Ashok Narayan, and Iqbal Sharma; and the dealers as political networks. Being partisan and managing an SOE often leads to the collapse of corporate discipline and practices for efficiency, as

the principal overlooks inefficiency and poor management in SOE operations (Swilling, 2017). When an agent will not accede to political demands, the principal often replaces them.

The concept behind the political appointment of agents in South Africa is known as cadre deployment or cronyism (Ndedi and Kok, 2017). Kisten and Maharaj (2022:238) interpret cadre deployment as the governing party appointing “a party-political loyalist to an institution or body, independent or otherwise, as a means of circumventing public reporting lines and bringing that institution under the control of the party, as opposed to the state”. The policy of cadre deployment is not unique to South Africa or Nigeria. It is referred to as a ‘political appointment’ globally (Praça, Freitas and Hoepers, 2011; Li and Liang, 2015) and regards providing influential positions at strategic state institutions and regulatory bodies to party loyalists to ensure that the governing party delivers on its electoral manifesto. However, cadre deployment in South Africa and Nigeria seems to be the root cause of corruption, especially at the government and SOE levels (Omotola, 2009:198). Shava and Chamisa (2018) blame the deteriorating state capacity to deliver services on cadre deployment, as the government has deployed people with insufficient skills to public offices. Similarly, Swanepoel (2022) views cadre deployment as the enabler of corruption within SOEs because political loyalists are deployed to create opportunities for their circle of political friends in or outside the entity. These scholarly views from Shava and Chamisa (2018) and Swanepoel (2022) suggest that cadre deployment is the root cause of corruption in SOEs and at the governmental level.

For example, South African Airways (SAA) is among those SOEs and has cost the South African government between R35 to R45 billion since 1999 and recently had to go under business rescue after multiple attempts by the government to bail them out (Head, 2020; Cassim, 2020). Investors had previously warned that multiple bailouts for SAA were not sustainable and would lead to it accruing debts like that of Eskom (Bowman, 2020). In other words, government bailouts covered up financial mismanagement in the entity. Tleane (2020) argues that the agents tasked with managing SAA have repeatedly failed to sustain the SOE or give reports to the principal. Therefore, mismanagement has led to the financial instability of SAA and increased incidents of corruption.

Similarly, even in the case of Nigeria, Nigerian Airways also collapsed due to corruption, mismanagement, and the vast borrowing of money from the International Monetary Fund (IMF) (Onokala and Olajide, 2020:2953). Onokala and Olajide (2020:2953) explain that Nigerian Airways was founded in 1958 as the West African Airways Corporation Nigeria (WAAC Nigeria) and rebranded as Nigerian Airways in 1971 until it collapsed in 2003. The majority shareholder of the entity was the Nigerian government, with just 51% until 1961 when their ownership was boosted to 100% state-owned (Fasan, 1999). Mismanagement, corruption, and nepotism caused overstaffing; the airline was in total debt of US$528,000,000 at its closure (Ajayi, 2000). In addition, the airline had a poor safety record, and the operative fleet only included a single aircraft flying domestic routes and two leased aircraft operating the international network. These were early signs of corruption and political patronage in Nigerian SOEs, leading to the collapse of Nigeria Airways (Akpoghomeh, 1999).

The SOEs' response to the energy crisis has been overshadowed by corruption, lack of accountability, and maladministration. Maiyaki (2010) and Olaniyi (2014) assert that Nigerian corruption levels are among the worst in the world, hindering the state's ability to supply services and run clean governance. The corruption levels have also affected Nigeria's socioeconomic imbalance, which was already from economic imbalances (Bankole and Olaniyi, 2014). The issue of corruption is not unique to South Africa and Nigeria but is a common occurrence in SOEs worldwide. Baum et al. (2019) note that SOEs have the most substantial relevance in the global economy and nationally but exist in permanent corruption. Baum et al. (2019) present evidence that SOEs in about eighty-eight nations worldwide run under a financial disaster rather than efficiency. Cheng (2004), while focusing on China, reports that there are still underperforming and inefficient SOEs. Ghazi-Tehrani and Pontell (2020) compared the US and China and found a considerable corruption problem despite well-developed mechanisms like anti-corruption units. Corruption negatively affects the productivity of SOEs in the US, Italy, and China (Merloni, 2018), even to the point of their downfall (Ghazi-Tehrani and Pontell, 2020; Ghazi-Tehrani and Pontell, 2022). Therefore, corruption is not a phenomenon limited to South Africa or Nigeria but a challenge for SOEs globally, and if it is granted, corruption is permanent in the life of SOEs. It is crucial to control the levels of corruption to the extent that it does not destabilise the SOEs' operations, efficiency, and sustainability.

3.4.1 The corruption challenges of SOEs' response to sustainable energy supply

The privatisation of the Nigerian electricity sector was hoped to revive the sector and do away with the legacy of corruption. Roy, Iwuamadi and Ibrahim (2020) allude to the revenue shortfalls from the SOEs, which can be traced to as early as NESCO. Corruption in the Nigerian energy sector costs over ₦11 trillion (Naira, Nigerian currency), equivalent to US$30 billion (Ikein, 2017). In addition, Ikekpeazu (2018) argues that the Nigerian energy sector has been neglected even since the early days of NESCO. Henceforth, the industry has been marred by corruption, ineffectiveness, and inefficiency that have undermined the energy supply, even after the sector's reform. The corruption in the Nigerian energy sector is so severe that various administrators have tried to revive the sector without success. Nigerians are still experiencing an energy crisis (Ikekpeazu, 2018).

From that understanding, the electricity crisis in Nigeria is general mismanagement, which includes corruption, lack of political leadership, outdated infrastructure, illegal electricity connections and high energy consumption (Roy *et al*., 2020; Chanchangi *et al*., 2022). In comparison, Eskom corruption has endured for years, including both the organisations' principals and agents, as they may all be part of a plot to loot the entity. Over the years, the government has bailed out Eskom and strived to save the power utility, and this came at a cost for the government, and this intervention ended up being looted by both agents and principals of the entity. Although it is difficult to calculate the overall cost of corruption to the government at Eskom, the entity ended the 2019 fiscal year with a loss of R20.7 billion (Vunza, 2023). Furthermore, it was estimated that the government would provide R59 billion in bailouts over the next two years, with a promised R69 billion for Eskom by 2021 (Vunza, 2023). Also, the Eskom debt has kept rising due to corruption, while the entity is also owed about R40 billion from the citizens of different provinces (Vunza, 2023). Bloomberg (2023) labelled the corruption at Eskom as systemic sabotage because of persisting increases in operational costs annually. Bloomberg (2023) argues that this has cost the government billions of rands. As a result, the strategic focus becomes saving the entity from corruption instead of building Eskom and NESCO's capacity for competitiveness in sustainable energy supply.

The inability of SOEs to invest in sustainable energy technologies results from corruption because monies are diverted away from the core functions of the entity (Lagarde, 2017). The diversion of monies from core functions due to corruption has led to shortfalls in the budgets and development funding. Therefore, the corruption at NESCO and Eskom has led to proposals that entities are better privatised than those belonging to the public (Grobbelaar, 2011; Smit, 2023). However, other proponents argue that privatisation has led to the corruption and collapse of SOEs (Etkind, 2023). Scholars such as Bankole and Olaniyi (2014) and Bowman (2020) agree that Nigeria and South Africa's political economy suffers from the failure of the energy sector. Therefore, the corruption at these entities hinders an effective response to the energy crisis.

3.4.2 The performance inefficiencies of SOEs vs POEs in sustainable energy supply

Goldeng et al. (2008) argue that the vast existing literature on the comparison between SOEs and POEs suggests that state entities have lower efficiency than those in the private sector. The concern about inefficient SOEs is fair because the variables that determine their efficiency are the same as those for POEs: management incentives, operational costs, and market exposure (Goldeng *et al*., 2008). Therefore, no unique variable makes POEs perform better except a commitment to good sectoral practices. However, Estrin et al. (2016) hint that POEs are more committed to making a profit, which is fundamental to their increased market exposure and management incentives, while SOEs are driven by political agendas more than profits. In addition, there is an impression that the managers in SOEs also pursue self-enrichment and corruption networks instead of operational efficiency and clear performance outcomes (Goldeng *et al*., 2008). When comparing POEs and SOEs in the energy sector, Alkhuzam et al. (2018) note that better financial performance and good service delivery quality are excellent distinguishing aspects. Although most power-producing utilities are state-owned, private entities are the most profitable (Alkhuzam *et al*., 2018). Wang (2008) found shortcomings in both SOEs and POEs while analysing the work attitudes of Chinese employees in these entities. For instance, POEs must review the idea of employment and focus on employing young people while ensuring that the workplace is conducive for the agents (Wang, 2008). While the SOE principals need to consider workers' commitment, as many take advantage of the sector, they find themselves in

positions due to job security and not work commitment. Thus, compared to the two entities, the private sector has a better chance of reaching full efficiency while ensuring sustainable development over the years than the public sector. However, this does not remove the much-needed policy changes that should happen in the private sector. For example, economic policies such as capitalism can be transformed into a socialised policy that prioritises human capital instead of a profit-driven agenda, which is currently the private sector's agenda.

The perception that SOEs are inherently inefficient should not be left unchallenged. For example, a POE called Comair Limited in South Africa faced closure because it could not sustain itself, which shows that POEs can also collapse under the challenges that SOEs face (Lechman, 2022). Comair Limited is a private airline that had to undergo business rescue as SAA did due to mismanagement of resources, which led to the National Union of Metalworkers of South Africa (NUMSA) trade union calling for the resignation of the CEO (Lechman, 2022). This directly reflects the same mismanagement seen with SAA. Therefore, SOEs are not necessarily inferior and do not always reflect corruption and mismanagement. Centrica, a British Gas company, faces financial challenges, depicting a global POE crisis.

However, this does not necessarily mean that those in the public sector are corrupt and may be running at a loss due to mismanagement. Blalock (1992:184) defines mismanagement as “a failure of competence in the handling of one or more tasks of planning, organising and controlling an enterprise”. This means that most SOEs fail to adequately plan their activities, resulting in wasteful or fruitless expenditure (Adebayo, 2022:126). Alkhuzam et al. (2018) explained that effective energy production and distribution management is challenging for any entity. A public entity, the Electricity Company of Ghana, typically takes about 78 days to upload new customers to the national power grid, while another private utility, Empresa Electrica de Guatemala, takes about 44 days to connect new customers (Alkhuzam *et al*., 2018). This shows how easy it is for people to access electricity, and POEs are becoming real competitors of the energy market share that SOEs enjoy. Public entities must work more efficiently in response. Aspects of responding to the competitive environment are seen in the rapid growth of POEs in Dubai. The SOE, Dubai Electricity and Water Authority, implemented a reform to accelerate energy connections within ten days compared to

the usual 55-day waiting period (Alkhuzam *et al*., 2018). On the note of coemption, Alkhuzam et al. (2018) further allude that power outages have little to do with the type of ownership of an entity but are a matter of future planning and anticipation to accommodate the increased demand. When SOEs cannot manage the demand that outstrips supply, it presents a business opportunity for POEs to serve those who want a reliable energy supply. In other words, people would use the services of a reliable and cheaper energy supply entity, whether private or state-owned. The longstanding energy crisis is because of a government that does not make policy provisions to allow POEs a more significant role in the energy sector to resolve the energy crisis.

Regulatory institutions such as NERSA and the Nigerian Energy Regulatory Commission (NERC) could carry the greater responsibility because they place embargos or policies which regulate the amount of energy produced and by whom. Hence, NERSA has approved electricity production by IPPs in South Africa with an allowance of up to 100 MW of energy production. While in Nigeria, NERC has allowed eleven different POEs (Abuja, Benin, Eko, Enugu, Ibadan, Ikeja, Jos, Kano, Kaduna, Port, and Yola Electricity Distribution Companies) to oversee energy production as they battle with producing sufficient energy. Regarding high energy prices as a driver of the crisis, Alkhuzam et al. (2018) argue that SOEs and POEs' electricity tariffs are the same because the energy regulatory bodies regulate energy tariffs; the prices set should be able to accommodate each entity in the private and public sectors. It is also worth noting that SOEs have an advantage in the energy sector because they manage the distribution infrastructure. For instance, Eskom's challenges regarding IPPs' access to the grid can also be seen as examples of the competition brought by the private sector (Eskom, 2023). Similarly, in the case of Nigeria, the rolling out of the metering system being in control of the private sector also challenges the role of the public utility there. Hence, Oseni (2015:155) mentions the reluctance of the private sector to invest in energy production, which will provide a competitive edge for the public sector through the metering system.

From the above scholarly work, SOEs may be trailing behind concerning energy provision, implementation of policies, and response to customer needs for energy provision. Nevertheless, the private sector also has its fair share of challenges inhibiting growth. Although most states resort to private entities for energy production,

they still experience a prominent level of energy poverty, inadequate connections, and mismanagement (Raina and Sinha, 2019), leaving much space for political leadership to intervene.

3.4.3 Political interference in SOE operations

Politics affect the events that unfold within society's different spheres. At a social level, it affects who gets what, when, and how in terms of the distribution of resources (Heller, 2020). Political decisions can affect economic growth regarding the extent of political stability that influences the ease of doing business in the political community (Billah Tufail *et al*., 2019). This aspect of the distribution of resources and the ease of doing business is at the centre of SOE functions and political decision-making. For example, independent regulatory agencies (IRAs) in the energy sector are vulnerable to influence from political principals and other political institutions as well as administrators to decide on the policy of tariffs and licensing of new private sector players in energy production and distribution (Adesola and Brennan, 2019; Correa, Melo, Mueller & Pereira, 2019). Formally, the IRAs are immune from the direct inference by political principals; an example is how, when called upon by some sections of society to deal with the increasing electricity tariffs, South African President Ramaphosa said he could not interfere in NERSA's decision to hike the prices (Dentlinger, 2023). However, in practice (informally), the IRAs are at risk of political interference. This is shown in how, a week later, after declining calls to interfere with the electricity costs, President Ramaphosa changed his argument when he asked Eskom to halt their 18.65% tariff hike amid the energy crisis even though NERSA had alluded that it could not change its decision (Khumalo, 2023).

The scenario above shows how SOEs are led to operational inefficiency and financial ruin by political principals instructing them to deviate from cost-recovery policies. The increase in energy tariffs could benefit the agent who wants to ensure the profitability of the SOEs and impress the principal as far as the return on investment is concerned (Wang and Mao, 2022). However, the tariff increases could frustrate the principal who wants to use low prices to show political concern for the public and secure electoral support (Salamon and Siegfried, 1977). Whether increasing tariffs for profit or keeping them low for political expediency, the agents in energy entities benefit from performance bonuses and lucrative retirement benefits (Hillman, 1982).

The other aspect of political interference is from the SOEs, who want to preserve their monopoly in the energy sector and keep POEs out of the picture (Jarvis, 2012:479). The arrival of alternative energy production technologies like solar panels threatens the customer base of SOEs, as customers resort to cheaper and more reliable suppliers (Billah Tufail *et al*., 2019). Furthermore, Okedu (2019) indicates that the concern should be about the sustainability/survival of SOEs rather than protecting the agent's or principals' interests. Agents who have heeled to the pressure of political influences in the decision-making at SOEs regarding operations have seen these entities collapse or be inherently inefficient. This has led to questions regarding whether POEs could be the best way to ensure the energy security essential for industrialisation (Lazzarini and Musacchio, 2018).

Notably, POEs have a better prospect of efficiency and supplying energy sustainability because they are free from political interference in their operations (Lazzarini and Musacchio, 2018). In that regard, this study notes political intervention as one of the components that constitute South Africa's and Nigeria's energy crises. Within Nigeria, political elites enjoy the benefits of political networking and government participation (Kennedy-Darling *et al*., 2008). These political elites interfere with the day-to-day running of these entities, looting resources through corrupt activities (Madonsela, 2018). Hence, SOEs such as NESCO are suffering and under constraints. Omoleke et al. (2011) document that political interference is taking its toll on the day-to-day running of the entities, their capacity to supply services, and their ability to effectively execute their mandates. Omoleke et al. (2011) further assert that SOEs suffer from corruption, maladministration, and irregular spending, which hinder their ability to generate energy at full capacity. The maladministration and irregular spending include spending on projects which will not equip the development of the entity. In addition, having ghost workers added to the payroll system adds to entities' constraints, as the budget towards these workers could be reprioritised to other matters (TSJ Reporter 1, 2024). However, due to such corruption, entities do not address critical strategic sectors and lose more capital. Similarly, in South Africa, corruption is also taking its toll on the growth of Eskom as a giant entity that has also been under the radar of political interference and many political networks (Thomas, 2012). But ghost workers had not been found in Eskom since 2018, showing a company with improved systems (PMG, 2022)

Political interference is one of the most significant factors contributing to the energy crisis in Nigeria and South Africa. Through patronage, political networking, and clientelism, political elites have ensured they can interfere with these entities' operations (Oyelere, 2014). Political appointments limit Eskom and NESCO's ability to generate energy effectively and at full capacity due to corruption to enrich themselves and their cadre. Therefore, political cronyism has brought about the apparent energy crises in South Africa and Nigeria, bolstering calls to redesign the energy sector because "the essence of privatisation is to extricate government interference and its excesses from the operations of hitherto State-owned utilities while private entrepreneurs are managing them" (Audu *et al*., 2017:1228).

Audu et al. (2017:1219) highlight how a monopolised energy supply in Nigeria between 1972 and 1998 through the SOE, National Electric Power Authority (NEPA), was abysmal due to "inadequate funding, institutional corruption, and excessive political interference along with poor managerial and operational strategies". The political interference in NEPA and its inefficiencies led to the Electric Power Sector Reform (EPSR) Act in 2005, which liberalised the energy sector with the hope that privatisation would lead to stable and uninterrupted power supply (Audu *et al*., 2017:1228). However, the Nigerian power sector's privatisation did not meet expectations because power outages and lack of access to power persist (Audu *et al*., 2017:1220). The reasons for the poor performance of POEs in the Nigerian energy sector include a lack of clear institutional and policy focus (Hamza *et al*., 2020:58), improper implementation of energy policies, poor strategy, low investor knowledge, fragmented shareholding structure and undue politicisation of the privatisation process, as stated by Abba (2008), cited by Audu et al. (2017:1222).

3.5 INCONSISTENT POLICY FORMULATION AND IMPLEMENTATION

Principals have the most influence on energy policies and which priorities SOEs implement. Hence, what politicians consider a priority for reforms may not be what the SOEs need (Adesola and Brennan, 2019). For instance, when an entity is not productive or running at a loss, politicians through the energy regulatory bodies may want to increase the tariffs, as has been done in the case of Eskom (Acharya and Gumbi, 2023). However, the problem is not tariffing structures but corruption, mismanagement, and lack of operational ability. Raising tariffs is not only part of the

problem but also burdens poor communities as electricity becomes expensive (Akabuiro and Umeobika, 2020). Tariffs are a problem because due to the rising costs of living, which most people cannot afford in Nigeria and South Africa, they resort to illegal connections, which will further overburden the utility, contributing to the energy crisis and limiting the entity from being sustainable (Adesola and Brennan, 2019; Kennedy-Darling *et al.,* 2008). As a result, despite numerous bailouts, SOEs remain ineffective (Musacchio, Lazzarini and Aguilera, 2015).

This study argues that politicians overseeing policy formulation is one of the critical issues which limit SOEs' sustainability because many are specialists in that sector and are only deployed to these sectors due to partisan or majority rule. There needs to be a clear understanding of the issue to formulate policy; hence, the policy should serve as a remedy to tackle the problem. In addition to the above-mentioned, for Eskom and NESCO to be fully sustainable, there must be a clear understanding of energy poverty, theft, corruption, and mismanagement at the utilities. Thus, understanding the issues at Eskom and NESCO will help policy formulation to tackle the energy crisis. The policy of unbundling the SOEs responsible for energy is currently preferred in Nigeria and South Africa.

3.5.1 Unbundling of Eskom

The policy of unbundling the energy sector is not unique to South Africa. Aruba implemented it, only to reverse it again (Shirley & Kammen, 2013). There is a call for Cameroon to break its monopoly in the energy sector because a monopoly makes the country vulnerable to energy insecurity (Pietrzak *et al*., 2021:4). Breaking the monopoly in the energy sector is another term for unbundling. Unbundling Eskom mirrors Nigeria's SOE unbundling (Audu *et al*., 2017:1223). The reasons for unbundling SOEs could be for operational and financial efficiency, but the other reason is the transition to renewable energy sources and the reduction of carbon footprint. South Africa's power utility contributes a lot to the carbon footprint, and the emissions of Eskom are one of the overwhelming worldwide (Hlongwane and Daw, 2022:256). To that extent, the economy of South Africa is also considered to be a carbon-intensive one, and there is a high reliance on the burning of fossil fuels for production/manufacturing (Kumar, 2019). Thus, Eskom also lies within the borders of these industries or entities with intense carbon footprint, this is because of the burning

fossils to attain its products. Hence, the announcement of an international climate deal at the COP26 to avail about US$8.5 billion for Eskom to transition from coal electricity production and to unbundle its operations (Baigrie, 2022). The unbundling of Eskom refers to the separation of operations at the utility concerning energy generation, transmission, and distribution (Kumar, 2019). The unbundling of Eskom would significantly decrease the power utility's red tape, management, and operations hence making means of production easier. In addition, administrators also hope that this limits the amount of corruption at the utility and enhances accountability. Lack of accountability has led to the demise of Eskom. Scholars like Baigrie (2022) consider Eskom an obsolete organisation. Baigrie (2022) notes that Eskom's debt amounts to about R392 billion (US$24 billion), which is close to 8% of the country's gross domestic product (GDP). This shows that Eskom is not sustainable and cannot operate under normal circumstances, which is the reason to disrupt Eskom's monopoly controlling the generation, transmission, and distribution of energy in the country (Hlongwane, 2022; Baigrie, 2022). The unbundling of Eskom will also open the space for IPPs to operate and distribute energy for consumers and businesses (Baigrie, 2022). The participation of IPPs is expected to reduce the occurrence of power cuts due to unmatched demand.

Thus, the unbundling of Eskom is hoped to be a solution as multiple entities focus on a specific task to generate, transmit or supply energy. This will also depict which entity is losing or generating more income so that the managers can easily determine the issues causing it to fail and resolve them. In its current form, Eskom has a centralised power production mechanism that limits the ability of the utility to be sustainable. Hence, the unsustainability of the entity significantly contributes to the energy crisis in South Africa. Similarly, the unsustainability of the utility is causing or contributing to the economic downturn from negative economic growth. Figure 3.4 below depicts the current energy generation and distribution through Eskom, where IPPs sell generated power to the SOE to sell to the consumers directly or through municipalities. Under this arrangement, IPPs can generate electricity but not sell it directly to consumers because the transmission infrastructure belongs to Eskom. In other words, Eskom does not allow private entities on its grid, allowing Eskom to determine the energy purchase prices and prevent competitors who would sell electricity cheaper.

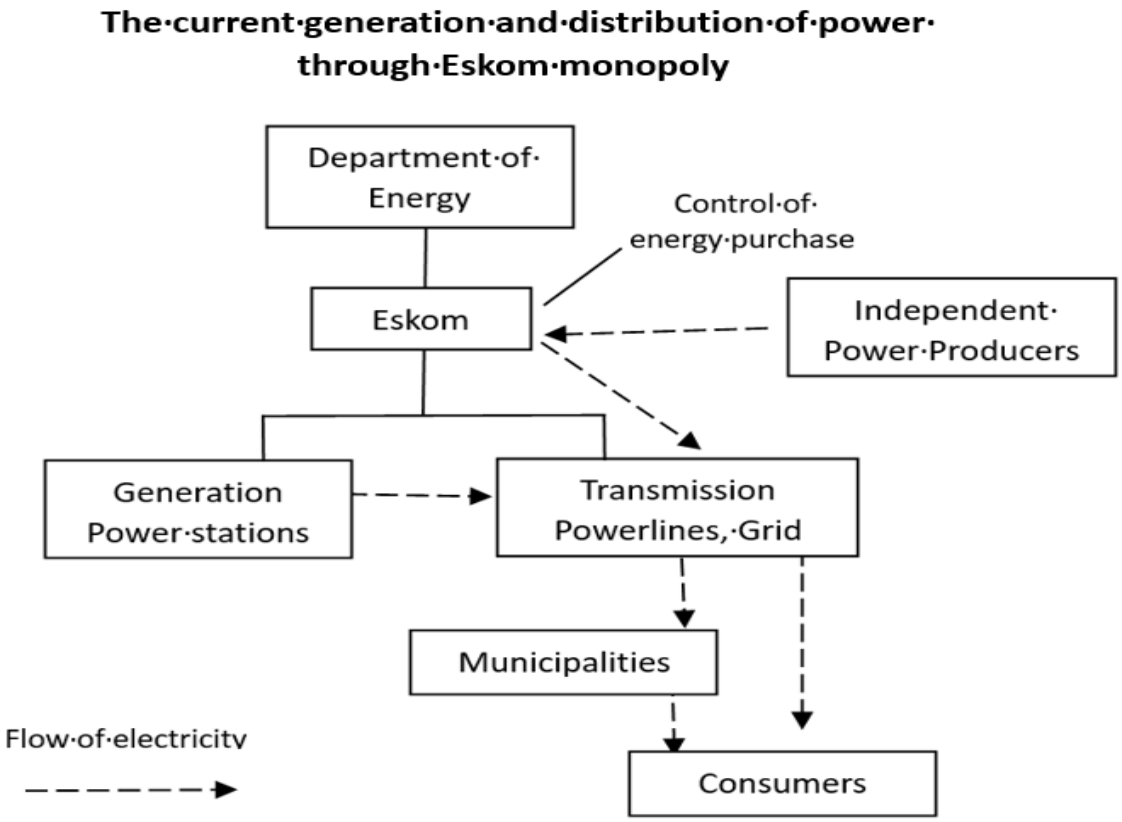

Figure 3.3: Electricity generation, transmission, and distribution of Eskom (adapted from www.OUTA.co.za)

The desired configuration for energy generation and distribution under an unbundled Eskom would see the virtual removal of Eskom and replace it with subsidiary companies, such as the National Transmission Company of South Africa (NTCSA) (Comins, 2023). The NTCSA will operate the transmission business (Eskom, 2022:3, 6) Figure 3.4. below illustrates the new configuration of the energy supply institutions in South Africa. However, looking at the shareholding arrangements in the institutional transition, one sees that the NTCSA is not a private entity but a company that is 100% state-owned (Eskom, 2022:8,10). Moreover, the NTCSA cannot incur new debts, leaving it at the mercy of the Eskom board (Eskom, 2022:10), which sees Eskom informally being in control of the NTCSA. This is another aspect of principal-agent relations where Eskom's interests prevail over the NTCSA. The NTCSA's purpose seems to be to facilitate IPPs to operate in the energy decentralisation process (Eskom, 2022:14).

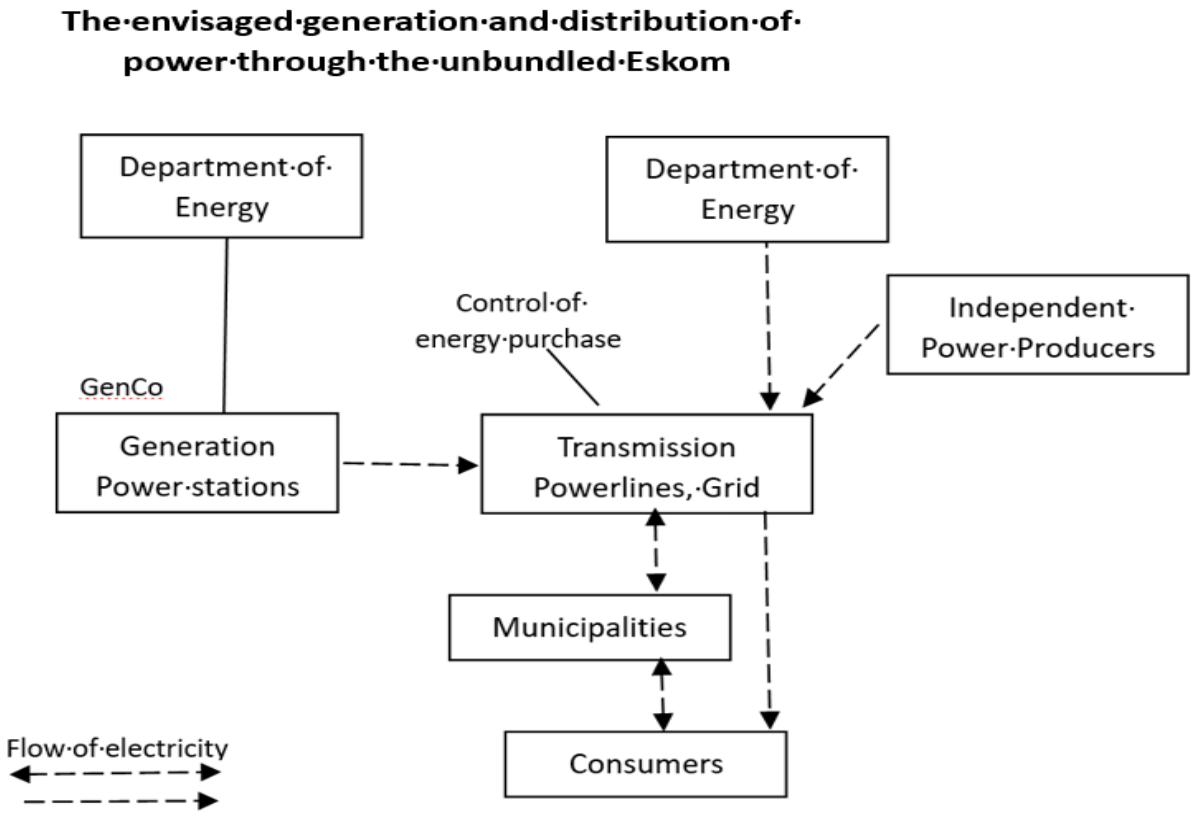

Figure 3.4: The envisaged electricity generation, transmission, and distribution of Eskom (adapted from www.OUTA.co.za)

This study argues that the unbundling of Eskom is premised on the same reasons that led to the liberalisation of Nigeria's energy sector: management focus, efficient service delivery, and undoing corruption that impedes energy security.

> *Unbundling into separate subsidiaries under Eskom Holdings will allow management focus, improve efficiency, create greater transparency around performance, provide greater protection against corruption and rent-seeking, and will give capital providers more visibility of the component parts, resulting in more investment comfort (Eskom, 2022:3).*

Section 3.6 in this chapter indicates that Nigeria still has energy supply challenges with frequent power cuts because of poor management focus, policy implementation and low investor knowledge. South Africa's policy certainty should build investor confidence, and unbundling should not present any fragmented shareholding structure because the government owns the NTCSA, and onboarding new IPPs does not seem too politicised, meaning increasingly IPPs will get to join the grid when they are ready to supply electricity. That the NTCSA is at the centre of the electricity reform (Eskom, 2022b:3) assures that energy security will not be undermined by a transmission division that is privatised, which is essential to ensure energy sovereignty.

3.5.2 Nigeria's private energy distributors

Nigeria is at an advanced stage of implementing the vertical unbundling policy, having started in 1951 (Remteng *et al*., 2021). The whole purpose of the unbundling policy in Nigeria is to privatise the management and ownership of the electricity assets and infrastructure (Onagoruwa, 2011). All eleven distribution companies (DISCOs) are privatised, with the government holding a minority of 40% shares (Anyaogu, 2020; Addeh, 2022). All thirteen generation companies (GENCOs) are also privatised (MandyNews, 2022). As a result, the Power Holding Company of Nigeria (PHCN[1]) monopoly has broken. The only transition company in Nigeria that is state-owned is already managed through concession by the private sector. Nigeria had 15% and 17% power availability in 2014 and 2016, respectively (Remteng *et al*., 2021), having reached a supply capacity of 3.7 GW versus the demand of 8.25 GW in 2019 (Aderounmu, 2022). Nigeria's energy industry proves to be among the most inefficient and underpowered in the world (Iwayemi, 2008:17). The primary role of the energy policy reform in Nigeria is to address the power outages and unreliable energy supply (Igbinovia, 2014:8). Thus, this led to the Electric Power Sector Reform Act of 2005 which allowed for the unbundling of the utility (Khaleel and Chakrabarti, 2019). Since the persistent energy crisis in Nigeria, it has developed measures to alleviate the burden on public utility. In Nigeria, NESCO was dissolved to form the National Electric Power Authority (NEPA), which later became the PHCN. Figure 3.5 below shows the vertical unbundling of the Nigerian electricity sector.

[1] PHCN was formerly known as Nigerian Electricity Power Authority (NEPA), the reader might see NEPA frequently used in news media and other publications.

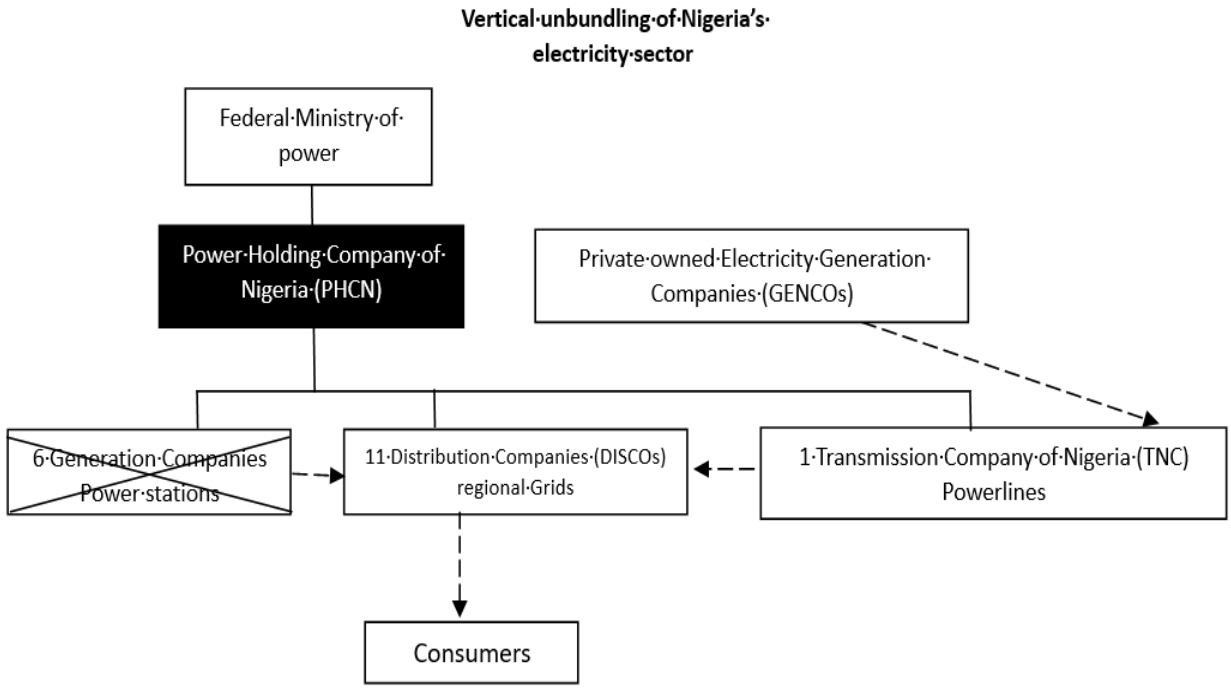

Figure 3.5: Electricity generation, transmission, and distribution in Nigeria (Own construction)

Figure 3.5 above shows that the Nigerian government has eliminated public ownership of GENCOs in the electricity sector without the SOE tasked with power generation or distribution. The blacked-out PHCN block in the figure symbolises the former SOE monopoly. The reader can imagine that that block is not there anymore (Hall, 2010). In 2013, the PHCN was dissolved to form the Nigerian Electricity Regulatory Commission (NERC), tasked with reforming, monitoring, and regulating Nigeria's electricity (Khaleel and Chakrabarti, 2019; Igbinovia, 2014). One other reason for the vertical unbundling of the Nigerian electricity sector was the geographic spread that is too far and wide, which led the government to believe that a single entity would not have the capacity to manage generation, transmission, and distribution on its own (Emovon *et al*., 2018; Khaleel and Chakrabarti, 2019; Gershon and Ezurum, 2017).

The vertical unbundling of SOEs could be seen as a viable response to the energy crisis. However, the response seems unsuccessful in Nigeria because power outages continue without any end in sight. The other interesting aspect that the vertical unbundling has created is the opposite of its purpose, that is, instead of enhancing political accountability, politicians in Nigeria have now started passing the blame off to GENCOs and DISCOs, saying the sector is in private hands, and therefore the people cannot blame the government for blackouts (Udegbunam, 2019). A failed state and

lack of public trust grows when the government privatises SOEs meant to supply essential services and avoid political accountability for the poor conditions in which the public lives. The SOE's unbundling has not worked in Nigeria; therefore, South Africa should approach it with great caution not to repeat the mistakes of Nigeria.

Given the evidence presented above, SOEs remain a central key point in solving the energy crisis in both countries. Hence, policy frameworks have sought to transform the public sector before resorting to the private. For instance, Eskom, as a public utility, plays a leading role in solving the crisis with the adoption/inclusion of IPPs on the rise. Similarly, NESCO has also been the most prominent role player in the Nigerian energy sector for years; it can be noted that it is the foundation of energy production in Nigeria. However, the failure to transform NESCO and unbundle NEPA and Eskom as policy frameworks of these states seems to be one of the key developments towards inhibiting sustainable energy supply and production.

3.6 CHAPTER SUMMARY

This chapter explained the main factors hindering SOEs' sustainable energy supply growth, discussed how to advance SOE growth through sustainable energy supply and emphasised that energy utilities worldwide embrace renewable energy. The chapter also examined how a lack of energy infrastructure development and maintenance leads to energy insecurity. It presented the case for sustainable energy as a solution to energy poverty. The chapter provides issues and solutions for SOEs to improve sustainable energy supply. The discussion about racialised and othered energy poverty has not received enough attention in energy policy discussion. In discussions about the energy crisis, this study presents models depicting racialised and othered energy poverty. It follows that the principal-agent tensions are fundamental to the inability of SOEs to alleviate the energy crisis compared to POEs. Political interference and private interests for self-enrichment in POEs lead to countries like Nigeria struggling to overcome the energy crisis despite SOEs selling their shares. Thereby, inconsistent policy formulation and implementation related to the unbundling of SOEs is a critical consideration for Eskom, which is now following the path of Nigeria to open the energy sector to private energy producers.

Moreover, the chapter defined sustainable energy supply and how the two power utilities adopted this concept to ensure a stable energy supply. Similarly, the chapter discussed the following themes: good governance, corruption, infrastructural development, and sustainable development (policy formulation and implementation. These were important to understand better the concept of sustainable energy supply in South Africa and Nigeria. In the discussion, the chapter deduced that South African and Nigerian SOEs have taken significant measures toward sustainable energy supply. In addition, the vast existing literature has proven that SOEs and POEs do not significantly differ in management and operations. Therefore, privatisation does not necessarily mean that the entity will function efficiently. In conclusion, energy racism, infrastructure degradation, and political intervention are the main factors limiting sustainable energy supply.

CHAPTER FOUR

THE IMPACT OF THE ENERGY SHORTAGE ON ECONOMIC DEVELOPMENT IN NIGERIA AND SOUTH AFRICA

4.1 INTRODUCTION

The previous chapter focused on the main factors hindering the transition of SOEs to sustainable energy supply. From that premise, the chapter deduced that SOEs should be at the centre of energy supply and transition. The previous chapter is important because it starts to depict the factors that hinder this energy supply and transition, taking a global perspective and narrowing down to selected countries towards the conclusion. Henceforth, this chapter focuses on the energy shortage's impact on economic development in Nigeria and South Africa. It unfolds in two sections.

First, Section 4.2 focuses on the research methodology and the subsections, including sampling data collection and analysis techniques. It also includes comments about data validity and reliability, along with the dissemination of findings, not forgetting the discussion about the limitations and delimitations of the study. Second, Section 4.3 presents the findings. This section reflects on the economic development of Nigeria and South Africa, providing evidence of the growth or decline of the two countries. The role of SOEs in government income generation makes sense when considering the significance of corporate social responsibility and infrastructural development with specific reference to Nigeria and South Africa. Thereby, the energy shortage versus economic development in Nigeria and South Africa bears on globalisation and technology. The chapter summary shows what South Africa and Nigeria have gained or suffered from the energy crisis.

4.2 RESEARCH DESIGN AND OPERATIONALISATION

This study follows a qualitative case study method that ensures in-depth analysis and focus on a particular phenomenon, like the energy crisis in Nigeria and South Africa (Bhandari, 2020; Baxter and Jack, 2008). In a narrower sense, the qualitative case study design was best suited to focus on SOEs as entities in the selected countries and their response to the energy crisis. The qualitative case study design is also in the interpretive research approach, looking at the context of the energy crisis and SOE responses to it in the selected countries. The case studies enabled the researcher to

make practical policy recommendations to deal with the energy crisis and build effective SOEs in the era of energy transition.

4.2.1 Sampling techniques

The researcher employed purposive sampling and snowball sampling. Purposive sampling is also called judgmental, selective, or subjective sampling, as the researcher relies on their judgment when choosing the sample(s) of the material to be employed in the study (Suen *et al*., 2014; Sharma, 2017). The large economy and potential power generation capacity of the selected countries in the African continent are among other aspects that determined the case judgment. Other reasons include identifying and selecting information-rich literature on Eskom and NESCO. In comparison, snowballing citation tracking, as Sharma (2017) supports, was essential in the sampling process. Snowballing citation tracking helped identify additional papers on SOE's responses to the energy crisis in South Africa and Nigeria. This is where the researcher used the reference list of the material found to find more related material/existing literature on the responses of Eskom and NESCO to the energy crisis in their respective countries. Hence, the researcher employed snowball sampling to find referrals to other materials on the phenomena under study. Thus, purposive and snowball sampling were integrated to select books, journal articles, government documents, and repositories such as Boloka, UPSpace, OpenUCT, UJ IR, Knowledge@UChicago, University of Lagos research repository, Google Scholar, SCielo, CEIC DATA, and trading economics among others that address the topic of the study. The data sources were freely available on search engines, such as but not limited to Google Scholar and Research Gate.

The inclusion criteria for the literature in this study were based on (1) literature written in English, (2) full papers with abstracts, and (3) excluding papers with abstracts only. It is not wise to use abstracts only without a detailed discussion of the study, which is vital for critical reflection. The author used keywords such as energy crisis, energy sector SOEs, Nigeria/South Africa energy crisis, and political economy of energy. Like institutional reports and published articles, grey literature was used to gain in-depth insight into Eskom's and NESCO's responses to the energy crisis.

4.2.2 Data collection technique

The study relied on document analysis and computational research techniques. Computation social science is one of the growing fields academics use to adequately collect data from social media to use in their research (Mann, 2016:468). This has made it easier for academics to access data on social media, which was not easily attainable in the past. Social media data could be unavailable for various reasons, like being encrypted or because the source does not allow it to be used for public consumption (Mann, 2016). Using computational research techniques is also essential for analysing narratives on social media about the SOE's responses to the energy crisis in Nigeria and South Africa. Twitter, YouTube, and government webpages are among the essential tools of computation social science (Mann, 2016:469).

The Twitter application programming interface (API) was the primary social media tool for data gathering; however, since the change in Twitter ownership to now X, the academic version of pulling data from the app has since been stopped. However, the application was still crucial for data scraping. The social media app X is still essential because political executives use it to post important announcements, even provoking responses from the public. This interaction is vital for understanding the nature of dialogue and narratives that dominate the issue of the energy crisis. Over and above that, the study employed a document review analysis. Clarke (2020) explains that document analysis as a research technique relies on various texts and sources that help put the case study in a better light or allow for theory generalisation. Therefore, document analysis assisted the researcher in analysing the SOEs' responses to the energy crisis in Nigeria and South Africa.

The following section discusses the data presentation and analysis method used for the study.

4.2.3 Data Analysis

The gathered data was presented as main themes drawn from research questions and objectives. Maguire and Delahunt (2017) explain that thematic data presentation is a standard process in the qualitative spectrum. Hence, the data is sorted into themes and presented in thematic structures. Therefore, it can be viewed that each of the responses by the SOEs (either good or bad) was classified following the main themes

and subthemes. For the study, the researcher relied on descriptive content data analysis to describe the characteristics of the energy crisis in the selected countries (Grbich, 2012; Nassaji, 2015), allowing for capturing the people's perspectives and opinions about the impact of the energy crisis in these countries (Nassaji, 2015:129). The entire data set from the research questions was gathered according to the following themes to guide the analysis: (a) the energy crisis in South Africa and Nigeria, (b) principal-agent interests and the role of SOEs in energy security, (c) main factors that hinder SOEs' growth in sustainable energy supply, and (d) the impact of the energy shortage on economic development in Nigeria and South Africa.

The above themes summarised the research questions and objectives and were the primary determinant for linking evidence from the document analysis with key arguments in this study about the role of SOEs in energy security.

4.2.4 Data validity and reliability

The study used existing data on the subject to ensure data validity and reliability. This material included scholarly work from peer-reviewed articles and reports, such as those from Eskom and NESCO. Reliance on peer-reviewed documents and official reports from formal institutions (state or non-state entities) ensured that the study did not support claims and evidence from untested or unreliable sources. This was particularly important for the researcher, who has not been in Nigeria and is unfamiliar with its operations. This desktop study had to be extremely careful that the sourced literature was valid, scientific, and dependable. The sentiments presented are sourced from various platforms and include the sentiments of residents, experts, and professionals from South Africa and Nigeria. Thus, the study's findings do not deviate much from other studies following the same research protocol. Neither does the study make claims about the responses of SOEs to the energy crises in South Africa and Nigeria that scientific publications cannot uphold.

4.2.5 Limitations and delimitation

The study's main limitation was that it was a desktop study, and the researcher was not physically present at Eskom or NESCO. However, the study was conducted through scientific analysis, leading to the findings gathered. The researcher analysed and relied on documents already published and in the public domain. After reviewing

the research proposal, the Basic and Social Sciences Research Ethics Committee (BASSREC) and Human Social Sciences Research Ethics Committee (HSSREC) decided that this was a feasible and no-risk study based on it being a desktop study.

The following section clarifies the study's findings related to the impact of energy shortage on economic development in Nigeria and South Africa.

4.3 PRESENTATION OF THE FINDINGS

In comparing the energy shortages of Nigeria and South Africa, this chapter examines the relationship between energy shortages and their impact on economic development. As the earlier chapters have established, energy shortages/crises have a substantial economic impact on the state, society, and industrial development. In addition, the study has chapters noting that SOEs are integral to the country's economic development. Henceforth, the study has noted Nigeria and South Africa as leading role players in the African continent based on their economic ambition and developments. Therefore, energy shortages/crises negatively impact prospects for further economic development. The chapter used multiple factors/themes which reflect the economic development of Nigeria and South Africa because of the energy shortage crisis in these countries. These themes include SOE's role in governmental revenue collection, energy availability and its relationship with the economy, globalisation, technology development, and economic growth. The economic development of the African continent is filled with challenges and misfortunes dating back to the scramble/particining of Africa, currently servicing debts, and poverty (Gardner, 2017:249). The retrospective political development of colonialism, apartheid, and civil conflict in some African countries has led to contemporary societal, economic, and infrastructural development, among others, in the African continent. The continent's historical credentials concerning development must be carefully understood. Hence, this section of the study provides a brief background of the socioeconomic development of South Africa and Nigeria, respectively.

4.3.1 The negative impact of energy shortage on economic development in Nigeria and South Africa

Reliable and sufficient energy provision (security of supply) and economic, social, and infrastructural development are crucial factors at the forefront of human civilization and its progress (Oyedepo, 2014). Noting that energy shortage worsens socioeconomic inequalities, Oyedepo, (2014) further argue that the path to a better-quality lifestyle and economic development depends on the security of supply. Hence, the role of SOEs in ensuring the security of energy supply is at the centre of debates about energy transition (Trollip *et al*., 2014:13). The failure of SOEs to ensure the security of supply has led to various economic sectors resorting to self-supply to avoid closing. Energy shortage worsens unemployment, increases crime rates, and impedes essential public services, which does not bode well for society (Farooq and Shakoor, 2013). The Fourth Industrial Revolution (4IR) presents an economy that relies heavily on energy availability, meaning that most services are difficult to supply in the era of power cuts (load shedding). This implies that security of supply is indispensable for the modern economy to thrive and support innovation.

4.3.1.1 The energy crisis and Nigeria's Economic development

Nigeria has the largest GDP on the African continent. However, the quality of its infrastructure and technological advancements does not exceed that of other African countries (Bloch, Makarem, Yunusa, Papachristodoulou and Crighton, 2015:6). Nigeria is a middle-class economic country with mixed economic policies and emerging markets (Handley, 2015:620). Hence, it is developing as the African continent's most significant economic hub, seeking to expand its manufacturing, technology, and telecommunication sectors to be a renowned, established, and industrialised state. Nigeria has increased its continental and regional integration ability by overtaking South Africa as the continental frontier in economic growth. The GDP of Nigeria has increased from US$31 billion in 1990 to US$522 billion in 2013 due to increased regional integration (Bloch *et al*., 2015:6). Recently, the GDP of Nigeria has been declining and exhibiting slow growth, for instance, in 2019 it was US$474.52 billion, with a 12.51% increase from 2018, then in 2020 it was US$432.20 billion, with an 8.92% decline from 2019. In 2021, it was US$440.83 billion, with a 2% increase from 2020, and the latest statistics for 2022 was US$477.39 billion, with an

8.29% increase from 2021 (Galal, 2023). Figure 4.1 shows the variances in Nigeria's GDP from 2013 to 2022.

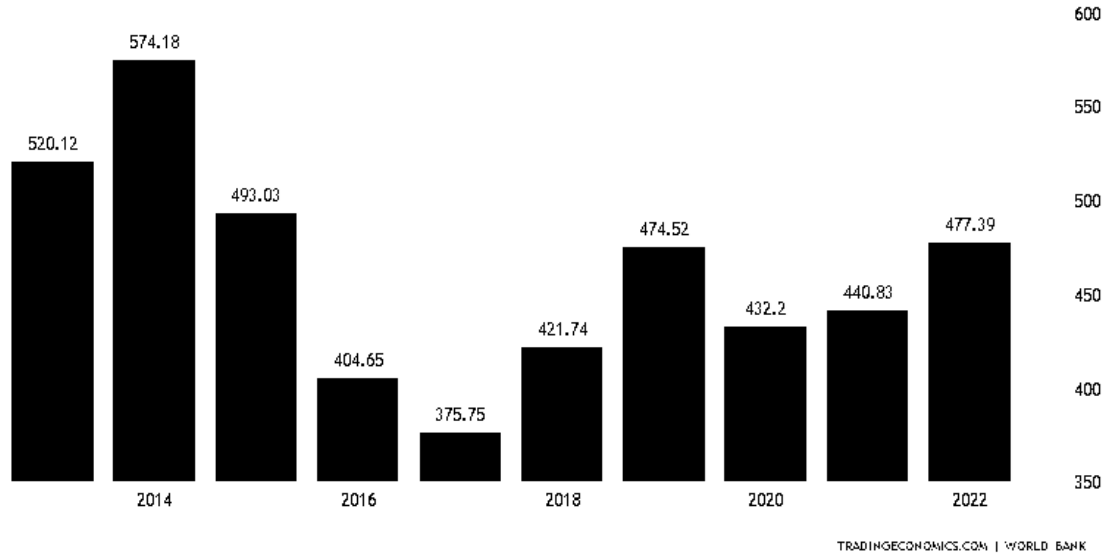

Figure 4.1: Nigeria's GDP (Source: Trading Economics)

Nigeria has enjoyed immense economic dominance over the African continent, especially among the Economic Community of West African States (ECOWAS), which has also enjoyed the benefits of this economic growth, accounting for 43% of the flow of goods in the region in 2013. For instance, Hon. Awajim Abiante, cited by Ojeme (2022), alludes to how Nigeria's GDP growth allows it to continue supporting neighbouring countries, particularly members of ECOWAS, by supplying them with power, medical intervention and, if or when needed, peacekeeping intervention. Torres and van Seters (2016:3) allude that 73.5% of the total exports from ECOWAS are due to its large economy and the petroleum sector at its exposure.

Bloch et al. (2015) further argue that although Nigeria has seen the benefits of economic growth over the years, the country is still experiencing a high energy crisis despite being a significant gas and oil producer on the continent. Policymakers in Nigeria resorted to redeveloping and changing the policy plans of the country to revitalise its economic downturn (Bloch *et al*., 2015:52). These included the privatisation of the energy supply, which would see more collaboration between the public and private sectors. Scholars such as Idoko and Abu (2020) and Bloch et al. (2015) have asserted that despite the country's vast economic potential and policies, Nigeria faces honest criticism from world rankings on poverty, unemployment, and

lack of economic growth. These rankings make the case that Nigeria is underdeveloped and among those countries regarded as third world (Jack, 2016:206). Nigeria's economy is struggling to be revived because of its energy shortages. On the 14th of September 2023, the country faced a total system collapse where Nigeria's electricity distribution companies announced the system failure due to a technical failure (Jeremiah and Musa, 2023).

The government's failure negatively impacts the economy as many people and businesses must rely on themselves for energy use. Hence, Business (2023) mentions that more than 40% of Nigerians use generators for personal or business use, costing around US$14 billion annually. Jeremiah and Musa (2023) further allude that this was the case, as the grid collapsed four times in 2022. This had dire consequences on the economy, resulting in negative GDP growth, unemployment, and business costs (Business, 2023). This grid collapse comes after about US$7.5 billion was invested to ensure the security of supply in the sector, and this depicts images of corruption and mismanagement as the investment did not solve the crisis (Jeremiah and Musa, 2023). In addition, the lack of accounting and oversight in the sector for the invested money can also attest to corruption and mismanagement.

4.3.1.2 The energy crisis and South Africa's economic development

Like Nigeria, South Africa is also experiencing economic challenges because of economic imbalances and the retrospect factors of racial difference, which dictated access to economic opportunities, which are still a reality to the state's socioeconomic development. South Africa's economic development is noted to be upper-middle-income, meaning that it is a developing economy with the most developed industries (Burger, Venter, Wearne & Krause, 2023:25). The GDP of South Africa increased from US$126.05 billion in 1990 to US$400.89 billion in 2013 due to growth in various sectors such as mining and the stability of energy supply at the time (Galal, 2023). Figure 4.2. below is a variation of the South African GDP between 2013 and 2022.

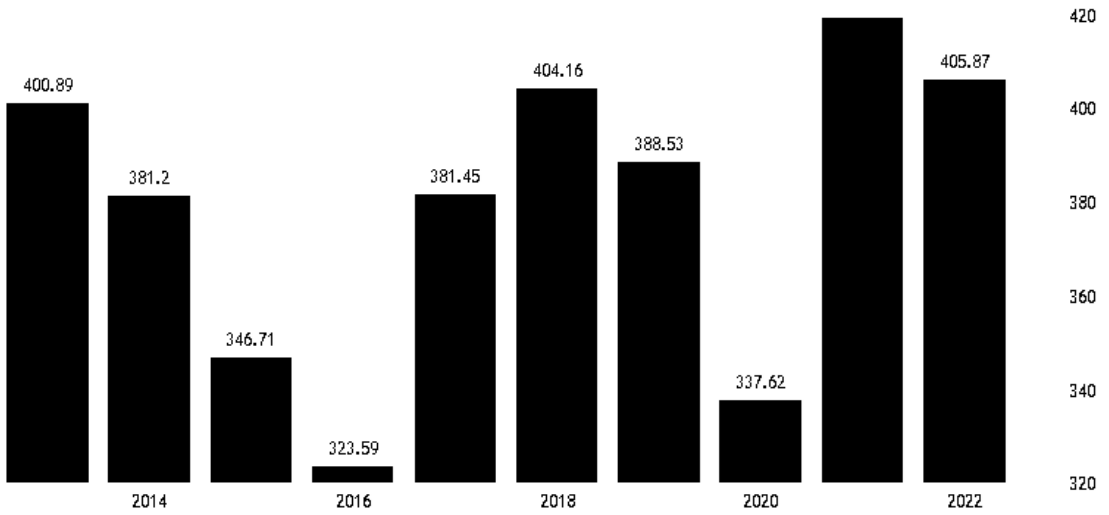

Figure 4.2: South Africa's GDP (Source: Trading Economics)

Although energy shortages date back to as early as 2008, load shedding was not yet severe. For instance, Carnie (2010) reports that Eskom asserted that there would be no load shedding. South Africa is the second largest economy in Africa despite being better than Nigeria in technological advancements, industries, and diversified economy (Adebajo, 2023). Kirsten, Botha, Biyase and Pretorius (2023:2) argue that South Africa's economy is one of the world's most unequal economies because of the racialised political dispensation that afforded Whites more economic benefits than Blacks. The gap between the rich and the poor widens each financial year (IMF, 2020). Thus, this negativity has led to most citizens relying on the government for social grants (Bronstein and Olivier, 2015), and the lack of energy availability has negatively impacted the economy's growth, resulting in more people relying on the government.

4.3.1.3 Gross domestic product vs energy availability

The GDP of South Africa shows vast growth, especially after the uplifting of sanctions as the country was heading into a democratic dispensation. Figure 4.3 below shows the variation of electricity generation in South Africa between 2013 and 2023 with a downward trend.

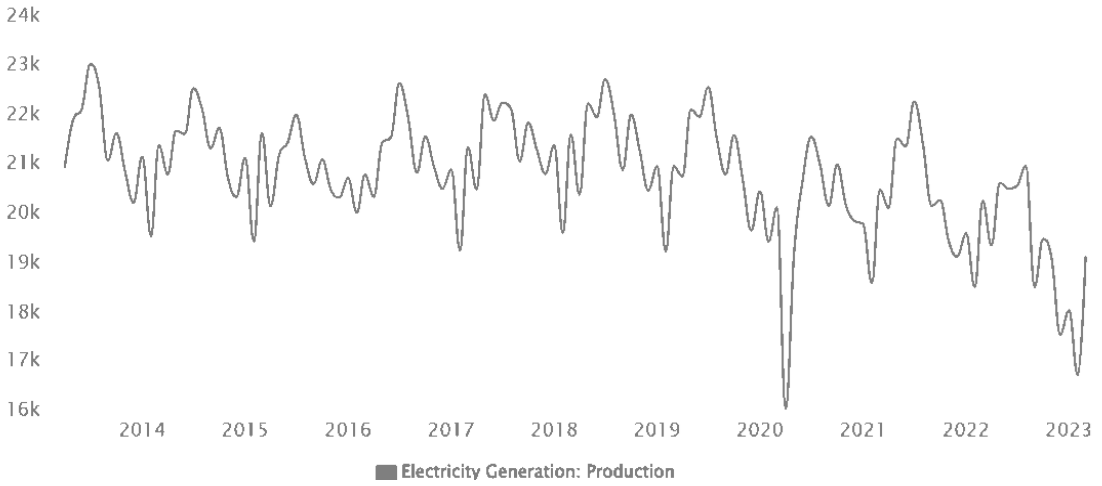

Figure 4.3: South Africa's electricity generation between 2013 and 2023 (Source: https://www.ceicdata.com/en/indicator/south-africa/electricity-production)

For critical comparison, Figure 4.4 below juxtaposes Figures 4.2 and 4.3, showing the electricity generation trends versus the GDP between 2013 and 2022. It follows that the rise and fall of electricity generation is relatively like the rise and fall of the GDP in South Africa. Considerations of self-generation can explain inconsistencies between a low electricity output versus a higher GDP through generators and other power sources. However, GDP increase is not only dependent on the electricity output.

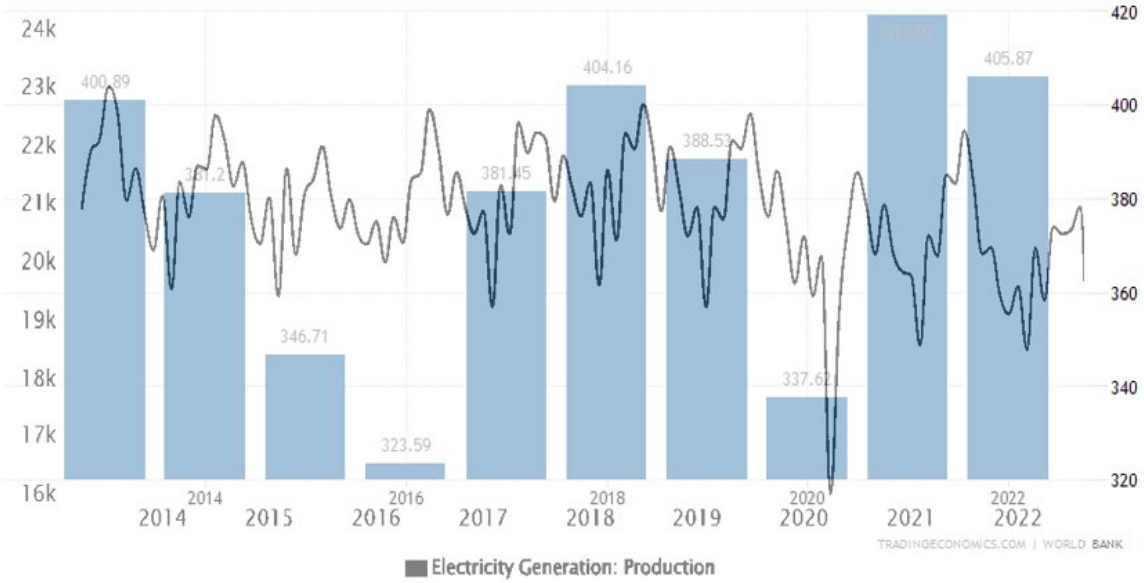

Figure 4.4: The juxtaposition of GDP versus electricity generation in South Africa between 2013 and 2022 (Own construction)

Looking at the GDP growth of South Africa from 1960 to 2022 (Mactrotrends South Africa, 1960-2023), South Africa's GDP has been steadily growing, especially after the uplifting of global sanctions due to apartheid in the 1994/1995 period. This peak shows South Africa grew from US$8.75 billion in 1960 to US$405.87 billion in 2022. However, the period of 2007/2008 shows a decline in GDP growth as the challenges of load shedding in South Africa started in 2008. Hence, the 2008 financial year dropped from US$333.08 billion in 2007 to US$316.13 billion in 2008. This depicts the relationship between GDP growth and energy availability. In addition, 2022 is also the worst year in terms of load shedding, and the GDP subsequently declined from US$419.02 billion in 2021, with a growth of 4.91%, to US$405.87 billion in 2022, with a growth of 2.04%. Therefore, there is a relationship between GDP growth and energy availability.

Figure 4.5 below shows the electricity generation in Nigeria between 2013 and 2022, with a clear downward trend between 2013 and 2015. After that, it was punctured by a steep but brief increase in production, followed by an immediate steep decline in 2016.

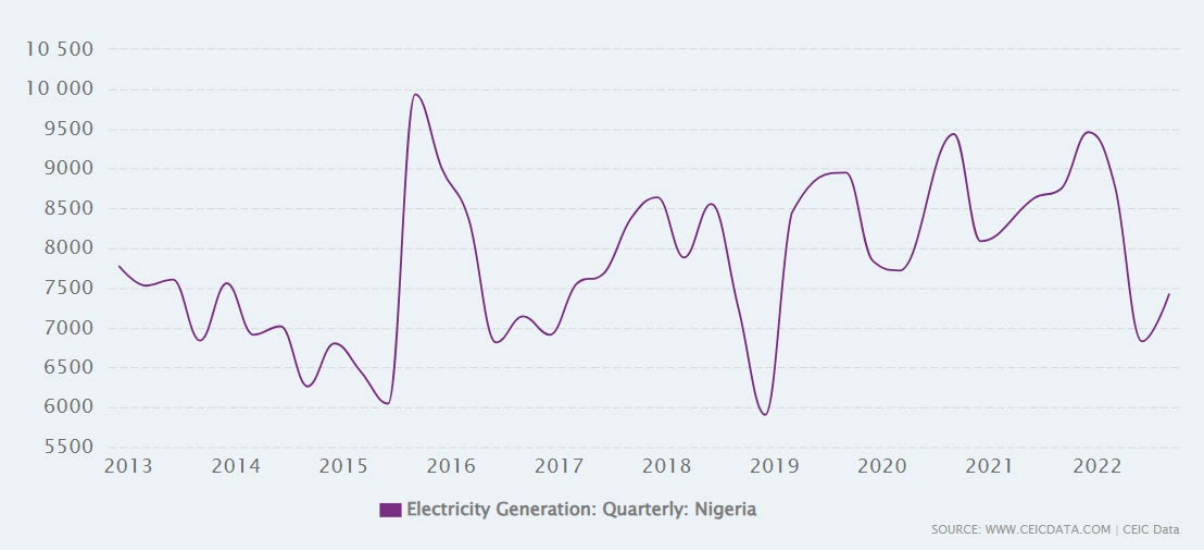

Figure 4.5: Nigeria's electricity generation between 2013 and 2022 (Source: https://www.ceicdata.com/en/indicator/nigeria/electricity-production)

Figure 4.6 below juxtaposes Figures 4.1 and 4.5 to show the GDP performance in Nigeria versus its electricity generation trends.

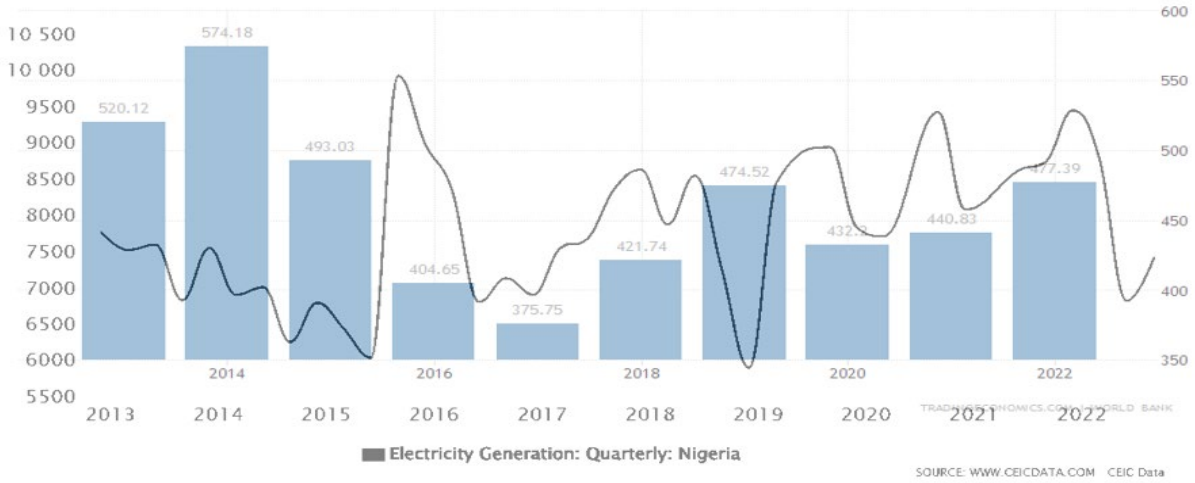

Figure 4.6: The juxtaposition of GDP versus electricity generation in Nigeria between 2013 and 2022 (Own construction)

What is interesting about Figure 4.6 is that the highest GDP growth occurred during low electricity generation in 2014. Its highest energy production in 2016 was incidental because it coincided with the lowest GDP growth between 2016 and 2018. From there on, Nigeria has a trend of haphazard electricity generation. Nigeria as it stands, is on the opposite (looking GDP growth and electrical trends) by increasing GDP versus the electricity generation trends that are on decline. The possible explanation for this opposing trend is that Nigeria relies on oil production for most of its income, significantly boosting its GDP. The low electricity generation has led to members of society adapting to the status quo, and alternative energy sources are now pervasive at both business and household levels.

Data (Mactrotrends Nigeria, 1960-2023) shows that Nigeria has had a steady GDP growth from 1960, with a GDP of US$4.08 billion, to US$477.39 billion in 2022. However, Nigeria has declined over the years due to power shortages, although the sector was officially privatised in 2013 (Mac-leva and Sunday, 2019). The country saw the worst power cuts and grid collapse in 2016 and 2019, respectively. Nigeria has seen 206 power grid collapses or failures, in which 2016 and 2019 were the worst years, and the GDP growth was affected immensely, from US$493.03 billion GDP in 2015 with a growth of 2.65%, to US$404.65 billion with -1.62% growth in 2016. Similarly, even in the wave of system failures in 2019, the GDP decreased from US$478.52 billion with 2.21% growth to US$432.20 billion with a -1.79 decline in 2020 due to energy shortages in the previous financial year.

4.3.1.4 Jobs losses due to load shedding and power cuts in Nigeria and South Africa

According to Brandt and White (2023), “Minister of Electricity, Kgosientsho Ramokgopa, said 650,000 jobs were lost in the South African economy in 2022 because of the energy crisis, and the figure might rise to more than 850,000”. Thus, this depicts that the energy crisis directly impacts the economy and the number of jobs created or lost. Similarly, Akuru and Okoro (2014:64) explain that there were about 83,400 job losses in a single year due to load shedding. Udegbunam (2021) also mentions that the slopy energy supply costs businesses in Nigeria about US$29 billion per annum; hence, most businesses have no other option but to retrench or close. This further depicts the impact of total grid collapse as some businesses have permanently relied on generators to ensure their continued operation. Hence, Business (2023) from This Day newspaper alludes that it costs US$14 billion per year in petroleum costs to ensure that businesses continue to function; hence, they end up not making any profit and are forced to retrench some workers.

4.3.1.5 Principal/agents’ interest in Eskom and NESCO

The study believes the governments’ interest in Eskom and NESCO is to establish power utilities to cement their economic dominance in their respective regions. Nigeria and South Africa hold regional hegemonic status in their respective regions, and the constant power cuts threaten this status. Similarly, besides national power supply stability, these nations would be better positioned to sell their energy to their neighbours. Thus, this will ensure they increase their dominance in the region as the most prominent energy producers, contributing significantly to their GDP growth.

The general interest of agents in SOEs is derived from the understanding that they seek enrichment for themselves and those in their circle. Thus, to create a web-like circle that will ensure that they monopolise the entity to ensure that they can keep on looting the resources. Henceforth, in the case of Eskom and NESCO, the study believes that agents deployed within these entities seek to enrich themselves and those around them. In addition, they are not interested in rewarding those within their circle based on merit but instead focus on protecting their interests. Their interest in Eskom and NESCO may include managerial positions as they want to work with people, they trust by awarding contracts or tenders that work in favour of the agent

and not the entity. Similarly, they will also seek financial resources which will be used for personal matters.

4.3.2 The relevance of SOEs on governmental income generation

Gumede (2016) agrees with Fourie (2001) that South African SOEs play a significant role in the country's economy. South Africa has a wide variety of SOEs in several industries, such as the airline industry through SAA and broadcasting through the South African Broadcasting Commission (SABC), which should enable the government to monopolise the economy and be involved in the economy's growth overall. However, the ability of the government to monopolise the economy has also come with several challenges, such as burdensome bureaucracies, a shortage of skilled workers for some high-tech industries, restrictive labour regulations, corruption, and political instability. The high levels of corruption and political instability have led to the mismanagement of SOEs, which has created a disaster for the financial stability of entities such as SAA, which had to be bailed numerous times by the government. Marimuthu (2020) agrees that the government has had to assist most SOEs due to mismanagement and corruption challenges. Some of these include Eskom, SAA, and the SABC, which failed to keep its finances afloat and has had to cut operations to continue functioning (Madonsela, 2018).

Eskom and NESCO can focus their resources on these projects while being taxed, impacting the government in a good manner as revenue collection is less due to social projects which contributes to the wellbeing of the society. However, in another view, electrical units provided at no cost will lessen the economic hardship for most citizens. This dramatically impacts the entity's income and affects the government's tax collection. In addition, these entities have a social responsibility to ensure a stable supply of electricity to society such that people can purchase electricity with complete confidence that they will receive a stable supply. Therefore, failure to do so will cause society to be unable to be productive at total capacity, impacting social lives and economic output. Regardless of the Coperate Social Responsibility (CSR) projects which qualify projects to improve infrastructure and human lives, these projects will not be practical due to a lack of stable energy provision, as the government does not seem to have a sufficient plan for resolving the crisis.

Although all these multinational corporations (MNCs) may also seek to invest in more CSR projects to positively impact the lives of local citizens from where they run their operations, due to a lack of productivity and a lack of stable energy supply, incomes and profit productivity may not be enough. They will seek to invest in their pockets more than development as they operate with a capitalist agenda. Henceforth, the lack of infrastructural development will result in low economic activity in the area.

The contribution of energy in the social spectrum is associated with family structures and improving morale. This is particularly important because some nations consider electricity a vital resource that ensures societies are civilized and ushered into the dawn of industrialisation. Rosenberg (1998), while studying the role of electricity in industrial development, alluded that electricity was the key driver of the Second Industrial Revolution. Rosenberg (1998) explains that electricity led to the industrialisation of societies, making them more technological. Rosenberg notes that although energy production was not typical then, it most certainly led the way for societal development.

Therefore, from the 19th to the 20th century, the world slowly transitioned from traditional power production methods, such as fossil fuel combustion, to hydro and solar energy. It is now expected that each household be fully electrified and technologised, particularly in South Africa and Nigeria, as they lead the industrial development sector of the African continent. Therefore, the success of most social and economic policies depends on the availability of a sufficient energy supply, especially since industrialisation is the central component of economic security and development.

On another note, most human activities depend on the availability of electricity, for example, news dissemination, information sharing, communication, and household activities, among others. Torriti (2014) supports the above statement by documenting that most European families have increased their electricity consumption. This assertion is based on societies being technologised and increasingly dependent on electricity for daily activities. Torriti (2014) believes that one of the reasons electrical tariffs are increasing is based on the steady increase in residential usage of electricity.

On the other side of economic development, SOEs are essential in developing a country. Most SOEs across the globe are tasked with fostering the economic

development and economic implementation of their origin states. However, many expand their operations to neighbouring countries to increase profits or share knowledge and expertise. Chen (1998) alludes to the SOEs that foster the state's economic policies, and the government has also made means to support these entities. Similarly, Chen (1998) argues that China's economic development started seeing real growth in 1997 after the government changed its policies to support the establishment of these entities.

Thus, these organisations can be noted to be the frontline leaders of business operations in China on a local and international scale since they can attract governmental and foreign investments. Wang (2015) explain that the policy driving the economic ambitions of China regards SOEs leading the restructuring of the country to build a better economy. Marimuthu (2020) studied public governance and SOE's development and found that these entities are very much dependent on those in government for assistance regarding revenue generation, exposure, and stability.

Hence, they also take advantage of this discourse and use these entities to foster their own political/governmental policies to attract foreign investments and grow the economy. Similarly, Gumede (2016) agrees with Fouries (2001) regarding the impact of SOEs on the restructuring of the South African economy. Thus, this shows governments' emphasis on the investment of their SOEs towards an economic turnaround and boosting foreign investment. In addition, Nigeria is also not immune to this factor, and the government has given much thought to the power crisis, such that several policies had to be changed to better facilitate economic emancipation, both at the governmental and social levels.

Particularly for countries such as Nigeria, the new metering system would depend on the 4IR and being able to combat electricity theft. Hence, through the POEs that seek to produce, transmit, and distribute power, Nigeria will invest in much-needed technology, which will also see a growth in technological exposure in the country. The government will aim to foster their political/governmental policies and grow the economy while ensuring foreign investment attraction for the energy sector.

Therefore, Eskom and NESCO should be leading their countries' economic and social development. With Eskom's current crisis, investors are seeking to understand the

crisis and lend a helping hand. Thus, stable power provision is also crucial for the South African economy's growth. Similarly, Nigeria also depends on the availability of energy capacity as it seeks to restructure its economy. Over and above that, the social lives of these countries are dependent on the availability of stable energy as they seek to develop their citizens and ensure that societies are technologised. Thus, stable energy provision by Eskom and NESCO is vital for economic growth and social development.

Energy is an essential part of economic development and attraction of MNCs; therefore, a stable energy supply is important for economic growth and development. Hence, as these MNCs grow and are productive, they will also be able to contribute to developing the country's infrastructure, increasing economic activity, and thus positively impacting the economy.

4.3.2.1 Role of SOEs in tax collection in Nigeria and South Africa

SOEs are some of the crucial mechanisms the government implements to ensure development and income generation. SOEs play a leading and strategic role in economic development; hence, in the case of China, SOEs are the pillars of the economy (Putniņš, 2015). Putniņš (2015:815) further mentions that “the special report points out that SOEs are undergoing a revival, with many countries making new investments in SOEs. SOEs continue to play an important role in major industries (the world’s ten biggest oil-and-gas firms, measured by reserves, are all state-owned and major markets (state-backed companies account for 80% of the value of China’s stock market and 62% of Russia’s)”. This attests to the role played by SOEs in China’s political economy. Mukhithi (2015:1) alludes that even in the case of South Africa, SOEs should be seen as the pillars of the political economy, which support the socioeconomic measures of the country.

Similarly, they also have a role in infrastructural development. The government taxes SOEs to ensure that they assist the state in either debt reduction or development. Therefore, SOEs have a responsibility to pay their taxes. Scholars such as Florio and Fecher (2011), Thynne (2011), Florio (2013, 2014), and Bernier (2014) explain the importance of SOEs in contemporary work. The scholars mentioned above contend

that in addressing economic and policy crises, SOEs must become critical instruments driving policy narratives and objectives, as in the case of China.

Their capturing of the economy will allow other SOEs with similar economic ambitions to rise and thrive in the same industry. In addition, they will be able to close the privatisation gap and contribute revenue to the economy (Putniņš, 2015). According to the IMF report, SOEs in South Africa account for 34% of GDP; in this composition, Eskom (electricity), Transnet (transportation), and Telkom (communications) represent about 80% of total revenue collected (Simone and Wang, 2022:20). Nigeria's SOEs have suffered economic misfortunes where the government lost over US$149.2 billion in government investments between 1975 and 2001. Nigeria had a total of 1,500 SOEs in 1986, which all have fallen victim to corruption, leading to their collapse. Asu (2020), as cited by Arockiasamy et al. (2022:22), mentions, "In 2018, the Nigerian National Petroleum Corporation (NNPC) realised ₦3.4bn in revenues but expended N160.13bn." This is due to the corruption and mismanagement of the entity and lack of accountability.

Putniņš (2015) further argues that most SOEs play a vital role in connecting the private sector and the government's administration as they can provide leadership in internationalisation, as is the case for South Africa and Nigeria. Similarly, they can also provide a public-private partnership (PPP), which is pivotal for development, thus signalling their importance. Hence, when this relationship exists between the two structures, tax collection by the government is made easier, while the SOEs are also held accountable and provide transparency in their finances. That is what the Nigerian Minister of Solid Minerals, Dele Alake, articulates when he says there needs to be more partnership between the sectors. He asserts that this will assist the Nigerian National Petroleum Company Limited in becoming profitable again and contribute more to taxation for government expenditure (Punch Editorial Board, 2023). Therefore, their role is considered a strategic reference point for serving the private and public sectors.

Therefore, entities such as NESCO and Eskom are the pillars of the economy and are supposed to play a strategic economic role. The country's policymakers bind them to be the leaders in economic development and mandate them a strategic role in the economy through the PPP policy. Putniņš (2015) mentions that the energy production

sector is integral to the economy as the state can be threatened if or when this sector is occupied by foreign ownership. Due to not having allegiance to the government, the MNC might seek ways to avoid paying taxes, which will impact the government's feasibility plans (Chen, Tang, Wu, and Yang, 2021).

4.3.3 The relevance of SOEs in South Africa and Nigeria's industrial, economic development and energy security

The study concurs with Putniņš (2015) that SOEs need to take the lead in industrial development, especially in ensuring that the state has control of the market and will be able to monopolise it (World Bank, 2000). Thus, this will ensure that the country's economy is under the leadership of the state's policy direction, and although influenced by external affairs, they have full authority. For instance, the global power crisis due to the Russian-Ukraine conflict has led to most SOEs across the globe resorting to coal as a means of energy production (Fiebrandt, Röder and Wagner, 2022). This was a clear policy direction by SOEs to ensure a stable energy supply. Thus, POEs within the sector will also follow this policy direction.

Fiebrandt et al. (2022) further assert that although this is a temporary measure, it highlights Germany's energy security constraints. Thus, emergency decisive leadership had to resolve to maintain the current fossil fuel supply even though the government had resolved to use renewable energy in the power-producing plants. In this instance, the government was the leading entity to clarify the state's position regarding policy changes and direction (Wüstenhagen and Bilharz, 2006). Therefore, the government played a strategic role in depicting the country's policy direction and ensuring its partnership with the private sector thrives.

Šahović and Da Silva (2016) allude that although the private sector is dominated by external investments/investors, the public is centralised around governmental ownership. This then qualifies that the two sectors must enforce partnerships and collaborations among the public and private entities. Thus, the state will ensure that it plays a pivotal role in the industrial development of the energy sector. Du and Wang (2013) analysed Chinese economic policy and noted that its SOEs contribute about 80% of market values to the economy in terms of industrialisation.

Hence, China has a large share of ownership in these entities, promoting government policies through political and social support. Therefore, the government ensures that SOEs are leading players in developing industries, creating financial stability, and ensuring less political intervention in these entities (Du and Wang, 2013). Du and Wang (2013) further present that after 2002, most SOEs in China outperformed the non-state entities. Thus, they could expand to ensure the stability of the industries, further making it easy to foster the state's policy.

Song (2018) state that SOEs become pillars of their industries, as they have much ownership in the space/sector. Hence, the state has the most influence on the economy due to its strong influence in most sectors. Therefore, Song (2018) assert that SOEs have a significant role in developing industrial sectors and should include strategic sectors to influence policy objectives. This can be attested to the fact that in 1980, Nigeria had about 1,500 SOEs due to the state's close involvement in their establishment (Asu, 2020). On that note, Eskom and NESCO are also expected to be role players in ensuring stability within the energy sector. Hence, the questioning of their responses as the SOEs responsible for energy provision in South Africa and Nigeria respectively and this should be understood from their influence as the state has more ownership and responsibility thereof.

4.3.4 Globalisation, technology, economic growth, and the significance of supply security in Nigeria and South Africa

Globalisation is a term often employed to critically understand the world's interconnectedness through trade and technology. In addition, as a concept, globalisation is also used to capture the economic and social patterns that may change due to this worldwide interconnectedness or interrelations (Jacoby and Meunier, 2010). Jacoby and Meunier (2010) further argue that globalisation allowed migration, monetary goods, ideas, and businesses to exchange some of these simply at the touch of a button.

Migration is an essential catalyst to foster ideas, eradicate some of the world's biggest challenges, such as low economic growth and social ills, and promote multilateral relations based on reaching countries' needs. The interconnectedness of the European countries is one of the clear examples of globalisation (Jacoby and Meunier, 2010). The European Union (EU) has ensured economic and social development

within the region. This development was fostered by the idea of developing its member states economically, socially, and otherwise, particularly by exchanging what they have in abundance with what others have in abundance.

Lipsmeyer and Zhu (2011) view that the latter has led to stable economies within the EU countries. Similarly, this has also led to a stable energy supply within these nations. Solarin, Bello and Tiwari (2022) contend that although countries such as Denmark are noted to be small, they contribute a lot to the energy sector of the European continent. Hence, the 4IR is not foreign to these countries as they enjoy a stable energy supply and growth in technological ideas and skills.

On another note, these countries can share technological advancements such as electric cars as they all belong within the EU, and there is a policy of free movement of people for 90 days within European countries (Jacoby and Meunier, 2010; Lipsmeyer and Zhu, 2011). Liu, Pan, Wang, Yousaf, Goh, and Rahman (2022) mention that these electric cars depend significantly on technological advancement and the stable availability of electricity, which power them during refilling or recharging.

Hence, globalisation, from such an understanding, is an essential weapon for migration, remittances, technological import, and export. From this background, a stable power supply is necessary to ensure a stable economic supply, which also affects social factors (Liu *et al*., 2022). On another note, since the world is technically in the globalisation stage, energy fast-tracks the implementation of communication and brings nations closer to one another (Jacoby and Meunier, 2010).

Norouzi, Dadashi, Haghifam, & Zare, (2022) notes that the communication process, which is currently complex, has necessitated that energy be a development partner. When drafting this dissertation, the world faces the scourge of the coronavirus, and it depicts that the entire globe is moving towards technological advancements for communication (Zuo, Ma, Zhang, Wu, and Ren, 2021). Thus, those not technologically robust, particularly developing countries, face a complicated communication network infrastructure (Norouzi *et al*., 2022).

The lack of network towers perpetuates this issue in capacitating the total number of users staying in this region. Similarly, Nigeria and South Africa were a nightmare due

to load shedding and power cuts being implemented now and then (Gray, 2008). Matsilele, Tshuma and Msimanga (2022) argue that although many entities had to close for the remainder of lockdown levels in South Africa, some companies forced their workers to work from home to continue operations. In addition, Nigerian businesses lose over US$29 billion annually due to power cuts, as stated by Udegbunam (2021). Sasu (2023) also mentions that about 2.2 million Nigerians working full-time lost their jobs due to the coronavirus crisis, resulting in negative economic growth. Matsilele et al. (2022) contents that COVID-19 changed the mode of communication in education, management, and family life; thus, technological advancements had to be available to keep the economy afloat. However, without energy, the face-to-face, hybrid, Microsoft Teams, and Zoom facilities could not have been achievable, or their existence would be without any impact, leaving the world stagnant. Matli (2020) asserts that these communication mechanism tools made the world see COVID-19 as an enemy that needs to be addressed as a matter of urgency.

The press conferences broadcasted on TV, tabloids, newspapers, and information sessions informed communities about the impact of COVID-19 (Matli, 2020; Matsilele *et al*., 2022). What were the precautionary measures to be adopted, the steps taken by respective governments and health institutions, and what impact that had? In the process, again, the communities were informed about the COVID battle and the number of infected. Without energy, all that could not have been possible. Moreover, economic growth was also tempered (Norouzi *et al*., 2022).

From the abovementioned, it is evident that energy provision is vital for social development. Globalisation stands at the centre of communication, technological advancements, and transfer. This knowledge and technology transfer contributes to embedding economic growth and fosters interconnectedness and interdependency from one country to another.

Hence, Norouzi et al., (2022) highlights that the state needs to procure a stable energy supply if there is any hope of sustaining the development of the 4IR and believes that the development will also see growth in the transport economy from regional, continental, and global perspectives. Not only that, but advancements in social and professional communications will also increase, thus signalling the importance of attaining a stable energy supply before commencing with the 4IR.

Lazo, Aguirre and Watts (2022) studied the Nigerian state during the COVID-19 lockdown, noting that the lockdown increased the demand for energy across the country. In addition, the lockdown also considerably impacted the migration of Nigerians as most had to work from home, thus increasing power or energy demand from households. Fouche and Andrews (2022) also found that working from home is a significant challenge for most South African citizens. These scholars also highlight that many students were marginalised when universities had to restructure their teaching philosophies and material.

Besides the issues of data constraints, the unstable energy constraints further perpetuated the learning space to be a vulnerable space for most. Willie and Skosana (2021) studied employees to decode the effects of working at home due to COVID-19 in South Africa. The abovementioned scholars believe that working from home due to load shedding is less productive than being in the office. This phenomenon makes employees lose productivity, negatively affecting profits and economic growth (Willie and Skosana, 2021).

Hence, it is vital to attain a stable energy supply in the world of globalisation. Many international entities have left the African shores of Nigeria and South Africa due to the unstable energy supply. Makgetla and Patel (2021) confirm that most have cited that the constraint power cuts and load shedding, which have resulted in the government having no clear vision on combating the energy crisis in these two countries, has resulted in international disinvestments.

While Lazo et al. (2020) maintain that the lockdown has increased the need for energy supply while constraining the system, this was also reflected in the number of disinvestments made in both South Africa and Nigeria because of unstable energy supply (Makgetla and Patel, 2021). Therefore, a stable energy supply is crucial for capturing foreign investors and establishing a good productive environment for businesses to start and thrive depending on the energy supply.

4.4 CHAPTER SUMMARY

This chapter presented the study's research design and methodology. The chapter further presented techniques that were applied to the study process. The chapter also presented the data-gathering techniques, data analysis, and ethical practices

employed in this study. The chapter elucidated and justified the research methods, techniques and samples adopted. In addition, the chapter further discussed limitations or challenges encountered relating to qualitative research and conducting a desktop study. These also affect reliability and validity concerning trustworthiness and provide valid empirical evidence.

Moreover, this chapter discussed the procedures and steps the researcher undertook to present and analyse data. The chapter then presented the study's data findings as guided by the impact of energy shortage on economic development in Nigeria and South Africa. The findings were presented in a systematic and thematic analysis manner whereby different themes were used to examine the study findings.

CHAPTER FIVE

MEASURES TO ENSURE THE SECURITY OF SUPPLY IN NIGERIA AND SOUTH AFRICA'S ENERGY SECTOR

5.1 INTRODUCTION

The previous chapter examined the impact of energy shortage on economic development in Nigeria and South Africa. In addition to presenting the research method the study followed, the findings-based literature related to energy shortage and its impact on the Nigerian and South African economies. This chapter reiterates the research objectives, showing their correlation with the findings. The chapter explains how each chapter of this dissertation stands for the key findings of the study, which are answers to the set research questions. This chapter also presents recommendations concerning the security of power supply in Nigeria and South Africa. This chapter provides the study's conclusion and reflects on the findings based on the set research objectives.

The first section of this chapter regards measures to ensure the security of supply in Nigeria and South Africa. The second section concerns alternative energy production methods for SOEs to remain competitive in a liberalised global energy sector.

5.2 MEASURES TO ENSURE THE SECURITY OF SUPPLY IN SOUTH AFRICA AND NIGERIA ENERGY SECTOR

This section is about the key recommendations the study generated after careful analysis of the character and impact of the economic crisis in Nigeria and South Africa.

5.2.1 Anti-corruption for the security of supply is the priority

Over the years, most SOEs in Nigeria and South Africa have depicted the impact of corruption, maladministration, and misuse of state resources. SOEs such as the Nigerian National Petroleum Company (NNPC) and South Africa Airways (SAA) have experienced the full impact of corruption. In addition, Obuah (2010) has alluded that, in many ways, the biggest problem in Nigeria is corruption, particularly in SOEs. Furthermore, Alok & Ayyagari (2020) concur with the abovementioned scholars that most politicians always target these SOEs as they are valuable for goods and services; they, therefore, become the epicentre of corrupt activities. This is important to

adequately depict the impact of corruption on the ability or inability of SOEs to deliver services. The study has thus far noted the importance of political leaders in battling the energy crisis and its role in SOEs. Therefore, there needs to be an understanding between political leaders and agents that run these SOEs to curb the spread of corruption. Mlambo, Zubane and Mlambo (2020) believe that clamping down on corruption will also solve the issue of maladministration, nepotism, and abuse of SOE resources. In addition, in South Africa, the government has invested in Eskom repeatedly, yet the entity still must be bailed out each financial year. Thus, this reflects the importance of dealing with corruption before seeking plans to expand or unbundle the power utility. Similarly, Olatunji et al. (2018) also depict that a lack of oversight at NESCO and Eskom has led to the energy crisis in Nigeria and South Africa. Thus, this lack of oversight has led to the corruption and mismanagement engulfing Eskom, and even NESCO, before its dissolution, which also faced the same crisis.

5.2.2 Stopping the criminal networks and the sabotage of energy infrastructure

Energy sabotage also seems to be one of the rising factors in the lack or inability of SOEs to produce and distribute electricity. Organised crime syndicates that steal state resources and unions that decide to embark on illegal strikes that also affect the functional efficacy of the entity are also increasing (Cowan, 2022). Among other mechanisms, Eskom uses diesel for general electricity, and frequently, the trucks delivering these critical resources are being hijacked, costing the power utility over one billion rand in 2022 alone, as Cowan (2022) documented. Organised crime syndicates use this opportunity to rob the power utility of its ability to provide power, especially since this can be an alternative measure by Eskom when generation units break down. Similarly, Cowan (2022) further argues that unprotected and illegal strikes also contribute to the breakdown of generation units due to the lack of personnel to work during the strike. Although not everyone may be part of the strike, due to the strike being illegal and unprotected, it often turns out to be violent, and strikers threaten those who want to work. Thus, these can also be some of the strategies unions use to sabotage the power utility such that they do not have a choice but to listen to their grievances (Carruthers, 2019). Similarly, supply chain sabotage is a significant issue within the energy sabotage mechanism, especially in countries with a high reliance on energy generation from national resources such as coal, oil, and water. Onuoha (2008)

refers to sabotaging Nigeria's thermal power station by interrupting the oil supply. In addition, Okoh (2005) has alluded to how 99% of Nigeria's oil and natural gas are situated within the Niger Delta region, and this place is crippled by conflict.

Thus, the abovementioned issues contribute to Nigeria's inadequate energy supply. Okoh (2005) further argues that Nigeria's economy depends on its oil reserves; hence, it has significant value even to energy production. Yet the sabotage caused in the energy sector causes untability particularly in the Niger Delta region, thus, this could contribute to energy sabotage. Not only that, but Nigeria's energy sector also has a vast dependence on hydropower, and this is important for economic development (Uchegbulam, Opeh and Atenaga, 2014). Therefore, the instability could sabotage the supply of water and oil, and this will affect both the thermal (Egbin Thermal Power Station) and hydropower stations (Kainji Power Station) in Nigeria, resulting in low energy generation or none (Uchegbulam *et al*., 2014). Both states have been met with vast sabotaging mechanisms, severely affecting the power utility. Thus, the SOEs sometimes fail due to sabotage. Unstable prices of natural or fossil fuels, crucial for generating energy, are also essential to curb, especially within the capitalist system where corporations chase profits.

Similarly, the ability to unionise and illegally strike and demonstrate while threatening other workers also places the power utility at risk of functioning at a lower capacity. The availability of natural resources such as gas and oil, which are also in demand worldwide, does not guarantee an adequate energy supply. The instability within the Niger Delta region reflects the dangers of conflict zones and how they contribute to energy sabotage, primarily when a country depends significantly on natural resources for energy generation.

5.2.3 Infrastructural development for the security of supply

On another note, there needs to be infrastructural development. South Africa has depicted that one of the primary reasons why the country is suffering power cuts is because of old infrastructure (Tshidavhu and Khatleli, 2020). The government and the power utility have invested little attention in developing and maintaining sustainable measures to deal with the energy crisis. Although the power utility invested in the Medupi and Kusile power stations as long-term solutions to the energy crisis in South

Africa, these are not viable for future generations (Tshidavhu and Khatleli, 2020). However, Tshidavhu and Khatleli (2020) further note that these power stations depend on producing energy through coal, which has proven to be unsustainable, hazardous and contributes to global warming. Coal is a natural resource South Africa supplies; however, multiple countries may not have this resource overall.

Similarly, Nigeria is also large regarding land area, and the government cannot reach some areas. Even with the privatisation of the energy sectors and the breaking down into eleven energy distribution entities, there is still a vast gap in the energy supply in rural areas (Dada, 2014). Furthermore, the plan to roll out new meters indicates that the old infrastructure is faulty, with several inconsistencies that can be bypassed to steal energy from the grid. Thus, the government's investments in new meters not only address electricity theft but will also assist in ensuring the delivery of reliable infrastructure that can be used for extended periods (Utazi and Obuka, 2014). Utazi and Obuka (2014) allude that the current meter system is not secure, making electricity theft easier.

In the same vein, to adequately implement measures to address the energy crisis, the government must invest in rural development and power through the distribution entities. The government can curb the vast migration from rural areas by powering these areas, which may result in energy supply constraints in urban areas. Similarly, these measures by the Nigerian government contribute to infrastructural development in rural areas and assist in curbing inequality. In addition, the local communities will also be able to get jobs from the power utility, limiting their reliance on the government for free electricity as they can afford to buy, which could also solve the crisis of energy theft. Therefore, infrastructural development is also crucial in addressing the energy crisis.

5.2.4 Policy changes for the security of supply

Policy changes and transformation are among the biggest challenges in addressing the energy crisis. Not only are the policies unclear in both states, but they are also not inclusive of new cooperation (between the government and private sector) that can assist the government in addressing energy poverty. Several civil society movements have also raised concerns about the policy implementation restriction within the

energy sector. Furthermore, the statements made by custodians who may also be gatekeepers of the sector may also be an issue when policy inclusion or change is concerned. Hence, even political leaders such as Gwede Mantashe, a politician who is the head of the Department of Energy, threaten sectors that do not support their vision and policies (Felix, 2022; Mantashe, 2022). Felix (2022) further asserts that the minister of energy and mineral resources in South Africa has declared that he will fire anyone who does not support his nuclear energy programs.

In addition, the vast issues within the energy sectors are also due to the restrictions of the non-policy implementation phase of the projects. The Nigerian government, for instance, depends on thermal and hydropower energy production, while other measures can be explored. Policy measures such as nuclear energy enrich the energy sector of Nigeria, while South Africa also explores the wind power and hydropower mechanism to address the energy crisis. Although the government has tried to touch on these sectors to improve its energy supply system, it does not have enough capacity to invest in them.

In addition, revenue to roll out the program might also be in the private sector, where the government must rely on a public-private partnership to ensure the project's success. However, due to the enclosed policy market, the private sector may not necessarily invest in the sector as they view that it will not help anything. Thus, the government must take measures to open the market and accommodate IPPs and investors looking to assist the government in solving the energy crisis. In addition, the South African government also depended on coal for energy production for an extraordinarily long time, whereby in these years, some policies could have been articulated to explore other sources of electricity. This would attract new energy means, and the investors would also contribute as the sector would seek to move to greener energy production. In another view, the South African government could also integrate policy through the energy and RDP policies to ensure that each household built by the government has access to solar panels, contributing to fewer communities being dependent on the national power utility.

Not only will such a policy relieve the constraint of the power utility in terms of supply, but it will also assist society in ensuring the success of greener energy production. Since the local government is more at a ground roots level and is concerned with

service delivery, this will also enable the management and distribution of elections through this level of government. Moreover, according to the energy transition report, various municipalities across the county are indebted to Eskom, totalling R356,852 billion in 2021 (Hermanus, Scholtz and Kritzinger, 2022). This sphere of government (local government) is given the responsibility of societal needs, and they are better equipped as they are at the local level, so delivering services would be easier.

Furthermore, Hermanus et al. (2022) mention the importance of allowing more energy production from IPPs, which will assist the private sector instead of the state to relieve the pressure. Similarly, big corporations that use vast amounts of energy can also be allowed to produce their own power. Industries such as the mining sector can be encouraged to build small plants to ensure their sector's power. Then, the government will only monitor in terms of tariffs being paid by these industries, either when sourced from an IPP or their own they can be regulated by the state. This will ensure licensing exemptions for private energy generation up to 100 MW gain momentum as broad liberalisation of the energy sector will now be open to the private sector. Thus, such initiatives will also open the market for more jobs from the private sector, allowing the government to monitor their electricity production mechanism and ensure they pay tariffs or taxes.

For Nigeria, the government must first maintain the policy and eliminate outdated or dilapidated equipment and buildings (Abdullahi *et al*., 2022). They must develop a policy that ensures merit in hiring staff members and stops employment based on religion, politics, or favouritism. Similarly, Abdullahi et al., (2022) further argues that staff must be given proper training and equipment to work safely. In addition, the government's policies should understand and input scientific research such that measures to address the crisis are not politically motivated and in vain. Hence, the government can source funding for resolving the energy crisis by addressing these policy-related challenges.

5.2.5 Securing funding for the security of supply

One of the essential elements of energy security is to secure funding for maintenance and electricity production. The study notes the energy sabotage caused by illegal strikes and unions over wage disputes. This was after the power utility indicated they

did not have enough capacity to raise pay to the extent the workers and union asked. In a statement by Eskom on the 26th of June 2022, the power utility announced an anticipated stage four load shedding due to the illegal industrial action by some workers and the unions.

In addition, funding security will ensure that the power utility can source the best personnel to promote the entity's vision. After a series of load shedding ravaging South Africa, the minister of public enterprises had to reshuffle the Eskom board (Winkler, 2022). In this, the minister resorted to sourcing new personnel to work towards solving the energy crisis (Winkler, 2022). Hence, the team included various professionals, such as engineers, who would ensure that the generation capacity is improved, particularly with the conversation of the energy transition at hand. However, Imran & Amir, (2015) alludes that these are short-term solutions to the energy crisis and that the government needs to invest heavily in the utility to see long-lasting results, including sourcing funding from external or international investors as the crisis is rooted in infrastructure capacity, leadership at the utility, and corruption, among others.

Abdullahi (2022) asserts that the inability to secure funding for the Nigerian government also contributes to the under-provision of energy. Abdullahi (2022) is of the view that although Nigerians are constantly seeking ways to bypass the meters such that they do not have to pay their electricity tariff fees, corruption by agents at the energy utility (NEPA) is also causing a lack of profit, resulting in a lack of funding. In some instances, although the energy might be available for transmission, the lack of electric lines because of incomplete projects by the power utility also causes energy poverty. Particularly in the villages, NEPA officials misuse the funds directed to the projects deemed to expand electricity to the villages.

Therefore, energy security in both countries is embezzled with lack of funding for the functionality of the power utilities. Thus, this is guided by the targets of the entity. In South Africa, Eskom has only worked to service its foreign debts for years without making a profit, contributing to its ill performance. While NEPA is entrenched in vast corruption in and out of the entity, leaving workers without equipment in some instances. However, nepotism, mismanagement, and white-collar crime are the business order in Nigeria and South Africa. Therefore, to adequately curb this, there needs to be serious sourcing of funding that will contribute to the growth of these

entities, especially since there is a high reliance on fossil fuel from both countries, and they need to transition to clean energy, which can only be achieved through sourcing external funding.

5.3 ALTERNATIVE ENERGY-PRODUCING METHODS

IRENA (2020) alludes that the overdependency of Nigeria and South Africa, among other countries across the globe, has sparked the conversation around alternative means of producing energy. This aligns with the UN clean energy policy and the African Union Agenda 2063 agenda of resolving various issues within the African continent, including the solutions for the energy crisis. What is clear is that to curb this crisis succinctly, governments must transition from fossil fuels and develop cleaner measures, as IRENA (2020) documented. Hence, this includes creating industries that will not contribute to air pollution.

Abdullahi (2022) alludes that while Nigeria needs to find a solution to the energy crisis, which will require improved entity performance with a long-lasting solution that will also benefit future generations. Hence, the idea of renewable energy sources will also be vital in the energy transition for Nigeria and how it intends to solve the crisis for future generations (Oni, 2018). Abdullahi (2022) adds that it is evident that the solution to Nigeria's energy crisis is renewable energy resources. He adds that this is the perfect solution to Nigeria's energy crisis and the best form of energy generation for Nigeria and the world.

This study concurs that the energy transition conversation is essential to ensure that energy transition is the centre of energy policies, especially in nations that depend highly on fossil fuels (Abdullahi, 2022). Therefore, renewable energy can be understood as the energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat (Oni, 2018; IRENA, 2020). In addition, in some instances, this renewable energy can be referred to as clean energy, and the goal of energy production in the 21st century is to generate enough clean energy to create clean environments for communities.

In 2020, South Africa was the third largest economy in Africa, after Nigeria and Egypt, depicting the need to transition towards renewable to maintain economic growth (IRENA, 2020). Within that period, South Africa was scaling up to national renewable-based energy generation methods, which would also be cost-competitive, while gradually seeking to reduce the dependency on coal-based generation. IRENA (2020) further asserts that greenhouse gas (GHG) emissions in South Africa emanate from energy supply and consumption, thus signalling a need for alternative measures.

Scholars have noted the efforts by these countries to counter their energy crises. South Africa has launched the prospects of renewable energy projects, and Nigeria has focused on its Renewable Energy Master Plan (REMP). These similar projects seek to advance these state's ambitions to add renewable energy to the grid and relieve their energy crises. Although there have been vast existing policies before this, since the collapse of NESCO to NEPA, the government has set various new policies. However, this section provides insights into the REMP, which is the country's road map towards renewable energy.

Established in 2005 by the Energy Commission of Nigeria (ECN) together with the United Nations Development Programme (UNDP), the REMP was a road map depicting the renewable energy action for the government. In addition, this was in line with the UN’s green environment policy; hence, there needed to be a collaboration between the two organisations. This was reviewed again in 2012 and revamped by another approach two years later in 2014, the National Renewable Energy and Energy Efficiency Policy (NREEEP). This policy was drafted by the Federal Ministry of Power and approved by the Nigerian Federal Executive Council.

The Nigerian government envisioned a long-term plan that would yield results soon. Hence, NERC had already anticipated generating a minimum of 2,000 MW of electricity, particularly from renewable sources, by 2020. This was because the government saw the potential to tap into the sector with vast sources of renewable energy supplies. The sources of Nigeria's energy supplies include solar energy, hydro-energy, wind energy, and biomass energy. These gave the government hope to harness power from wind, water, sun, and waste that are abundant in the country and could be used in the fight against the energy crisis.

The South Africa renewable energy road map was launched in 2015 in line with the NDP 2030 policy (IRENA, 2020). The goal was to find alternative ways to produce energy in South Africa such that its overdependency on coal for electricity production is relieved. In 2015, the energy production sector of South Africa was overdependent on fossil fuels, with coal at 66.9%, oil at 16%, and petroleum products at 6.8%, with smaller shares for gas at 2.2% and nuclear at 3.5%, as documented in the IRENA (2020) report. Hence, renewable energy began to be a topic as an under explosed method of energy production in South Africa, like in Nigeria, while there is a high dependency on harmful carbon emission fossils. At the end of 2015, coal-based energy production was said to have accounted for 78% of the national power generation capacity. In addition, this was followed by hydropower and nuclear with 3.9% and 3.7%, respectively. The non-renewable turnover indicates underuse as they only contributed 4.7% to power generation capacity during that particular year (IRENA, 2020).

Thus, to overturn this, the South African government developed the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (IRENA, 2020). This policy attracted investors from the private sector to invest in the government's vision to attain more sustainable energy generation capacity. The IRENA (2020) policy report further explains that this program would run on a tendering system in which the government would use this to build relations with the private entities within the sector.

Furthermore, the system would also control the capacity generation and the technology used during this process, and this would include technologies such as onshore wind, solar PV (photovoltaic), CSP (concentrated solar power), small-scale hydro, biomass, and biogas or landfill gas. Thus, the funding secured by the government from the COP26 Environment and Energy Conference was used to assist South Africa in securing funding for the energy transition goal. Ryklief (2022) documents that the R131 billion secured by South Africa from the conference was to assist with the move away from coal as the country looked to ‘go green’. During the conference, Eskom was said to be the biggest emitter of sulphur dioxide polluting the environment. Henceforth, this funding will go towards assisting the energy transition

and having clean energy while also seeking to secure the energy crisis in the country (Ryklief, 2022).

This shows that, like Nigeria, South Africa still has a vast space for renewable energy to be used and embedded in the system for more energy generation and capacity. Thus, according to the renewable energy roadmap to 2030, there will be considerable growth in renewable methods to generate power by 2030. In addition, this will represent over 49% of the total energy in the grid and will be a significant growth from the 9% in 2015. This will be driven by deploying solar PV and wind technology. This indicates that South Africa and Nigeria can derive their energy from renewable sources, especially the sectors that have not been fully explored.

The cooperation between the government and the private sector will be crucial for driving these nations to reach renewable energy goals. Although Imran & Amir (2015) asserts that there are no immediate solutions to the energy crisis, the existing renewable energy space provides light for both countries, which will assist in the transition from coal to more environment-friendly energy production methods.

5.3.1 How renewable energy will solve the energy crisis

The vast existing literature has depicted the noting of renewable energy as a plan to deal with the energy crisis across various countries. This is because not only are fossil fuels temporary, but they are also against the policy of the UN for countries to move away from hazardous means of energy production. However, they have also proved unreliable, and their capacity is insufficient to provide for the two respective countries. The IRENA (2020) policy report depicted that although South Africa's reliance on coal for energy production is 66%, the country is still experiencing vast load shedding and reduction or power cuts due to capacity in energy generation.

Therefore, long-term investments in renewable energies like wind, solar, hydro, biomass, biogas, or landfill gas can potentially contribute significantly to eradicating energy poverty. The governments have indicated their commitment to solving the energy crisis through green or renewable energy. The Federal Ministries of Environment and Power and the Energy Commission of Nigeria should start applying their action plan for renewable energy technologies, solar, as this is noted to have the most potential to solve the energy crisis in Nigeria. With the continuing changes in

renewable energy generation (solar, wind, waste) and storage technologies (batteries), the wide availability of solar PV from household to commercial scales can be embedded in the distribution grid or off-grid. ‘Smart’ sensing and communication technologies can be used to supplement the performance of distribution grids.

Therefore, renewable energy methods will not only assist the government to reduce their environmental air pollution but also secure intelligent energy production methods. Not only will these be reliable, but the government will also be able to provide stale energy to citizens while strengthening its alliance with the private sector to create more jobs and ensure that the environment is conducive for investments. Renewable energy is not just contributing to the environment but also to economic and social growth as well as security.

CHAPTER SIX

CONCLUSION AND CONTRIBUTION OF STUDY

6.1 INTRODUCTION

The previous chapter examined measures to ensure the security of supply in Nigeria and South Africa. It also presented alternative energy sources. In short, this chapter is about conclusion and reflection on findings based on the set research objectives. This chapter reiterates the research objectives, showing their correlation with the findings. The first section concerns the research objectives set in the study, linking them to critical arguments regarding the security of supply in Nigeria and South Africa. The second section concerns this study's contribution to knowledge. The last section provides the study's conclusion.

6.2 REVISITING THE CHAPTERS AND AIMS AS SET IN THE STUDY

The study's problem statement asserts a general problem of SOEs "shirking" in the face of the widespread energy crisis; "shirking is simply failing to work and is often associated with laziness and general inactivity". The study highlights that the existing energy crisis is, among others, caused by the shortfalls of SOEs. The failure of SOEs to conduct regular maintenance and appoint efficient agents causes a problem for the effective running of the entity due to "shirking". Furthermore, the study also points out that other factors contribute to the shortfall of energy supply by SOEs, such as political intervention, clientelism and patronage, or criminality either by managers, employees, or citizens.

The study's primary research question was: How do SOEs respond to the energy crisis in South Africa and Nigeria? The study has established that Eskom in South Africa has sought to go through an unbundling process into three departments: generation, transmission, and distribution. In addition, through the government, Eskom has also given leeway to private entities to generate their own electricity, limited to 100 MW. Similarly, through government policies, Eskom has also welcomed the installation and use of renewable energy through solar for private use and business purposes. This is while the entity seeks to revamp its generation units through regular maintenance and implementation of load shedding to avoid a grid collapse.

In comparison, Nigeria has undergone different phases of SOE responses to the energy crisis. NESCO was dissolved in 1951, with ECN emerging as its successor, which was also dissolved in 1972 to form the National Electric Power Authority (NEPA), which later became the PHCN in 2012. During these different phases, the Nigerian government aimed to revive its energy sector while revising policies to ensure better energy efficiency. Hence, the transition to PHCN saw the planned unbundling and privatisation of the sector to ensure sustainable supply. However, this saw little intervention from the government, with the private having more access to generation, transmission, and distribution. Nigeria is still experiencing vast challenges with its energy supply. Thus, this has led to employing renewable energy sources, such as wind turbines, solar, gas, and radiation, as in South Africa's case.

Chapter One laid the foundation for understanding the source of the energy crisis in Nigeria and South Africa. In spelling out what constitutes the energy crisis in the two selected countries, the chapter deduced from the existing literature that the key indicators of the energy crisis include frequent power cuts, load shedding, load reduction, and, in some instances, the complete failure of the power grid. The chapter points to arguments that the energy crisis is caused by the government's SOEs' inability to maintain proper business processes and planning, leading to their mediocre performance in ensuring the security of supply.

Chapter Two revealed the specific principal-agent interests in SOEs tasked with energy security. Through theoretical underpinnings, this chapter critically discussed the relationship between the state (SOE owners/principals) and SOE managers (agents assigned to run the SOEs). The principals' interests have negatively impacted policies and decisions by agents to the extent that the SOEs have failed to ensure the security of supply, leading to devastating economic and social well-being impacts for Nigeria and South Africa. The principal-agent relationship is vital in ensuring the success or failure of an SOE. Similarly, the harmony of this relationship or network was also scrutinised through the principal-agent theory, particularly regarding each entity wanting to achieve different goals within the organisation. The poorly managed principal-agent relations have stifled SOE responses to the energy crisis in Nigeria and South Africa.

Chapter Three identified the main factors hindering SOEs' sustainable energy growth. The chapter explored SOEs' preparedness to adapt to the changing world of energy supply and initiatives for just energy transition. The chapter provides that SOEs tasked with energy supply in Nigeria and South Africa are stagnant and unresponsive to the growing energy demand. Worse than unresponsiveness, the SOEs have not planned efficiently for infrastructure development. This is worsened by poor governance protocols that fail to enact policies that enhance the competitiveness of SOEs in the liberalised energy economy with private critical actors in energy supply. Hence, the chapter identified political interference, lack of infrastructure maintenance, energy racism, and development policies as the main factors inhibiting growth.

Chapter Four described the impact of the energy crisis on the economic development of Nigeria and South Africa, discussing the social, economic, and environmental development sparked by the lack of energy provision. The chapter further explained the research method that led to the findings documented in this report.

Chapter Five provides possible solutions to the energy crisis in South Africa and Nigeria. The measures suggested speaking to the efforts lacking in the current management and governance protocols of SOEs tasked with energy security in these countries. The chapter is cognisant that supply security will remain unresolved unless the Nigerian and South African governments end the problem of corruption, criminality, and maladministration of energy infrastructure at the affected SOEs.

6.3 THIS STUDY'S CONTRIBUTION TO KNOWLEDGE

The study contributes to the body of knowledge by highlighting the impact of politics in solving the technological or engineering issues existing within society, such as the energy crisis. In addition, the study further depicts that the two countries under study are the most prominent economic hubs in sub-Saharan Africa, and their development inspires policy changes in other African countries. Thus, by Nigeria and South Africa developing a rigid policy to address the energy crisis, they will also contribute to the vision of other African nations toward solving the energy crisis continentally. The policy drafts that would include renewable energy will depict that this can be a reality for most African countries and release their dependency and others on the fossil fuel

mechanism. Thus, this can draw investment from the private sector and strengthen government relations while working towards a clean energy solution.

The study further alludes to the importance of energy security for economic development, which can foster relations between Nigeria and South Africa as the two economic hubs of Africa. Similarly, the study further indicates that South Africa is seeking to follow the path of Nigeria and privatise the sector with the unbundling of Eskom. This is the same mechanism Nigeria used during the dissolving of NESCO. However, the country is still experiencing the vast reality of the energy crisis. Thus, South Africa could learn from the experiences of Nigeria while they both seek to establish renewable energy sectors.

6.4 CONCLUSION OF STUDY

The responses to the energy crisis in South Africa and Nigeria through SOEs are weak. Not only do they lack clear policy direction, but these SOEs also do not have adequate means to deal with energy poverty. Thus far, these states have seen many illuminating threats to the total collapse of the system or the grid, and the only measures have been power cuts, load shedding, and load reduction in some instances. These measures are currently assisting the SOEs to avoid total blackouts or grid collapse. In addition, these countries are suffering immensely due to their energy crises; not only are their economies shrinking, but there has also been a social aspect of communities a violation of their fundamental human rights.

The Nigerian and South African governments can and are willing to assist these entities in solving and contributing to the energy crisis. However, corruption and lack of resources prevent them from performing at their full potential and contributing to development. Even with the idea of renewable energy as an ideal measure to solve the crisis, lack of resources and corruption may still be an issue, especially in rural communities. In another view, South Africa seems to be following in Nigeria's footsteps in privatising its energy sector, even though this did not work in Nigeria, as not only is the capitalist system thriving there, but it does not advance solutions to the energy crisis.

To this extent, energy racism also becomes an important factor and is one of the main factors contributing to the crisis. This is an important dynamic, especially for South Africa, considering its historical credentials and the government's responsibility to distribute state resources equally among its citizens. Therefore, the study concludes that although measures have been taken by the SOEs responsible for energy provision in South Africa and Nigeria to address the crisis, their efforts to curb the energy crisis are overshadowed by corruption, energy sabotage, and lack of resources. Thus, these entities have not explored all the means to address the crisis, and the economic and social impacts are very much visible; hence, development is stagnant. To address the prospects of development, SOEs in Nigeria and South Africa must take a stance towards solving the crisis adequately.

Energy provision has always been an integral part of development in any country, especially within a modern-day society where countries seek massive growth technologically and otherwise. Thus, energy provision becomes a central value of development and an agent for fostering development socially, economically, and in other aspects. Thus, the study focused on understanding energy poverty and how this lack of energy provision is now regarded as an ongoing crisis. Examining the energy crisis in Nigeria and South Africa provides a comprehensive picture of the status of energy within the continent, especially since these countries are the leading economic hubs of Africa.

The reflection on the energy crisis within these countries provides a clear picture that the crisis is driven by corruption, maladministration, energy racism, lack of developmental capacity, and rigid policy makeup, to name a few. In addition, the study also depicts that this has a massive impact on the economic development of these countries, thus leading to underdevelopment continentally. Hence, the study recommends that to deal with the underdevelopment in the African continent, stable energy provision must be given preference, with an understanding that it has a central role in state development within the 4IR.

The study's main question concerned how SOEs respond to the energy crisis in South Africa and Nigeria. Seeing that the study has established the prospects of an energy crisis in these countries, the study further signals the importance of SOEs as leaders in responding to crises. Hence, the study explains SOEs' roles through the lenses of

development and energy provision. Thus, the responses from Eskom and NESCO depict that these governments are working tirelessly to provide sustainable energy production for the future. Moreover, the study notes the importance of Eskom and NESCO and their role in building societies and economies while contributing to less environmental pollution.

Thus, Eskom and NESCO, through their respective governments' policy-making and prospects of implementation, try to adopt renewable energy and sustainable means of producing energy that may be independent of the power utility. Hence, the South African government has allowed the production of 100 MW of energy from IPPs, while there is also hope to provide measures for households to self-produce energy. Similarly, this is the same approach Nigeria took through NESCO as NEPA then later PHCN was established, and the 11-distribution cooperation was also formed to allow an open market to the energy sector. Unfortunately, corruption has prevented the success of these distribution companies as Nigeria is still experiencing an energy crisis. Hence, Nigeria and South Africa's prospects of solving their energy crises require vast infrastructure and power utility improvements while also directing massive funding towards renewable energy.

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Annexure A: Proofreading Certificate

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It is hereby certified that this dissertation has been proofread and edited for spelling, grammar and punctuation by a professional English language editor from www.OneStopSolution.co.za

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A Comparative Analysis of State-Owned Entities' Responses to the Energy Crisis in South Africa and Nigeria

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