

Examining the main Factors that Hinder the Transition of SOE's To Sustainable Energy Supply in South African and Nigeria

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Abstract

Ensuring a sustainable energy supply is a fundamental responsibility of state-owned enterprises (SOEs) as part of their public service mandate. However, in countries such as South Africa and Nigeria, which are vital economic hubs in Africa, the shift to sustainable energy supply has encountered significant challenges. Despite possessing the necessary infrastructure and financial capability to spearhead this shift, these countries have made minimal progress in establishing sustainable energy provision, resulting in an energy supply shortage. This paper seeks to investigate the primary factors impeding SOEs' transition to sustainable energy supply in South Africa and Nigeria. Throughout the paper, the term "energy utility" is used interchangeably with "state-owned entity" (SOE), and "clean energy" is used interchangeably with "green energy" for clarity. This qualitative study draws on accredited journal articles, reports, and books to comprehend the issues at hand. The findings indicate that the government must take decisive action to tackle the challenges affecting SOE performance. Factors such as corruption, insufficient infrastructure investment, operations, and maintenance, and a lack of commitment to sustainable development policies must be addressed through good governance. In conclusion, the paper underscores factors such as the failure to integrate sustainable energy supply, issues of good governance, corruption, infrastructure development, sustainable development, and unequal access to energy as the primary obstacles hindering SOEs' transition to sustainable energy supply.

Keywords: *Sustainable energy supply, Good governance, Corruption, Infrastructural development, and energy racism.*

Introduction

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

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comes from the principles of sustainable development, whose pillars include social, economic, and environmental security (Nel & 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). Oduola (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 (Oduola, 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 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 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	Sustainable energy will increase the diversity of energy access, reducing reliance on

	reliance on harmful methods such as coal. This will benefit the economic, environmental, and social sectors.	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 mainly 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 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 in order to reach a sustainable energy supply and the factors affecting this process.

China and Poland have taken different approaches to sustainable energy supply. China has utilised international cooperation and domestic private-sector involvement to advance sustainable energy supply, with state-owned enterprises (SOEs) playing a crucial role. In contrast, the private sector in Poland has not been actively involved in sustainable energy development, with the government focusing on small-scale renewable energy projects that have not effectively raised public awareness. As a result, SOEs in China have become global leaders in wind energy supply. Achieving energy security is seen as challenging without the involvement of SOEs, as argued by Zhao et al. (2011:1105).

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

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 also 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, Maduwesi 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, coal 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.

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.

From the above-mentioned, 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 population growth has caused an increase in the energy consumption demand, more than the existing power plants can bear (Alam, Fatima and Butt, 2007:826) due to the lack of maintenance on the power grid. Since the grid is under strain, it will cause more issues as it was not made to supply excessive energy. In addition, since the structure is old and has had limited maintenance, it will also collapse as it is under strain (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 wrench 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) contends 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 almost 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 (Motswaledi, 2023).

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 would 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.

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 similar to 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 subset 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, Masekamani 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 mainly 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.

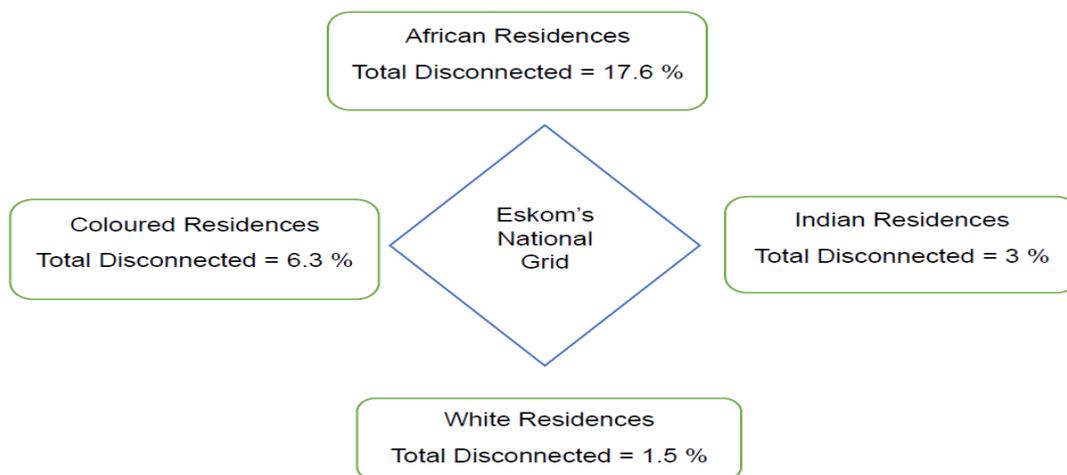


Figure 2: A racialised/othered quadrant of energy supply in South Africa (Own construction)

Figure 2 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 residences 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 residences, with about 3% not connected to the power grid. Finally, only 1.5% of White residences 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 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.

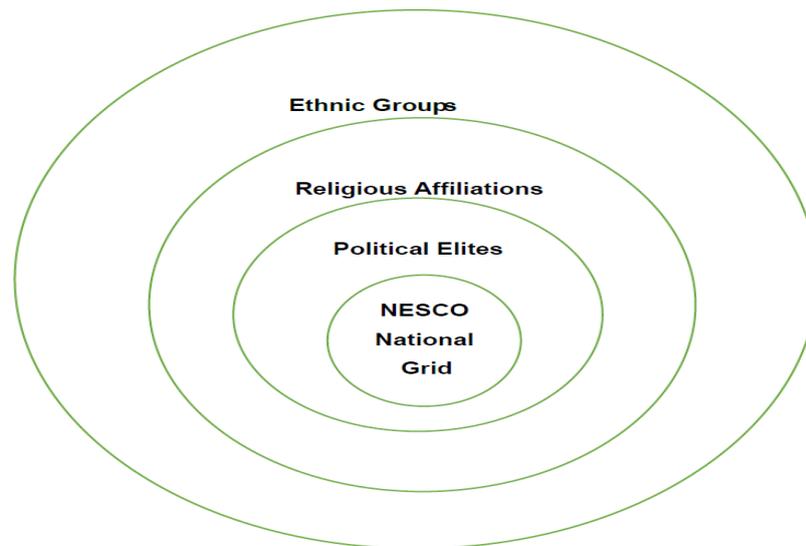


Figure 3: An othered circular model of energy supply in Nigeria (Own construction)

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.

Conclusion

The paper has 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. Furthermore, it has also examined how a lack of energy infrastructure development and maintenance leads to energy insecurity. Henceforth, it has presented the case for sustainable energy as a solution to energy poverty and provides issues as well as 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 paper thus presents models depicting racialised and othered energy poverty. Thereby, the paper concludes that 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, there ought to be good governance, less corruption, infrastructural development, and sustainable development (policy formulation and implementation) to better manage the energy crisis.

Acknowledgments

This work resonates from my Master's dissertation completed at the North West University. **Motswaledi, T. R. (2023)**. A comparative analysis of State-Owned Entities' responses to the energy crisis in South Africa and Nigeria (Master's dissertation, North-West University (South Africa)).

Funding: The paper acknowledges the North West University and the National Institute for the Humanities and Social Sciences (NIHSS)/ South African Humanities Deans Association (SAHUDA) for funding this project.

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