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Authors
Nthabiseng Mohlakoana
Peta Wolpe
Coordination
Anda David (AFD)

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Unbundling Eskom: How would a new distribution system impact on energy poverty

AUTHORS

Nthabiseng Mohlakoana

University of Stellenbosch (South Africa)

Peta Wolpe

Independent researcher

COORDINATION

Anda David (AFD)

Abstract

South Africa's electricity generation and transmission are currently dominated by the country's vertical monopoly power utility, Eskom. Distribution is shared between 165 licenced municipalities and Eskom. The intention to divisionalise or unbundle Eskom will eventually affect the current distribution framework and the tariff structures in place, which in turn, could directly impact energy poverty within the country. Alongside this, South Africa recognises the dire and urgent need to address climate change and to transform into a low-carbon and climate-resilient country by lowering emissions and moving into a more sustainable energy future, which should be done within a just transition framework. That transition is premised on moving away from being fully dependent on fossil fuels for electricity generation to incorporating renewable energy. This paper attempts to find out if energy poverty alleviation strategies could emerge from a close examination of the distribution system and tariffs in the face of Eskom's unbundling. In doing so it highlights that the tariff structure in place is to a large extent driven by the political economy of the country and without systemic changes will not, on its own, be a major driver in alleviating energy poverty.

Keywords

Energy poverty, just transition, just energy transition, South Africa

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Résumé
La production et la transmission d'électricité en Afrique du Sud sont actuellement dominées par la compagnie d'électricité du pays, Eskom, qui détient un monopole vertical. La distribution est partagée entre 165 municipalités titulaires d'une licence et Eskom. L'intention de diviser ou de dégrouper Eskom finira par affecter le cadre de distribution actuel et les structures tarifaires en place, ce qui pourrait avoir un impact direct sur la pauvreté énergétique dans le pays. Parallèlement à cela, l'Afrique du Sud reconnaît la nécessité impérieuse et urgente de lutter contre le changement climatique et de se transformer en un pays à faible émission de carbone et résilient au changement climatique en réduisant les émissions et en s'engageant dans un avenir énergétique plus durable, ce qui devrait se faire dans le cadre d'une transition juste. Cette transition repose sur l'abandon de la dépendance totale aux combustibles fossiles pour la production d'électricité au profit des énergies renouvelables. Cet article tente de déterminer si des stratégies de réduction de la pauvreté énergétique pourraient émerger d'un examen approfondi du système de distribution et des tarifs face au dégroupage d'Eskom. Ce faisant, il souligne que la structure tarifaire en place est dans une large mesure déterminée par l'économie politique du pays et que, sans changements systémiques, elle ne constituera pas, à elle seule, un facteur important de réduction de la pauvreté énergétique.

Mots clés
Précarité énergétique, transition juste, transition énergétique juste, Afrique du Sud.

Introduction

This paper attempts to find out if energy poverty alleviation strategies could emerge from a close examination of the distribution system and tariffs in the face of Eskom's unbundling. In doing so it highlights that the tariff structure in place is to a large extent driven by the political economy of the country and without systemic changes will not, on its own, be a major driver in alleviating energy poverty. At the very least what will be required is tariff and fiscal interventions within a new electricity industry structure. Whilst South Africa is on a journey of change, without that change being linked to a political economy overhaul accompanied by social and welfare reforms, poverty and energy poverty will remain a challenge.

Electricity generation and transmission are currently dominated by the country's vertical monopoly power utility, Eskom. Distribution is shared between 165[1] licenced municipalities and Eskom. The intention to divisionalise or unbundle Eskom will eventually affect the current

distribution framework and the tariff structures in place, which in turn, could directly impact energy poverty within the country. Given that Eskom is in a financial crisis with a huge debt of over R400 billion and R50 billion owed to them from unpaid municipal accounts and that they are recovering from poor governance and State Capture; a clear emphasis is now on improving their business case, which includes implementing realistic cost-reflective tariffs. However, the costs of running three new stand-alone entities that are expected to be self-sufficient will have to be covered, which up until now have been subsumed under one entity namely, Eskom Holdings. In September 2022, Eskom requested a 32% increase in tariffs owing to primary energy increases, such as diesel, emergency procurement from independent power producers (IPPs) and a depreciation of assets. Whilst the increase has not yet been approved by the regulatory body, it is evident that they are trying to recoup increased costs, and this is prior to the establishment of a new distribution entity as part of the unbundling process. However, a 32% increase still means that the tariff would remain below a cost-reflective level (Creamer, 2022).

Every time Eskom adjusts its tariffs, this has a ripple effect on municipal tariffs. Historically and owing to the fiscal framework of municipalities, the sale of electricity is one of their major revenue-generating sectors for those licensed to distribute. This has meant that municipalities not only recoup the cost of distributing electricity but are allowed and

[1] https://www.nersa.org.za/electricity-overview/electricity-licences/

are expected to add a levy or charge a higher rate per kWh than they paid for their bulk purchases from Eskom. The additional amount varies for different municipalities and depending on the customer tariff. Those that do not distribute electricity rely largely on municipal rates to generate income. However, untangling the tariff structure and the regulations in place is extremely complex and, to some extent, is tied to the country's political economy. South Africa's economy has been built around the Minerals Energy Complex (MEC) as defined by Rustomjee and Fine in 1996 (Fine & Rustomjee, 1996) which is dominated by coal and coal-fired electricity (Baker & Phillips, 2019; Bowman, 2020). Moreover, how tariffs have been set, who has had preferential rates and who has received electricity is interwoven into the apartheid and post-apartheid economy.

After 1994, the ANC began to develop and implement several policies that would address the unequal legacies of the apartheid era. One such programme was the Redistribution and Development Programme (RDP) (*White Paper on Reconstruction and Development*, 1994), which included electrification, housing and water programmes. The new democratic government was faced with the enormous challenge of redressing high levels of poverty, inequality and unemployment all borne out of a history of colonialism and apartheid separatist rule. This was not going to be an easy task and, despite good intentions and good policies, these triple challenges persist whereby 55% of the population remains in poverty, the majority of which are black Africans and Coloureds (Sulla, 2020). Furthermore, although 87% of the population have access to grid electricity today, most poor households cannot afford to use it or substitute with other unsafe fuels (Ledger, 2021b; SEA, 2022). Thus, energy poverty is not only about access to safe and reliable energy but also about affordability.

Alongside this, South Africa recognises the dire and urgent need to address climate change and to transform into a low-carbon and climate-resilient country by lowering emissions and moving into a more sustainable energy future, which should be done within a just transition framework. This means that those who have been most impacted by the coal-based economy should not be negatively impacted further by the transition, their voices should be heard and they should form part of the solution (PCC, 2022). That transition is premised on moving away from being fully dependent on fossil fuels for electricity generation to incorporating renewable energy. This has been happening for some years through various local and national strategies, such as the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) introduced in 2011 and by more recent changes in the regulatory space. Moreover, visible action is being taken by different government institutions as well as the private and financial sectors in embracing and enabling this transition to

take place. Eskom has made it clear that as an electricity utility, it needs to transition to cleaner energy production in order to comply with the country's commitment to lower emissions. The South African Just Energy Transition Investment Plan[2] includes the decommissioning and repurposing of 22GW of coal-fired plants over the next 15 years, 950 MW of battery storage, 2550 MW of solar and 600 MW of wind power.

For South Africa, the energy transition is expected to fulfil what the transition to a democratic state could not achieve and this includes alleviating energy poverty. (Ledger, 2021b) states the following:

> "We believe that a truly just energy transition must incorporate the basic principles of energy justice, where we would define as all households having access to sufficient affordable and safe energy. In turn, the details of the dominant distribution model are central to whether or not we can achieve energy justice" (Ledger, 2021b, p. 2).

Ledger's argument implies that a just distribution of electricity cannot happen in the face of increasing tariffs, which as noted above, are going to happen and have been occurring on an annual basis, without sufficient cushioning for poor households. These households will remain in a locked position of not being able to afford the right to clean energy to meet their daily needs.

To assess the impact of Eskom's unbundling on energy poverty, this paper focuses specifically on the restructuring of the distribution of electricity and introducing cost-reflective tariffs on poor households. To do so the paper provides a brief overview of the political economy and how Eskom is a leading player in the coal and electricity industry. This paper provides some detail in terms of the role of Eskom and municipalities in the distribution space and begins to unpack the complexities surrounding the setting of tariffs. The next chapter provides an understanding of energy poverty and electricity subsidies in South Africa before presenting the fieldwork findings of a sample of 41 households in a low-income area in the Emalahleni Local Municipality. The final section is an analysis with recommendations for a way forward.

[2] https://www.thepresidency.gov.za/download/file/fid/2649

1. Eskom and its journey to unbundling

1.1 Understanding Eskom within South Africa's political economy

Coal mining, coal generated electricity and the energy intensive industries that have developed as a result of an abundance of cheap coal are integrally part of South Africa's political economy and is referred to as the mineral-energy complex (MEC) (Fine & Rustomjee, 1996). Eskom is the country's power utility and generates 87% of electricity from low-grade coal (Calitz & Wright, 2021). Sasol produces liquid fuel from coal and in 2005 they were producing 28% of South Africa's fuel needs (Sasol, 2005). Electricity has been the driving force for many other industries such as mineral processing, including gold and platinum, smelting, refining and manufacturing. Thus, placing Eskom at the core of the energy intensive economy. The utility entered into very low-price agreements with many of the mining industries which enabled them to also procure cheap coal supplies (Winkler, 2009) and many of those agreements are still in place. Furthermore, the financial sector has been closely connected to mining, manufacturing, and other productive and service sectors making the MEC even more central to the economy (Ashman & Fine, 2011; Baker et al., 2014, Strambo & Burton, 2019).

The Electricity Supply Commission (ESCOM) as it was initially known was established in 1922 and has continued to hold a monopoly on the generation, transmission and, to a lesser extent, the distribution of electricity. This was the beginning of the centralised and vertically integrated electricity sector that is still in place and at its peak, produced some of the cheapest electricity in the world. In 1985, it became known as Eskom following a full review due to financial and supply capacity challenges. The focus now was on financial sustainability and operating cost-effectively. By early 2000, Eskom had become a state-owned enterprise (SOE) under the direction of the Department of Public Enterprises, and was run on corporate business lines (Eberhard, 2006). It has remained a vertically integrated utility with an emphasis on providing cheap power to industry in line with overall economic policy in the country (Hallowes & Munnik, 2017). In the 1980s, Eskom had excess capacity, and several power stations were mothballed. In the early 1990s, Eskom informed government that demand would outstrip supply, a fact that was reiterated in the 1998 White Paper on Energy Policy, although this was not addressed until it was too late, and load shedding or power outages started in 2007. Rather than concentrating on generation capacity, government focussed on corporatizing Eskom, a process which began in 2001. Eventually, they realised that there was a need for more capacity, which led to the decision to build the two new large power stations, Kusile and Medupi, both of which ran substantially over construction time and financial budget. Since their commissioning, they have experienced

operational challenges contributing to Eskom's current financial crisis and supply shortages.

1.2 Eskom today and unbundling

The MEC is fundamentally at the root of South African capitalism, and many economic policies introduced post-apartheid have supported and maintained that economic system (Ashman & Fine, 2011; Habib, 2013). However, today the very architecture of the economy is in jeopardy as the world and South Africa address climate change and the critical need to lower emissions and move towards a just transition. For South Africa, this means a fundamental change in its coal-based economy. Coal phase-out is happening, and Eskom is closing power stations that have reached end of life, the utility has no plans to build new coal-fired power stations and is beginning a programme of repurposing the land including developing renewable energy projects and leasing land to IPPs (BusinessTech, 2022b). Sasol is also investing in low carbon energy carriers such as green hydrogen.

For many years, the energy sector in South Africa focussed almost entirely on the supply-side of energy and energy security, with little attention being given to energy demand and sustainability. Electricity during apartheid was largely for industry and the white population. South African policy development after democracy in 1994 has focussed on the huge challenge of redressing the injustices of the apartheid regime, including the fact that almost all non-white citizens were excluded from opportunities, decent lives, and access to basic services, with only 36% of the population having access to electricity at the advent of democracy.

The Reconstruction and Development Programme (RDP) White Paper of 1994 (*White Paper on Reconstruction and Development*, 1994) was a pivotal document in the transformation and redistribution process. It promoted development and growth largely through a focus on the delivery of basic services previously denied to the majority. This led to a successful national electrification programme, the building of homes, job creation, and land redistribution, amongst other reforms (Annecke et al., 2022). The White Paper on Energy Policy (DoE, 1998) specified national priorities for the energy sector and also emphasised equity, economic competitiveness, private participation, and energy security through diversification.

According to the 1998 White Paper on Energy Policy,

> "there are a number of issues facing South Africa's electricity distribution industry, which limit its ability to achieve its primary objectives of meeting the aggressive electrification targets, of ensuring world class supply quality, and of continuing to provide low cost and equitably priced electricity to all consumers" (DME, 1998, p. 43)[3].

It also promoted electricity pricing that would encourage strong investments in infrastructure and pave the way for increased consumption of electricity and hence, growth, as well as a focus on affordability and equity. Whilst it was a strong paper, ultimately, many of its recommendations and policy suggestions were not implemented, including the unbundling of Eskom and restructuring of the electricity distribution industry, which advocated for regional electricity distributors (REDs).

The idea was that REDs would result in rationalisation of the country's electricity distributors into six REDs which would lead to centralisation of the distribution industry given that both Eskom and municipalities distribute electricity in the same municipal area (PMG, 2004), often with different tariff rates that have contributed to tensions in low-income sectors. In the early years of post-apartheid, there were many municipal electricity distributors and therefore it was thought that REDs would improve what was a very fragmented and inefficient industry. Tariffs were to be cost-reflective and assist in funding the electrification programme and other municipal services.

"The entire industry (generation, transmission and distribution) must move to cost-reflective tariffs with separate, transparent funding for electrification and other municipal services. While additional work in this area needs to be completed the objective would be to design a tariff and tax system that minimises the impact on end-user tariffs while addressing the funding needs in the industry" (p. 46 (DoE, 1998).

Negotiations around REDS continued for almost 10 years before it was formally disbanded and by this time, many municipalities had stopped investing in infrastructure and maintenance of their networks, which would have been a cost covered by the REDs. In addition, billions of rands were invested in the restructuring but to no avail. Neither unbundling, nor the implementation of REDs and cost-reflective-tariffs took place (Covery, 2021).

Eskom owns and controls most electricity generation and the high-voltage transmission grid; moreover, it supplies electricity directly to some customers. Most of its power is sold to large mining and industrial customers, municipalities, and directly to some customers in

[3] White Paper on the Energy Policy of the Republic of South Africa (1998).

township areas. It shares distribution with 165[4] municipalities that have been licenced to distribute electricity. Although this was not a new function post-1994, the Constitution gave a clear mandate to municipalities to reticulate electricity and gas (Republic of South Africa, 1996). They purchase electricity from Eskom in bulk and then resell it to customers, including residential homes, businesses, and their own operations.

The Electricity Regulation Act of 2006 established a regulatory framework for the electricity supply industry (ESI) from generation to distribution. It gave responsibility to the Minister of Energy to produce an electricity masterplan, such as the Integrated Resource Plan (IRP), and make decisions on electricity investments and generation (Baker, L.; Newell, P. & Phillips, J., 2014; R. Eberhard, 2016). It also called for tariffs to be cost reflective and include future investment planning.

However, despite the regulations and policies in place Eskom has over time become increasingly financially unstable. Today the utility is in a financial crisis and needs to recover all costs associated with generating, transmitting and distribution as well as managing its debt. A World Bank report makes it clear that utilities across Africa are failing to recover costs resulting in their services being compromised or leading to debt, as seen in the Eskom case (Trimble et al., 2016). The key problem the report found is related to the absence of cost reflective tariffs and therefore a factor in the inability to invest in new generation and network maintenance.

In 2018, President Ramaphosa appointed an Eskom Sustainability Task Team to examine the utility's financial and supply crisis. The first report included the recommendation to unbundle transmission which was later expanded by the President to include a full unbundling of the utility into three separate entities: generation, transmission and distribution (DPE, 2019). The motivation for unbundling included the fact that vertically integrated monopoly structures had globally become both outdated and costly. Eskom had been plagued by corruption, poor governance and there was a need for greater transparency, improved governance and efficiency as well as the need to open the space for competition. Unbundling was also seen as making inroads into the utility's massive financial and debt crisis. Finally, unbundling could support the country's focus on emissions reduction and a just transition through driving renewable energy as coal phases out. Supporting the unbundling process is the 8.5 billion dollars pledged at the United Nations COP 26 last year. Since then, through the PCC, government has developed a Just Energy Transition Investment Plan (JET IP)[5] which outlines the key areas of investment. The plan calls for investment in developing renewable energy at scale and to strengthen both the

[4] Figure obtained from discussion with NERSA and municipal officials.

[5] The Plan was developed through a broad stakeholder engagement process and involved various technical working groups and was facilitated in 2022 by the PCC and was launched at COP 27 in Egypt.

transmission grid and distribution system (Republic of South Africa, 2022). Of importance for this paper is the focus on the electricity sector and municipalities.

The Eskom Roadmap developed in 2019 (DPE, 2019) outlined the steps for unbundling over the coming years and to create three subsidiary businesses; generation, transmission and distribution all in line with the 1998 Energy Policy White Paper (Boulle, M, Filipova, 2019). The Electricity Regulation Amendment Bill 2022 (although not finalised) has been developed to support the unbundling process with a focus on enabling a competitive electricity market and a revised electricity pricing policy.

> "The formation of a Transmission Entity (TE) under Eskom Holdings will foster a competitive market and will encourage the use of diverse sources of energy…. Its core functions will be to act as an unbiased electricity market broker, to promote capital investment within the industry and to catalyse energy efficiency and cost sustainability." (DPE, 2019, p. 4)

At the end of 2021, Eskom announced that it had completed the legal separation of the transmission entity, and the separation of the generation and distribution entities were expected to take place by the end of 2022 (Dludla, 2021)[6]. However, unbundling is progressing slowly. Currently there is a new National Transmission Company of South Africa which has been registered but not yet operational. An independent transmission system and market operator (ITSMO) has not been set up and this would be integral before distribution is unbundled. Electricity tariffs, if they are to be cost reflective, need to include the construction and maintenance of networks and equipment that provide electricity to the customer. It will also need to include the full life cycle of distribution billing and other administrative processes.

The structure of the new distribution entity has not been determined and whilst the idea of REDs was sound, part of the reason its implementation failed was because it required a Constitutional Amendment given the municipal mandate concerning electricity reticulation, which has not been undertaken. There has been much media publicity on this unbundling and the costs that will be associated with it. Part of the complexity involved the debt that Eskom owes, unpaid electricity owed to the utility and how this and assets are transferred to the new entities as well as the licensing required. A change in the distribution industry will have an impact on tariffs and would likely entail a completely different structure to the one in existence today. The next section looks more closely at the role of municipalities and how tariffs are set in this complex arena of electricity distribution.

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[6] PMG notes on 'Eskom update on the unbundling process'. NCOP Public Enterprises and Communication (26 May 2021).

1.3 The role of local government

Local government powers and functions are set out in Sections 152 and 153 of the 1996 Constitution of South Africa (The Constitution of the Republic of South Africa, 1996). Their primary functions include managing ambient air pollution, building regulation, electricity and gas reticulation, municipal planning, and street lighting. Of prime importance is that local government must provide services to their communities sustainably and equitably, promote social and economic development, and provide a safe and healthy environment (SALGA, 2014a; SEA, 2017). Several robust policies and laws have been promulgated over the years to support these mandates, but implementation and capacity remain a challenge.

Local government is the developmental arm of South Africa's three-tier government system and is the sphere of government closest to the communities it serves. A significant area of responsibility is the delivery of basic services: water, electricity, waste disposal, and sanitation. Service delivery protests and unrest have become a norm in many municipalities because of a failure to adequately deliver those services.

Municipalities receive revenue from the national government in the form of the Equitable Share Grant to support the delivery of basic services (water, waste and electricity); the Municipal Infrastructure Grant to finance infrastructure, and a range of other transfers supporting low-income housing development, electrification, and transport infrastructure and grant income (Kam et al., 2015; SALGA, 2014). However, these grants are not sufficient for them to operate and meet their budgeted activities. They therefore depend on self-generated revenue from other sources, such as property rates, the sale of water and electricity, and investment from industry and companies, to deliver on their mandate.

The Local Government White Paper 1998, states that 90% of their revenue should come from their own revenue collection (The White Paper on Local Government, 1998). This leaves municipalities in a difficult position, as they cannot over-inflate property rates and are not allowed to add any tax that might be seen as double taxing. In other words, if a service is taxed by the national government, they cannot also impose a tax such as income tax and/or VAT and they cannot set budgets that cannot be financed. What they can do is add a surcharge on fees for services and this is where electricity sales are significant.

Central to the 1998 White Paper was the concept of developmental local government. It was a policy set up to operationalise the Constitution and underpinned by the need to transform a country beset by the legacy of apartheid and discrimination. Redressing these injustices was at the root of municipal mandates. Covery (2021) argues that post-1994 the aim was to drive decentralised government to support this agenda, and this meant giving clear powers to local government to strengthen democracy and ensure that community needs would be met. In the words of Covery (2021, p. 6):

> "The right of municipalities to fund their activities from electricity generated from the provision of services, and primarily from electricity distribution was enshrined in the Constitution. But while this provided a reliable revenue source, it entrenched an unsustainable business model."

Thus, not only must municipalities provide services to ensure development, but they must also operate along commercial principles to raise revenue and run their operations, which constrains their core business and pro-poor mandate. In the case of electricity, how they calculate the tariffs to include the costs of running the service and provide a surplus is essential for this business model to function.

Already due to increased electricity costs and interrupted supply many high-end users and small businesses are turning to small scale embedded generation options (SSEG). This is impacting on the volume of sales at the municipal level which has a direct impact on their revenue. Municipalities have begun to develop cost of supply and grid impact studies to assist them in achieving not only a full cost recovery but also maintain cross subsidisation. The increase in SSEG penetration is putting a strain on the municipal distribution business model, and it does often necessitate grid upgrades. SSEG tariffs aim to include appropriate network costs, preserve cross subsidies and provide a remuneration mechanism to the customer for energy generated onto the grid (Hermanus et al., 2022; SEA, 2021). Without cost reflectivity, appropriate tariff structures and high revenue collection rates most municipalities would find themselves in financial crises (Ledger, 2021b). In the next section, the paper looks in more detail at tariffs and examines how an increase in Eskom tariffs may impact further on energy poor households.

1.4 Electricity tariffs

The process of setting tariffs and the associated regulations and legislation in place is complex. For both Eskom and municipalities that distribute electricity this is in theory a means of recovering full operating costs and earning a return. Eskom supplies electricity directly to households and generally to low-income households in township areas, industry and those municipalities that are not licenced to distribute electricity. For a municipality to trade and distribute electricity to customers in its mandated areas, it must obtain an electricity distribution licence from NERSA as set out in Chapter 3 of the Electricity Regulation Act[7]. The licenced distributors (Eskom as well as the municipalities) need to have their tariffs approved by NERSA. Some challenges arise given that both Eskom and a municipality can

[7] No. 4 of 2006: Electricity Regulation Act, 2006, Chapter 6, section 8(1).

distribute in the same geographical area with different tariffs in place, which can lead to unrest, particularly in low-income areas.

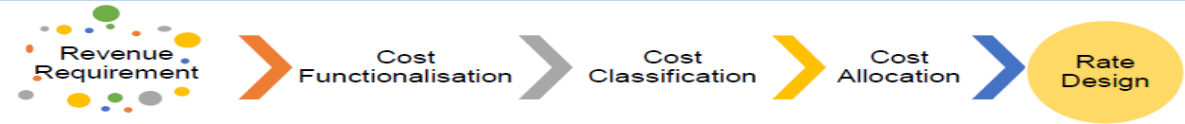
Eskom's tariffs have historically not been entirely cost-reflective in terms of including not only the actual cost of supply but also maintenance, future supply, infrastructure needs and staffing. According to the World Bank Report (2018), not having cost-reflective tariffs that include the whole cycle has been one reason for the utility's financial demise. According to expert input, Eskom's average 2022-2023 selling price is 138c/kWh[8] which is expected to cover all four of its activities, namely: generation, transmission, distribution and trading (where they buy from IPPs under the REIPPPP programme). If one takes Emalahleni local municipality as an example, their average selling price is substantially more than their bulk Eskom purchases and is closer to 250c/kWh. It is maintained that Eskom is selling at sub-cost-reflective prices and because municipalities include a huge mark up, this has an impact on the end consumer. If Eskom were to implement cost-reflective-tariffs and if municipalities did not include a mark-up, then it is possible that the end cost to the consumer might drop. Further, if renewable options were rolled out at scale and given the drop in prices over the years, this could lead to a lowering of generation costs and wholesale prices (Oosthuizen et al., 2022). However, implementing such a suggestion is not simple given the fiscal framework of municipalities within a market driven economy.

Licenced municipalities have to submit a cost-of-supply study to NERSA every five years and submit increased tariff prices on a yearly basis with an intention to set a fair and equitable tariff structure (Dippenaar et al., 2021; NERSA, 2019). In practice the five-yearly study is not adhered to by all municipalities. NERSA has developed a cost-of-supply framework for municipalities, which is a four-step process outlined below in box one and involves detailing the revenue required, costs and customer classification all leading to the desired tariff. Yearly, NERSA provides a guideline tariff increase based on a benchmarking methodology, which municipalities must use to formulate their tariff increases. The methodology includes both the direct or variable purchased costs from Eskom and indirect costs, such as repairs and maintenance, salaries and other fixed costs. Finally, they allow the tariff to include a net surplus. The percentage range for each category is benchmarked using national guideline increases, which in reality might not be appropriate for all municipalities. Interestingly a recent court order decision, which questioned the validity of the benchmarking process, was found in favour of the applicant. The Court judgement was critical of NERSA for not examining costs carefully enough and therefore not complying with the Electricity Regulation Act. The ruling will likely result in more stringent requirements in setting tariffs and disclosing actual costs (Kubushi, 2022). The benchmarking range allows a municipality that

[8] Based on a virtual interview with an Eskom tariffs expert on 04 August 2022.

trades services to recoup not only the running costs of providing that service but also additional revenue to reinvest in the network and more.

Box 1. The four-step rate determination approach as prescribed by NERSA COS framework for Municipalities



Step one is to **forecast the revenue required** that needs to be recovered by the municipality which eventually leads to the tariff rate design. NERSA has adopted the cost-plus methodology which is made up of various cost components plus a reasonable profit margin to ensure municipalities recoup the cost of supplying electricity as well as generating income. These are:

- purchases (this includes purchases from Eskom, IPPs, own generation and other sources),
- operating costs (inclusive of the salaries and contracting fees),
- repairs and maintenance,
- depreciation/amortisation of refurbishment and capital costs,
- interest on loans,
- shared costs with other departments.

Once the full costs have been calculated, they can add a margin of 15% margin (hence the notion of the Cost-Plus Methodology) to establish what is known as the total allowable revenue (TAR) the municipality can and must recoup from the sale of electricity. This first step of forecasting the total revenue required takes into consideration any increases or decreases associated with the Eskom Bulk tariff. The amounts allocated must be carefully determined and NERSA provides benchmarks to assist in accuracy and to this end calculate a percentage of costs:

- Eskom bills can account for 75% of electricity costs,
- Repairs and maintenance 6%,
- Energy losses 10% (the difference between electricity purchased and then sold),
- Net surplus of 15%.

What these benchmarks are showing, for example, is that after paying Eskom bills, repairs and maintenance and energy losses, municipalities can include a net profit of 15%.

The second step is cost functionalisation which relates to the function of the licence holder and could be the transmission, generation and/or distribution of electricity. In general, most municipalities are only licenced to distribute electricity.

The third step is cost classification, which refers to fixed or variable costs. The fixed costs will remain unchanged regardless of consumption such as meter and billing costs except where more customers are added, and new meters installed. Electricity costs will vary depending on the quantity of energy purchased from Eskom and how many customers a municipality has and how much they are consuming.

The fourth step is cost allocation whereby different rates are allocated to different consumer class groups and ultimately the cost of supplying different types of customers. These consumer classes are defined as domestic, free basic, commercial and industrial customers. Each customer group will have a different cost to the municipality based on the amount of electricity they use, their contribution to peak demand and if they are small or large customers.

The final step is the rate design, which effectively takes all of the information gathered from the previous four steps to design the final distribution tariff rates, which the municipality will submit to NERSA for approval.

Built into the allocation of different customer tariffs is cross subsidisation whereby ideally business tariffs will subsidise the residential sector and top end customers subsidise low end customers. One municipal official has stated that the average mark-up is around 60% although this is not a universal figure across municipalities nor sectors and through this mark-up cross subsidisation can be implemented. In some cases, businesses move into the Eskom distribution area to benefit from lower tariffs which will impact on municipal revenue. But the (fixed) cost to the municipality to distribute electricity to customers in providing the infrastructure, the network and cables is the same irrespective of income levels. The squeeze on cross subsidisation arrives when the amount of kWh of electricity purchased declines meaning that there is less disposable revenue for the municipality to provide electricity to the poor and to fund their services (Moodliar et al., 2022). This is because regardless of how much electricity is bought the running costs remain the same therefore the more electricity purchased the more revenue the municipality will make. Thus, the cost of supplying a particular customer group such as industry which will differ from supplying a mid or high-income household compared to a poor household. As one of our expert respondents stated, "the problem with cross-subsidies is that it creates an entangled situation, difficult to manage, –like trying to untangle a bowl of spaghetti".

The tariffs in place are not working for either Eskom or most municipalities, especially the smaller, less well-resourced municipalities. Due to non-payment of services and lack of sufficient funding, the mark-up on the electricity prices by these municipalities is not sufficient to cover all their distribution and maintenance costs. In both cases, neither are able to meet all the costs needed to distribute and maintain their networks. The challenges of technical and non-technical losses, such as theft, the non-payment of accounts and poor maintenance are difficult to solve. If Eskom implements cost-reflective tariffs, municipalities will have to increase their tariffs, which will further impact negatively on cross-subsidisation and ultimately on poor households. The next section examines energy poverty in more detail and focuses on a municipality in the coal region and then further provides a granular fieldwork study to determine the impact of high costs of electricity on poor households.

2. Energy poverty

1.5 Overview of energy poverty

Energy poverty is a multifaceted concept with a variety of definitions that are context dependent. It commonly affects low-income households which are often vulnerable to economic changes especially those that threaten their livelihoods. Energy poverty can be described as the lack of ability to pay for modern, safe and benign energy services to meet household basic needs, such as cooking, lighting and warming. Energy poverty can also be linked to poor nutrition because of a lack of sufficient energy sources and/or the inability to pay for energy services that would enable people to meet their cooking, refrigeration and food processing needs. This is most prevalent amongst households that can be classified as poor due to their economic status and a lack of sufficient income.

Several studies on energy poverty (Che et al., 2020; Day et al., 2016; DellaValle, 2019; Sovacool, 2012) have revealed the complexity of defining energy poverty whereby they make several suggestions on approaches that can be used to understand this concept. These authors range from defining energy poverty as lack of access to electricity and reliance on biomass, to defining it as the inability to afford energy services because of having a lower income than that set for the energy affordability threshold. Energy poverty measured through affordability focuses on the households' energy expenditure and to some extent, what households have to forego in order for them to spend their income on energy. The energy expenditure threshold or benchmark measure that is often used to determine the affordability of energy by households is if they spend 10% or more of their income on energy, then this is considered unaffordable (Bouzarovski et al., 2021; Wolpe & Reddy, 2014).

Energy poverty is also defined through assessing households' access to energy sources such as reticulation for electricity connections, distance travelled to access energy sources such as wood, liquefied petroleum gas (LPG) and kerosene. Access is also linked to affordability as it depends on how much the household can afford to spend in order to access such energy sources (Pye et al., 2015). In further clarifying energy poverty, it is important to note that access does not automatically lead to use of such energy sources and services. Due to several factors such as household decision-making, gender relations and ownership of appliances, energy use patterns can reveal the level of energy poverty.

In South Africa, energy poverty is associated with lack of access to electricity due to the inability to pay the electricity bill or buy electricity credits sufficient for household needs. It is also associated with how people are unable to access energy services because of the type of housing they live in, whereby many people who live in informal settlements do not have energy efficient homes and lack access to modern, affordable and safe energy services.

Informal settlements are generally found on land that is not proclaimed for housing, which means they are not eligible for basic services such as water, electricity and sewage. They therefore end up being exposed to harmful circumstances that result from using inefficient and dangerous sources of energy and sub-standard appliances (Che et al., 2020). This also means energy poverty can also lead to unhealthy living conditions and can have negative health impacts as a result of using harmful energy sources (Pachauri & Spreng, 2011).

One of the most prominent Sustainable Development Goals is SDG 7 "affordable and clean energy", which seeks to ensure access to clean, safe, affordable and reliable modern energy services for all (UN, 2015). Unlike many African countries, South African electrification rates are high with household electricity connections at 85% in 2018 (Stats SA, 2018). According to the SDGs score board, South Africa is on track in achieving SDG 7 because of this high percentage of electricity connections especially to households, which is interpreted as equalling the ability to use electricity for cooking[9]. However, despite the high electrification rates, it is important to note that many low-income households are not able to use electricity for all their energy needs mainly due to a lack of affordability and the other reasons mentioned above. Thus, this emphasises that electricity connections do not equate to an ability to use the supply, especially for households with prepayment metering services.

Ledger (2021a) argues that if households have access to electricity but cannot afford to use that electricity then, in effect, they do not have access. Her research has shown that money spent on electricity is money not used for food and in a country such as South Africa, where 25% or 4.3 million households live under the food poverty line and have less than R2 430 per month for living expenses (based on Stats SA 2020 data), no amount of electricity is affordable (Ledger, 2021a). Her research has shown that poor households are using grants and income on energy, which often results in families not having adequate amounts of food. She cites the 1998 Energy White Paper as making it clear that physical access to electricity was not enough; it also had to be affordable ("broken promises"). Later policy documents all referred to the issue of affordability, but the critically important problem has been in defining affordability.

South Africa ranks first amongst 164 countries in the World Bank's global poverty database when it comes to inequality making it the most unequal country in the world "based on the Gini coefficients of consumption or income per capita" (Sulla et al., 2022; World Bank, 2020). The Stats SA *Inequality trends in South Africa Report* cautions that such inequality is politically dangerous as those with wealth can easily influence country policies to protect their interests rather than those of the majority poor (Stats SA, 2019). The country's inequality is one of the direct results of apartheid the laws of which thrived on dividing the country's

[9] https://dashboards.sdgindex.org/profiles/south-africa/indicators

population and ensuring that what was termed "people of colour", especially those identified as Black African did not benefit from the state's resources and remained dispossessed of their basic human rights. After 28 years since the end of apartheid and change to democratic state, South Africa unfortunately still carries the burdens of apartheid such as the inequalities in spatial planning that continue to negatively impact the majority of the population that were assigned residential places outside of the cities with little access to basic services, infrastructure and economic independence (Knox et al., 2018).

The effects of inequality extend to various spheres of life and can exacerbate the impacts of poverty. In South Africa, economic and social inequality did not cease with the end of apartheid but has become worse with an estimated 50% of the population currently living in poverty. Inequality also leads to unequal access to opportunities such as education and work, which may improve livelihoods for individuals and households. This in turn leads to high levels of unemployment at 33.9% and 64% for youth as seen in the second quarter of 2022 (StatsSA, 2022), which leads to uncertainty in the country's economic stability. Unemployment is mostly experienced by black people "who are most disadvantaged at finding employment and earning substantially less when they are employed, relative to their white counterparts" (Stats SA, 2019).

Based on the above and in trying to determine what energy poverty means, it is important to take cognisance of the context and the complexities that arise from this. In the South African context, energy poverty is closely linked to the local experiences of high levels of poverty, unemployment and inequality. Lack of sufficient income affects people's means to afford basic needs which include energy. Lack of ability to use affordable, efficient and modern energy services further disadvantages already vulnerable individuals and households by making them energy poor. The next section focuses on the South African energy subsidies and the attempt to alleviate energy poverty.

1.6 Electricity Subsidies

As mentioned in Section 2 above, the National Electrification Programme achieved mass electrification of households in the late 1990s and early 2000s as part of fulfilling the RDP and 1998 Energy Policy mandates. This focus of this programme was to provide electricity to households that were excluded from electricity service delivery by the apartheid government. A majority of these households were low-income and based in the peri-urban and rural households that could easily access the grid. Through this electrification process, it was realised that there was low use of electricity in these households compared to the typical Eskom and municipal customers that had had electricity connections prior to the 1990s. Eskom conducted a technical study (Thom, 2000) and placed data loggers to determine the exact amount of electricity consumed by these new customers. Paired with

a qualitative study (Thom et al., 2001) where households were asked in-depth questions about their energy use patterns, the reasons for low consumption of electricity were revealed. The low-income newly electrified households were not using electricity for all their households' energy needs because they could not afford the costs, which they found to be expensive. This means they continued to use traditional energy sources and paraffin for their thermal energy needs such as cooking and heating the home in winter. Electricity was mostly used for lights and media appliances such as radio and television (ERC, 2002). Based on the Eskom technical study and the evidence collected through qualitative interviews, it was recommended that low-income households should be provided with a subsidy of 50kWh per month to enable them to meet some of their basic energy needs and to increase their monthly electricity use (ERC, 2002; Thom et al., 2001). This led to the development of the Free Basic Electricity (FBE)[10] policy which was introduced by government in 2003 (DME, 2003) to alleviate the challenges of affordability. The intention was to facilitate the provision of lighting, media access, limited ironing and water heating as basic electricity requirements (DME, 2003). The amount of 50 kWh was deemed sufficient by national government regardless of the household size, as the Eskom study showed that 56% of households connected to the grid consumed less than 50 kWh of electricity and therefore it assumed that this amount would be sufficient to meet their basic energy requirements. Figure 1 below gives an example of what households can power using 50 kWh.

Figure 1. What households can power for 50 kWh in a month[11]

Appliance	Watts	Number	Hours used per month	kWh
Energy saving lightbulbs (Evening)	11	4	3.00	0.13
Energy saving lightbulbs (Morning)	11	4	1.00	0.04
TV	35	1	3.00	0.11
Iron	1000	1	0.04	0.04
Hotplate	2000	1	0.50	1.00
Kettle	1200	1	0.10	0.12
Cellphone charger	15	1	24.00	0.36
Fridge	250	1	0.22	0.05

Source: Eskom, 2021.

[10] When FBE was first introduced and piloted, it was known as the Electricity Basic Support Services Tariff (EBSST).

[11] The figures are directly quoted and based on an estimated consumption as indicated by Eskom.

The allocation for FBE comes from the equitable share grant that municipalities receive from the National Treasury. This grant is intended to enable municipalities to subsidise and provide all basic services such as water, sewage, refuse, electricity and housing assistance to poor households. However, how the calculations are made, the amounts allocated and how each municipality targets and implements the free basic services is not uniform and is problematic.

The National Treasury's calculation is based on the number of indigents in a particular municipal area (including Eskom distribution households) as well as the Eskom tariff applicable in any given year. Thus, the municipality will receive 50 kWh electricity for each indigent and a contribution towards maintenance and operation costs. A study by Ledger (2021b) shows that the National Treasury allocates FBE for 10 million households across the country, but only 2 million receive the allocation. Table 1 below presents the number of households receiving FBE compared with the number, which are allocated to receive FBE from their municipalities.

Table 1. Households receiving FBE versus houses allocated funding

Year	Number of houses allocated to receive FBE	Number of households actually receiving FBE	Difference – number of households	Funding difference – (R billions)
2014-2015	8,702,989	2,747,490	(5,955,499)	R4.304
2015-2016	8,965,790	2,454,903	(6,510,887)	R5.172
2016-2017	9,193,130	2,563,493	(6,629,637)	R5.647
2017-2018	9,550,380	2,179,521	(7,233,236)	R6.608
2018-2019	9,805,644	2,047,218	(7,758,426)	R7.599
2019-2020	10,109,607	2,108,634	(8,000,973)	R8.992

Source: Ledger, 2021b which leads to funds being used for other needs (SEA, 2020).

Ledger (2021b) argues that the numbers are kept low in order to use the revenue for other municipal needs (SEA, 2020). The allocation is not ring-fenced, which means that municipalities can use the funds as they wish. Research indicates that fewer than 30% of households are obtaining free services, despite municipalities receiving revenue for a further 70% (Ledger, 2021b). Covery (2021, p. 72) contends that when revenue is constrained, there is a "strong tendency to maximise surpluses for general-purpose use – at the expense

of the service itself; with maintenance and new capital investments as typical first causalities". This further highlights the paradox municipalities face in terms of providing basic services and yet being required to operate on commercial principles. They do not have enough funds and are in effect juggling grants to pay for other municipal functions.

An additional hurdle is how poor households are identified by the municipality in order to get onto the indigent register. They must meet certain criteria set by their local municipality based on the National Framework for Municipal Indigent Policies which proves that households lack resources to access basic necessities needed for survival (DPLG, 2005). In line with the national framework, local municipalities set their own criteria to determine if households applying for free basic services do indeed qualify as indigent. It is important to note that the criteria used are not consistent across municipalities nor are they generic.

A key qualifying criterion is the income status of the household whereby those depending on government social grants with a household income below the poverty level threshold can access free basic services – generally this equates to two old age pensions. Another is the value of their property which determines household wealth. Some of the criteria to qualify as indigent are stringent and do not take into consideration people's realities, such as that some people do not own the houses they live in and are renting. Subsequently many households are disqualified from being classed as indigent because they have to prove ownership of the house they live in, which is not possible for many that live in informal settlements on land not proclaimed for housing. Research indicates that households are not aware of the renewal processes nor the criteria meaning that many fall through the cracks. Moreover, households have to register annually to remain on the indigent register, which many are not aware of.

Where households are successfully registered as indigents and are able to access free basic services, and in the case of electricity, each household receives 50 kWh per month at no cost to the household. Some municipalities give more than the recommended amount depending on their financial status. The City of Cape Town municipality allocates 60 kWh if the household consumption is below a set amount. If their consumption increases, the rate per unit of electricity purchased increases under the inclined block tariff rule and they might no longer be eligible for FBE. This means that if a poor household consumes more, they will be penalised without considering the likelihood that there could be more than one household using one meter.

Since its inception in 2003, the FBE allocation has never been reviewed by government and there are many calls to increase the subsidy amount. Whilst there is a recommendation in the JET IP to raise the subsidy to 100 kWh, how this is financed is not yet set out. Further how this might impact on Eskom and municipalities in their need to set cost-reflective-tariffs has not been explored from a quantitative perspective. Of significance is the fact that

households are regularly consuming more than 50 kWh of electricity per month as the fieldwork study below illustrates. And those households that cannot afford to buy additional electricity are using alternative and generally unsafe fuels (Ledger, 2021a; Mohlakoana & Wolpe, 2021; SEA, 2022). What this points to is that raising tariffs is not going to make an already dire situation better.

To highlight the electricity challenges faced by poor households a small qualitative fieldwork study was undertaken in a township in the heart of the coal and electricity region in the country. The intention of the study is to illustrate that an increase in tariffs will have a detrimental impact on poor households that are already struggling and leads to the overall findings of the paper.

1.7 Overview of the energy poverty landscape in Emalahleni

Emalahleni Local Municipality in the province of Mpumalanga is one of the key focus areas in South Africa in terms of energy transition discourse and planning. The province has a cluster of 12 coal-fired power stations and many mines, and the coal value chain provides approximately 125 000 jobs, from which many of the locals benefit. Given that South Africa depends on coal-fired power stations to produce upwards of 90% of electricity for the country, the coal mining industry has historically been seen as a pillar of the country's economy, which helped ensure a thriving economy.

Semi- and low-skilled work provided by the coal value chain, such as those in mining, coal truck drivers and at Eskom's power plants, pay substantially higher wages than other industries (Hermanus & Montmasson-Clair, 2021). Historically, these jobs have attracted people from other provinces and neighbouring southern African countries owing to the high demand for mid- and low-skilled personnel and the offer of relatively high wages. Therefore, many of those who live in Emalahleni, including those that have left their rural homes or other countries to become migrant workers in the coal mines, settled in this area where they became full-time residents who raised their families in the area. Moreover, with the relaxed influx control laws at the end of apartheid, many people felt they could freely stay in the area while working and even after retirement. However, these people, who depend on the coal value chain for their livelihood, will be impacted by the transition of the South African energy industry from fossil fuels to low-carbon sources in the interest of the environment (Marais & Cloete, 2020).

With a growth rate of 3% per annum, the population of Emalahleni Local Municipality is just above 450 000 with 150 000 households of which 74% are formal dwellings (Yes Media, 2022). According to the Municipality's Integrated Development Plan (IDP) 2022-2027 and the Local Treasury Local Government Equitable Share calculations (ELM, 2022), up to 76 842 households were considered to be poor and living below the lower-bound poverty line in

2020. Furthermore, in 2021, the lower-bound poverty line was set at R890.00 per person per month in Emalahleni, which indicates high poverty and the need for the implementation of poverty and inequality alleviation strategies. This poverty line indicates that within the South African socio-economic context, individuals living on this amount or less per month, are unable to meet their monthly costs of basic needs such as food and non-food items (StatsSA, 2019b).

The 2011 census data[12] on settlement type show that 95.4% of the municipality was urban while 4.6% were farm settlements. The data also show that only 16.9% of the population had completed high school education and only 2.5% had post-high school education (Stats SA, 2011). Although the statistics from the recent census will show a different picture than that of 11 years ago, given the numbers reported by the municipality, the factors contributing to poverty, unemployment, and inequality over ten years ago, such as low levels of education, persist.

Emalahleni Local Municipality has an indigent policy, which is a guiding framework for the municipality in the registration of impoverished households as indigents and providing them with subsidised basic services. They provide 50 kWh of free electricity per month for each household that qualifies as an indigent. Even though it is known that this amount is not adequate to cover all basic household energy needs for the whole month (Ledger, 2021a), Emalahleni Local Municipality is one of those that does not provide more that 50 kWh to its indigent households.

In Emalahleni, the number of households on the indigent register that receive assistance is currently 6 600 in 2022, whilst it was 4 400 in 2021, 10 522 in 2019 and 12 000 in 2012. The reason for the decrease in the number of registered indigent households is that many applicants do not meet the qualifying criteria as per the verification process[13]. At Emalahleni Local Municipality the Community Services Department conducts the verification process by cross-checking information provided by households that are applying. Some of the guiding criteria includes monthly income and whether the income amount earned is double the old person's grant, (which at Emalahleni Local Municipality can be up to R4 000 per household), being a homeowner, and having an electricity meter. However, the registration process is onerous and requires renewal, which can be between one and five years depending on the municipality. The Emalahleni Local Municipality has opted for the annual renewal of registrations to ensure that they have updated information about the households[14]. Where a second family lives in a formal or informal dwelling attached to the main house (known

[12] https://www.statssa.gov.za/?page_id=993&id=emalahleni-municipality-2

[13] Noted from interview with municipal representative on 13 July 2022.

[14] Information from an interview held with the Emalahleni Local Municipality senior official in charge of overseeing indigent household registrations on 13 July 2022.

as backyard dwellers) with a connecting cable, they would not be eligible for FBE, as they often do not have their own meter.

1.8 Fieldwork findings

1.8.1 Data and methodology of the study

The Emalahleni Local Municipalities (ELM) consists of four towns and cities namely Kriel, Ogies, Phola and Emalahleni which bears the same name as the local municipality. Fieldwork for this study was conducted in the town of Emalahleni which consists of several townships including KwaGuqa, the township that was specifically chosen as an ideal research location for the fieldwork study. The reason for this was two-fold. Firstly, the type of household and municipal services provided meant it would provide good information relevant to the paper question. Secondly the township and wider Emalahleni area was known to the research team based on previous studies and projects undertaken by them. It was thought best to collect data in an area where work and social relations were already developed and ongoing with the local communities (both individuals and community organisations) and with the local municipality. The data were collected through interviews with households located at KwaGuqa Township. KwaGuqa is a typical South African township with a variety of housing types, such as formal, informal, traditional and backyard housing (ELM, 2022; Mdluli & Vogel, 2010). More than 80% of the formal houses in this township have access to formal electricity connections with electricity being distributed by the local municipality. Considering the township's proximity to coal mines, it was found that households in KwaGuqa burn relatively greater amounts of coal in winter than those in other townships (Mdluli & Vogel, 2010). Many people employed in the nearby mines and Eskom power plants live in this township.

For this study, 41 low-income households were interviewed. It was decided to select only indigent households, and these were identified by the community leaders and fieldworkers. Further to this, a snowballing sample selection method was used to select more households that were also identified as indigent because of the subsidised basic services they receive from the municipality including social grants, such as old age pensions, disability or childcare grants. All the households interviewed were electricity customers, and this was verified by a presence of an electricity meter in their homes. Owing to ethical considerations and the requirement to keep the respondents' identification anonymous, the meter numbers were not recorded on the answer sheets. The data collected were analysed using correlations and cross tabulations methods.

1.8.2 Findings

Households with prepayment meter connections and FBE

One of the first questions on the interview guide was "Do you receive free electricity from the municipality?" Whilst the fieldwork team had established that the households were deemed to be indigent because they depended on social grants and were receiving municipal services for free or at subsidised costs, it was still essential to confirm that they were receiving FBE each month. Table 2 below shows that only 9 out of 41 (22%) of the surveyed households were aware that they were receiving free electricity from the municipality because this is not specified on the electricity purchase receipts that they receive from the vending stations. When the municipality was approached by the research team about this, it was explained that all indigent households receive 50 kWh (units) free each month, but this does not reflect on the electricity purchase receipt because of the settings on the vending points. In addition, when households apply for indigent status, some do not meet the criteria, but they are not aware of this because the verification and approval process of applications takes up to a year.

Another reason that households are not aware of these free units is that they receive them when they make their first monthly electricity purchase, and the units are added to the sale without a clear distinction of how many units are free and how many are paid for. To indicate the extent to which households lacked awareness of receiving these free units, one of the households mentioned that the municipality stopped giving them free electricity in the year 2021, but they did not know the reason for this. This could be explained by the municipality procuring the services of a new vendor in 2021, who does not reflect the free units on the purchase receipts. This created confusion amongst indigent households who blamed the municipality for not providing them with the free units, even though they did receive them.

Table 2. Households receiving free electricity from the municipality (n = 41 households)

	Aware of receiving FBE	Not aware of receiving FBE
Total households	9	32

Source: The authors

Of the 41 households, 35 indicated that they receive social income such as old age pensions and grants, while 4 had income from informal employment.

1.8.3 Inadequacy of FBE

Figure 2. Household average monthly extra expenditure on electricity

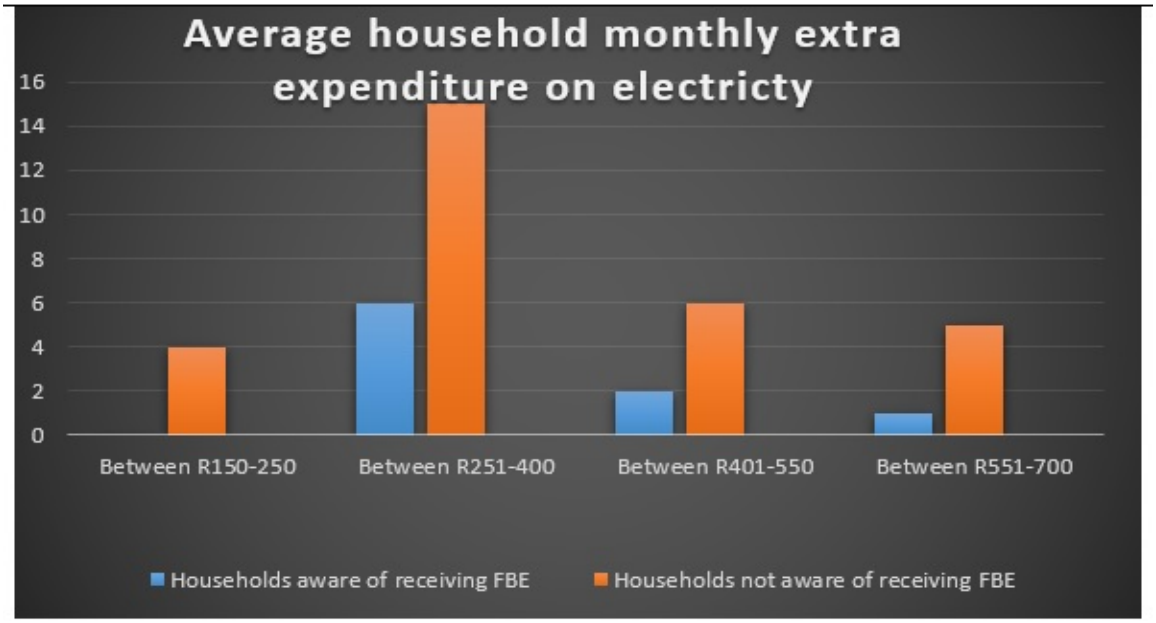


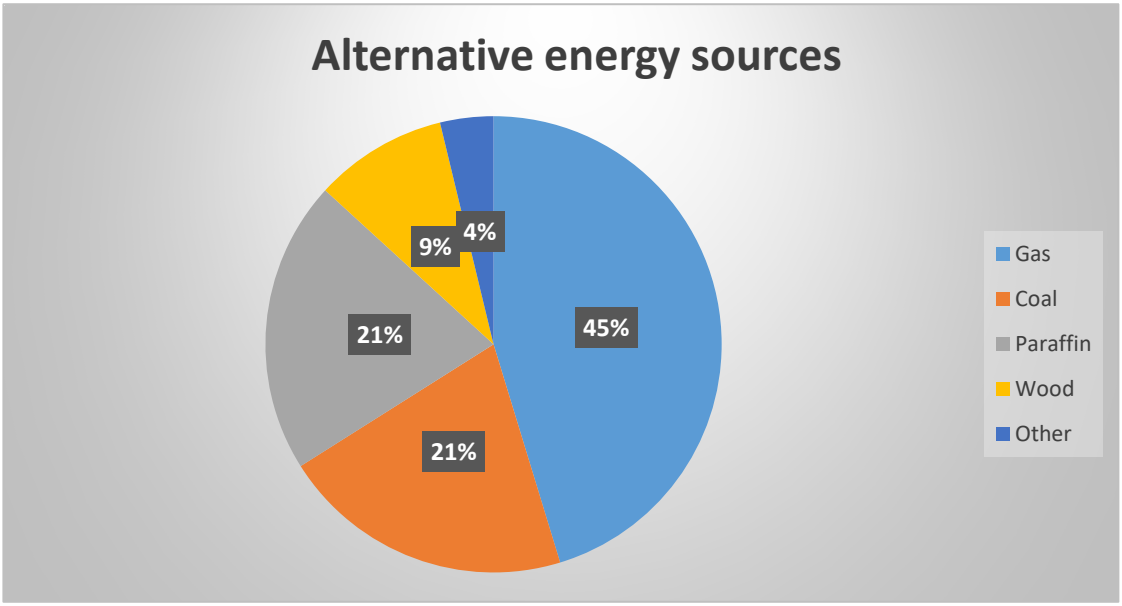
Figure 2 shows the households' average monthly extra expenditure on electricity, which indicates that the FBE is not enough to meet all household energy needs. As indicated in the figure above, households that are aware of receiving FBE spend between R150 to R700 (81.5 kWh to 380 kWh)15 extra on electricity a month, and 53% spend between R300-R400 (163 kWh - 217 kWh) extra income on electricity. Only 15% of households spend between R600 to R700 (329.6 kWh to 380 kWh) extra on electricity a month. It would appear that households

[15] The kWh is based on the cost of R1.84c per kWh on a Step 2 tariff of the Emalahleni Local Municipality in July 2022.

that are not aware of receiving FBE seem to be spending more on additional electricity than those that are aware of receiving this energy subsidy.

1.8.4 Alternative energy sources used by low-income households

Figure 3. Indigent households using alternative energy sources



Source: The authors

Figure 3 indicates the indigent households that use alternative energy. The study's findings showed that (55%) of surveyed low-income households use traditional sources (wood, charcoal, and paraffin), while (45%) use modern energy (gas) as their secondary energy sources to supplement their electricity. The energy-use patterns illustrated in the figure above indicate that owing to high costs, households cannot depend solely on electricity, and they end up spending more of their incomes on alternative energy sources, such as those reflected, in Figure 3 above. The results also indicate household energy stacking patterns and that households do not rely on a single form of energy source. This is consistent with national energy poverty studies generally and would include those not registered as indigent but clearly from poor households. Of all the surveyed households, 27% indicated that they use more than one type of alternative energy source, whilst 73% relied on a single alternative source of energy in addition to electricity. Although respondents were not asked why they mixed different energy sources, from the responses given on other questions relating to affordability, one can conclude that households stack energy sources mainly due to affordability, access and availability.

When asked why they find electricity to be expensive, respondents gave several answers such as the following:

> "It's expensive because we have to use all our money on energy and food."

> "It is expensive and sometimes it's difficult to get paraffin as it is not always available in the area. This means you can't cook and you end up eating bread only."

Figure 4. Variety of alternative energy sources and appliances used by households

Source: The authors

Some households stated that because of electricity tariff hikes, they only use electricity for quick and low-energy consuming services such as lighting and boiling water. During the interviews, households said that they found it difficult to keep up with the electricity costs because electricity prices often go up. One participant stated, "It's too expensive even though I am employed. I only use it for lights, making coffee and do small things". In addition, they said it was difficult for them to know what the real cost of electricity is because the price seems to be rising all the time. One possible explanation for this is that with the first purchase of the month there are always free units received as part of the FBE. Hence, they think the purchase price is less.

Despite 17% of the households stating their awareness of health risks associated with using traditional energy sources, they also felt that they did not have a choice but to use alternative sources because of the high costs of electricity. This is expressed by the following statement:

"High electricity costs leave us no option but to use the energy that is harmful for our lives."

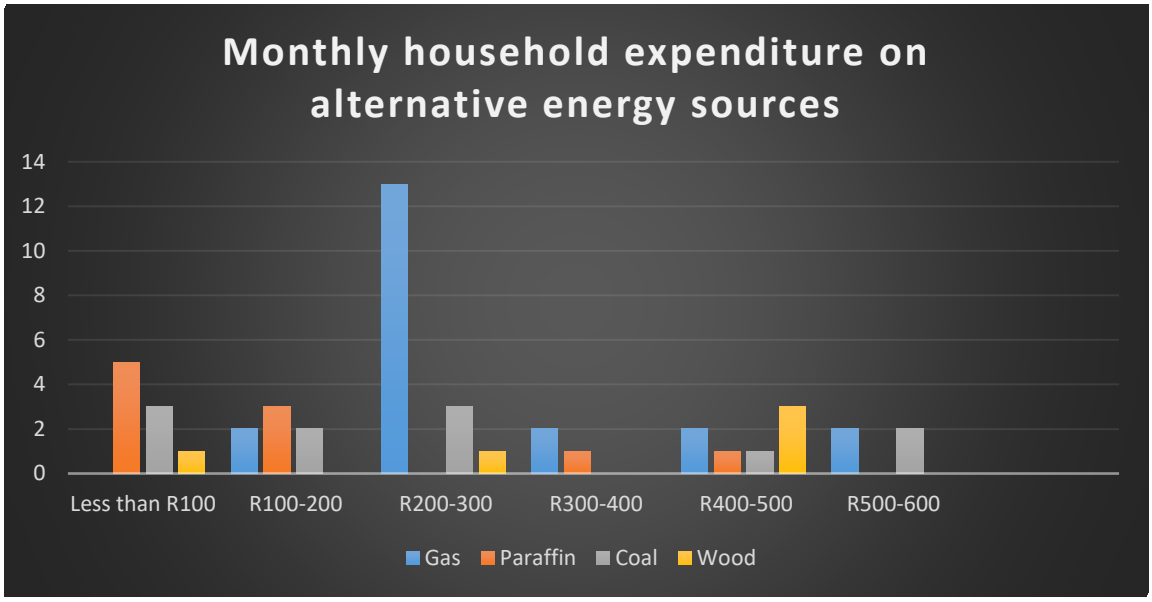
Table 3. Household energy mix

Energy type	Electricity	Coal	LPG	Wood	Paraffin	Candle
Total households	41	11	24	5	11	2

Source: The authors

Table 3 above illustrates that LPG is the most used alternative energy source by 24 of the households in the sample. LPG is mostly used for cooking by households, which indicates that they find it expensive to cook with electricity. Other alternative energy sources often used are paraffin and coal. As the fieldwork for data collection was conducted during winter, the use of coal may have been influenced by the cold weather and most definitely by the availability of coal in the study area, which is surrounded by and close to coal mines. Figure 5 below illustrates monthly household expenditure on alternative energy.

Figure 5. Monthly household expenditure on alternative energy



Source: The authors

The graph above shows that most low-income households spend more of their income on gas (LPG) with the highest number of households (35%), spending between R200-R300 a month over and above their electricity costs, which includes the FBE allowance. The graph also shows that 30% of households are using both paraffin and coal, 14% are using wood and 5% are using other sources, such as candles and that these households are spending less than R100 a month. Most households indicated that whilst these alternative energy sources are also expensive, they are more affordable than electricity.

Overall, the costs of energy sources are unaffordable for most of the households interviewed and it impacted negatively on other areas of their lives, as indicated in the following statement, "*All of them are expensive. No alternative lasts a month, and we have to make loans*".

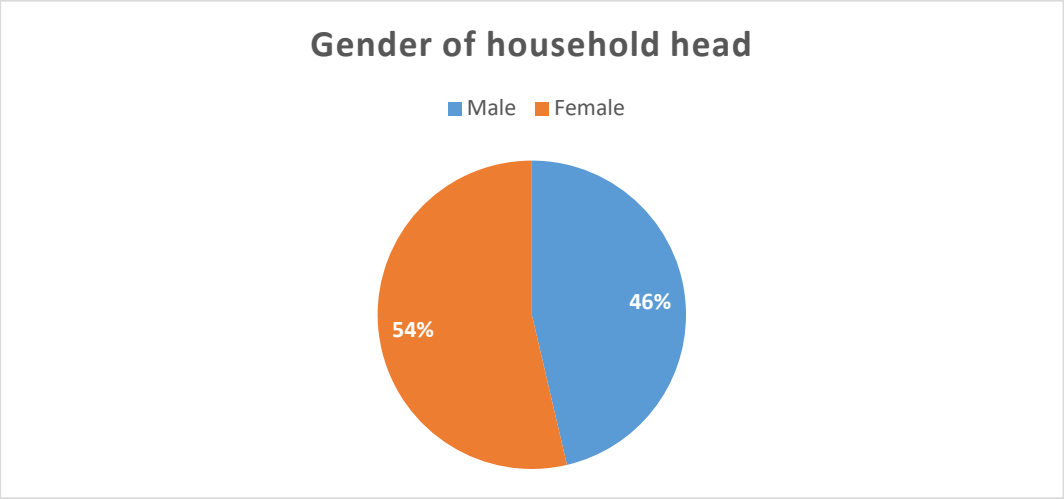
Table 4. Comparison between the total monthly energy expenditure of male- and female-headed households

Energy expenditure	≤R400	R401-600	R601-800	R801-R1000	R1001-R1150	Total
Male	1	1	8	3	3	16
Female	2	4	10	3	2	21
Total	3	5	18	6	5	37

Table 4 above shows the household energy expenditure for 37 households. The reason for this is that four households in the sample had very high energy costs, which indicated that they are potentially running a home-based business. The data does not show much difference in the expenditure on energy sources and services between the male and female-headed households. Most male and female-headed households (47%) spend R601-R800 per month on energy sources, which include electricity and a combination of alternative energy sources such as LPG, paraffin, wood, and coal.

Figure 6 below illustrates the gender of the head of the households in the study.

Figure 6. Gender of the household head



Source: The authors

Based on the energy expenditure, which includes electricity and alternative energy sources, the average amount of money that the households in this sample spend is R748 per month on energy. As these households are indigent as per the municipality's policy, their monthly income is R4 000 or less. It means, for households earning R4 000, they spend 18.7% of that on their household energy costs. For households that may be depending on just one old age income rounded off at R2 000 per month, they are possibly spending up to 37.4% on their household energy costs, which could be spent on other household priorities such as food. Both of these figures are way above the benchmark measure often used to determine affordability, which is spending 10% or more of their income on energy (Bouzarovski et al., 2021; Wolpe & Reddy, 2014).

1.8.5 Household sources of income for securing energy sources

Figure 7 below presents the sources of household income for obtaining sources of energy.

Figure 7. Household sources of income for securing energy sources

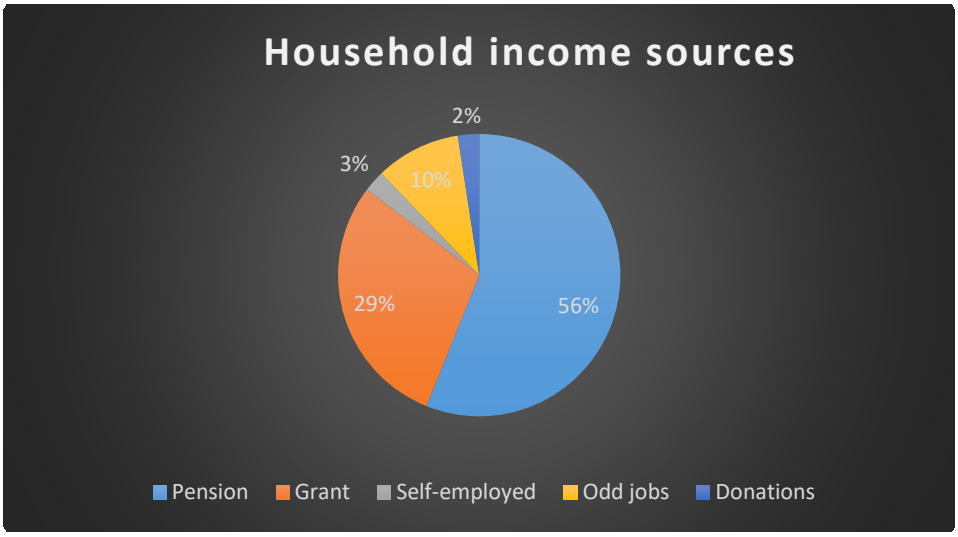


Figure 7 above shows that most indigent households (56%) indicated that they relied on the state old-age pension to secure energy sources for household use. While (29%) of the households indicated that they used government grants such as the child support grant, disability grants and care dependency grants to purchase various forms of energy sources used. Only 10% stated that they used their incomes gained from odd jobs and (4%) indicated relying on self-employment and donations respectively. One of the participants said, *"It's too expensive for us as we depend on child grants. My wife is the only one working odd jobs*[16]*"*.

1.8.6 How households access information on electricity tariffs

Table 5 indicates where households manage to access information on electricity tariffs. The study findings showed that most indigent households (46%) indicated that they accessed information on electricity tariffs from the radio, while 44% said they did not receive any information on electricity costs. Only 5% stated that they received the information on the electricity slips that they received after purchasing electricity, while 2% accessed the information directly from the municipal office. When asked if they had enough information on electricity price changes, 88% of households said they did not.

[16] Odd jobs are often temporary, low paying and inconsistent, making them unreliable for people that need energy poverty alleviation strategies.

Table 5. Sources for households' access to information on electricity tariffs

	Radio	Nowhere	Electricity	Newspaper	Municipality	Total
Info source on electricity tariffs	19	18	2	1	1	41

Source: The authors

1.8.7 How low electricity prices would impact households

Table 6 below presents how the participants thought low electricity prices would affect them.

Table 6. Impact of low electricity prices

	It will make a positive impact	It won't make any difference
How will it affect you if the electricity price goes down?	36	5

Source: The authors

Most households (88%) mentioned that lower electricity prices would have a positive impact, as they would be able to use more electricity and fewer alternative energy sources. They also indicated that they would be able to buy more food instead of spending so much on energy costs which also implies that higher costs would lead to greater poverty and less income for food. Some of the responses given included the following:

"*It will help me to pay the rent and be able to cook healthy food as I am suffering from high blood pressure.*"

"*It will be better because I will be able to save my pension money and cook as I wish.*"

"*It will give us a chance to afford it and maybe it will last a month.*"

"*I would be able to save and bake cookies instead of buying them.*"

"*It will help a lot because there will be no need for alternative maybe I will be able to heat my house and cook whatever I want.*"

"*It will help a lot because I can be able to use my electric stove to do what I cannot do right now.*"

From these statements, it is obvious that households would benefit in many ways from reduced electricity costs and the ability to prepare healthier food without worrying about the high costs of energy. This would significantly improve their livelihoods.

Only 12% of the households indicated that the drop in electricity prices would not make any difference because they either did not know how much less it would be, had no hope of ever being able to afford adequate amounts of electricity costs or had given up hope.

All the sampled households said that the current electricity costs are expensive for them, meaning that they find it difficult to afford the use of electricity. All surveyed indigent households highlighted affordability issues and were concerned that they could not buy electricity that would last them the whole month, which led to them relying on other sources of energy such as wood, coal, and liquid petroleum gas (LPG). This confirms statements and the literature on energy poverty, which indicate electricity connections do not necessarily lead to the use of the supply to satisfy all household energy needs. The free basic allowance for those who receive it is inadequate for all their requirements, and buying electricity is too expensive for these households as illustrated in Table 5 above.

The following remarks were made:

"It doesn't matter to me because there will be no difference at all even if it goes down."

"It will not help because it's already too expensive."

When households were asked how they would be affected if the price of electricity went up, they all responded that they would be affected negatively in various ways. Their responses indicate the difficulties faced by households and the harsh reality of energy poverty amongst these indigent households. The following statements are some of the responses from households that were asked how they would be impacted by higher electricity prices.

"As for me, I will go back to the coal stove even though it is hard to get that coal. It is expensive, 50kg of coal is R200 and cannot last for a month it will be hard. "

"I will not be able to use electricity, I will have to look for other alternatives."

"It is going to kill us and I will not be able to buy it. I will be done. "

"It will be too expensive. Things will go from better to worse."

Whilst the sample was small, it was indicative of the current energy poverty picture across the country. Almost 30 years post-democracy and despite pro-poor policies in place, such as FBE and a hugely successful electrification programme, many poor households remain in energy poverty. In the next section, we will analyse all the findings to provide meaning to the results and most importantly to answer the study's research question.

2. Challenges and way forward

2.1 Analysis

The fieldwork, which involved a sample of 41 electrified households at the KwaGuqa township in Emalahleni Local Municipality, found that all households were experiencing challenges in the affordability of current electricity prices. All participants were supplementing their Free Basic Electricity with additional electricity that they bought or and more likely by purchasing a range of unsafe energy sources to meet their energy needs. This included LPG, paraffin, coal and candles as well as sub-standard, unsafe appliances. All households said that electricity tariffs were too high. In the case of those who were aware that they were receiving FBE, they clearly stated that the amount is not sufficient, and were using social grants and other income to buy additional electricity or other energy fuels. Those who did not receive FBE were finding ways of buying some electricity.

Local government is expected to deliver on its developmental mandate, and this means ensuring that the poor have access to basic services. But a commercialised electricity industry driven by cost recovery and cost-reflective tariffs will not align with redistributive and equity principles that are at the core of their Constitutional mandate. The two are not compatible and within a market economy, inequalities in access and affordability will persist despite subsidy attempts to alleviate this.

Cost-reflective tariffs are necessary for Eskom in its road to financial health. For municipalities it is not only about cost recovery but also business survival and therefore within the current business model municipalities will always need to supplement their tariffs to build surplus revenue. The question is how this will impact on poor households. It is evident that despite subsidies and cross subsidisation in place, the poor are not managing to provide for all their energy needs. This is made evident in the fieldwork study as well as current literature. Poor households are using unsafe fuels or food money to supplement their energy needs. From 2008 to 2013 tariffs increased by 300% and have continued to increase and this has not benefited poor households.

Finding a solution to managing electricity access and affordability for poor households is not easy. Untangling and understanding the tariff system, the subsidy allowances in place and where there is room for change is a complicated task. Furthermore, making sense of what works and what could work is highly complex and tied to the political and economic history of the country. For this reason, it is argued that the problem of energy poverty will not be solved through tariffs nor in raising subsidies such as the FBE allowance as is recommended in the JET-IP. It will ease a hard situation but will not solve the problem of poverty, energy poverty, and inequality that despite many pro poor policies continue to persist in South Africa. Driving and implementing a just transition will demand considering the whole system and ensuring that the poor are not further disadvantaged in the process. Whilst the systemic and political economy is beyond the scope of this brief, its role in perpetuating the current problem needs to be kept in mind. Bottom-up changes are possible within the current system and could provide pressure points that might lead to change.

The research has highlighted four crucial themes, three of which link to bottom-up opportunities for change going forward.

2.1.1 Political economy

The electricity supply industry (ESI) is intrinsically interconnected to the political economy of the country, which is propelled by coal and electricity-based industries, all driving what is known as the mineral energy complex. This is the core of South Africa's energy-intensive economy and high emissions. Historically Eskom has played a pivotal role in the development of these industries, which during apartheid benefitted a few. After democracy, the ANC maintained the status quo of a market-driven energy-intensive economy whilst at the same time fostering redistribution, a developmental and pro-poor agenda to redress the injustices of apartheid. These two positions are diametrically opposed and have, to a large extent, led to many of the country's huge challenges and dilemmas. This is at the root of continued high levels of poverty, energy poverty, inequality, and unemployment.

2.1.2 Electricity pricing and tariffs

The electricity service industry and electricity policy and regulations have been established to support the MEC whereby many of the large industries and corporations received preferential and cheaper electricity rates, which still apply today. Eskom sells bulk electricity to industries and to municipalities that are electricity distributors and directly to some customers. Most of their direct customers today are households living in township areas. Whilst electricity prices are generally based on cost recovery principles that costing has not always worked for Eskom nor municipalities for different reasons.

Restructuring the ESI has been on the government's agenda for many years. Given load shedding and Eskom's financial crisis that process is now being fast-tracked and as it does so too will tariffs change and each entity will now need to recover both direct and indirect costs. Previously these were subsumed into one tariff, albeit not accurately. To recover all costs and implement cost-reflective tariffs, prices will increase as indicated by Eskom[17] (BusinessTech, 2022a; Eskom, 2022a, 2022b). This will impact negatively on the poor and is fundamentally in direct contradiction to the Constitution and the concept of a developmental and redistributive state. Implementing cost-reflective tariffs will probably be good for Eskom, but it will not benefit the poor. Whilst Eskom needs to become economically viable and needs to implement full cycle cost-reflective tariffs to move forward and bring in more renewable options, and improve and manage the grid, the ripple impact of this on municipalities and direct customer's needs to be looked at. The concessionary tariffs it has with some of the big energy-intensive industries also need to be overhauled.

2.1.3 Fiscal framework of municipalities

The Constitution requires municipalities to deliver basic services and operate developmentally as the sphere of government closest to the communities they serve. Yet, the fiscal framework under, which they operate is in direct contradiction to this intention. There is a disconnect between the two and as Covery (2021) succinctly puts it – it is schizophrenic. Local governments are not generating sufficient revenue to fund their services and act on their mandates. This means that they must find other means to build revenue which means that their pro poor mandate is often compromised. This is particularly evident in relation to basic service delivery. Furthermore, whilst the Constitution makes clear that local government has executive authority in respect of electricity reticulation, the rules are not spelled out such as who has power over tariffs – is it the municipality or is it NERSA? These grey areas compound an already challenged system. There needs to be a complete overhaul of the fiscal framework in light of global and national energy and economic changes, and this is supported in the JET-IP. With tariffs increasing at Eskom this will have a ripple effect on municipal tariffs. As long as municipalities need to generate revenue to manage and deliver on all their mandates and as long as they are expected to run their affairs under market-driven conditions, they will be challenged to deliver on their most important mandate – to operate developmentally and to ensure equity and the well-being of all their citizens.

[17] Interview with an Eskom senior employee on 4 August 2022.

2.1.4 Subsidies and Indigent registers

There are two clear problems. One is that the amount of FBE allocated is too low and far from sufficient to meet even a fraction of a poor household's energy needs and even if the ceiling is raised to 100kWh as proposed in the JET-IP this will still not be sufficient – it will help. The other is that most households that should be classed as indigent are not and are not obtaining free basic services. The City of Cape Town is considering an FBE allowance of 250 kWh. Discussions amongst civil society groups are also advocating a minimum of between 250 and 350 units. How this is financed again supports the view that the municipal fiscal framework is not working. The process of registering as an indigent is onerous and the need to register annually is not working. Backyard dwellers are not obtaining this subsidy and sub-meters could be a solution. The vending system should also be reviewed so that a household can see whether they are or are not receiving FBE.

2.1.5 Modelling benefits and challenges

A full modelling exercise is recommended to look at different possible scenarios and the impact of tariffs on energy poor. In addition, modelling could assist with the fiscal framework review to see what is feasible in a challenged resource climate.

If the system is not transformed, modelling could assist municipalities in defining tariffs that work both for them and energy-poor domestic consumers within a new distribution framework. It could assist in defining a new EDI. Modelling could also look at assisting municipalities in assigning different tariff rates across the different consumer classes, which could benefit poor households. It could also impact cross-subsidisation.

2.2 The way forward

More detailed research is recommended. This study was limited in time and scope, and it would be beneficial to expand the research in the following ways:

A review of international best practice in managing energy poverty and to assess which experiences could assist in the South African context. This could include how energy poverty is defined and understood and how data is collected. Further to draw on the many energy poverty initiatives that have been successfully implemented.

A full review of the FBE subsidy; how it is rolled out, the amount and how the system can be improved. This could also include a review of the Free Basic Alternative Energy subsidy which was not discussed in this paper but is linked to FBE and the intention of improving alternative energy subsidies.

Review and a detailed overhaul of the local government fiscal framework. This is not straightforward and would require the buy-in of national and local government departments, including the National Treasury. The current system is not working and a review with phased changes and improvements could benefit not only the municipal financial current crisis but could impact on energy poverty.

Energy poverty data is outdated and needs to be looked at concerning the following:

- Household energy usage
- Gender considerations and differences
- The extent of illegal connections
- Experience in registering as indigent and access to subsidies
- Percentage of income used on energy and food
- Awareness of the issues.
- A more in-depth and substantial modelling exercise based on more detailed data on energy poverty and tariffs that considers a number of different assumptions and outcomes.

Conduct further research to understand the tariff system fully as the unbundling of Eskom progresses and renewable energy (RE) is brought into the system.

Given the scope of the recommendations one approach might be to take a municipality or district and run as a pilot project but this would require national government buy-in. Taking a bold step and doing things differently can bring positive change.

Bibliography

Annecke, W., P. Wolpe, A. David and A.Godin (2022). *What role for social policies in the framework of the just transition in South Africa?*

Ashman, S. and B. Fine (2011). Neo-liberalism, varieties of capitalism, and the shifting contours of South Africa's financial system. *Critical Perspectives on SouthTransformationern Africa*, *81*, 144–178. https://doi.org/10.1353/trn.2013.0013

Baker, L., P. Newell and J. Phillips (2014). The political economy of energy transitions: The case of South Africa. *New Political Economy*, *9*(6).

Baker, L. and J. Phillips (2019). *Tensions in the transition: The politics of electricity distribution in South Africa*. *37*(1), 177–196. https://doi.org/10.1177/2399654418778590

Boulle, M. and A. Filipova (2019). *Key Lessons on Institutional Arrangements for Managing the Restructuring of Power Utilities Policy Note Power Futures Lab*. *May*.

Bouzarovski, S., H. Thomson and M. Cornelis (2021). Confronting energy poverty in europe: A research and policy agenda. *Energies*, *14*(4). https://doi.org/10.3390/en14040858

Bowman, A. (2020). Parastatals and economic transformation in South Africa: The political economy of the Eskom crisis. *African Affairs*, *119*(476), 395–431. https://doi.org/10.1093/afraf/adaa013

BusinessTech. (2022a, August 8). *Eskom proposes complete tariff overhaul – including a massive change for prepaid users*. BusinessTech. https://businesstech.co.za/news/energy/615163/eskom-proposes-complete-tariff-overhaul-including-a-massive-change-for-prepaid-users/

BusinessTech. (2022b, November 30). *Eskom's big plan to shut down and transform power stations in South Africa – and how much it's going to cost*. BusinessTech. https://businesstech.co.za/news/energy/647293/eskoms-big-plan-to-shut-down-and-transform-power-stations-in-south-africa-and-how-much-its-going-to-cost/

Calitz, J. R. and J. G. Wright (2021). *Statistics of utility-scale power generation in South Africa in 2020*. http://hdl.handle.net/10204/11865

Che, X., Zhu, B., & Wang, P. (2020). Assessing global energy poverty: An integrated approach. *Energy Policy*, *16*(112099). https://www-sciencedirect-com.ez.sun.ac.za/science/article/pii/S0301421520308107

Covery, T. (2021). *Running to Stand Still: Politics and path dependency in South Africa's Municipal Electricity Sector*. Unlimited Energy (Pty)Ltd, Johannesburg.

Creamer, T. (2022, September 21). *Affordability of Eskom's 32% hike comes under intense scrutiny on last day of hearings*. Engineering News. https://www.engineeringnews.co.za/article/affordability-of-eskoms-32-hike-comes-under-intense-scrutiny-on-last-day-of-hearings-2022-09-21/rep_id:4136

Day, G., N. Walker and Simcock, N. (2016). Conceptualising energy use and energy poverty using a capabilities framework. *Energy Policy*, *93*, 255–264. https://www-sciencedirect-com.ez.sun.ac.za/science/article/pii/S0301421516301227

DellaValle, N. (2019). People's decisions matter: understanding and addressing energy poverty with behavioral economics. *Energy and Buildings*, *204*(109515). https://www-sciencedirect-com.ez.sun.ac.za/science/article/pii/S0378778819305675

Dippenaar, J., B. Khonjelwayo, T. Shumba and M. Euston-Brown (2021). *How to undertake a simplified municipal cost of supply study*.

Dludla, S. (2021, May 27). *Unbundling of Eskom is on track, says De Ruyter*. IOL. https://www.iol.co.za/business-report/companies/unbundling-of-eskom-is-on-track-says-de-ruyter-3457f124-6e62-49b6-a5d6-77c7f5c62878

DME. (1998). *White Paper on the Energy Policy of the Republic of South Africa*. Department of Minerals and Energy.

DME. (2003). *Electricity Basic Services Support Tariff: Free Basic Electricity Policy*. Department of Minerals and Energy.

DoE. (1998). White Paper on the Energy Policy of the Republic of South Africa. In *Department of Minerals and Energy, South Africa* (Issue December). http://www.energy.gov.za/files/policies/whitepaper_energypolicy_1998.pdf

DPE. (2019). *Roadmap for Eskom in a Reformed Electricity Supply Industry* (Issue 1).

Eberhard, A. (2006). The political economy of power sector reform in South Africa. In Victor & Heller (Eds.), *The Political Economy of Power Sector Reform* (pp. 215–253). Cambridge University Press.

Eberhard, R. (2016). *Understanding electricity demand patterns in South Africa's cities: Briefing Paper 1 for National Treasury*.

ELM. (2022). *Emalahleni Local Municipality Integrated Development Plan 2022/2023 - 2026/2027*.

ERC. (2002). *Options for Basic Electricity Support Tariff: Analysis, issues and recommendations*.

Eskom. (2022a). *Summary of the Retail Tariff Plan*. Eskom Website. https://www.eskom.co.za/distribution/retail-tariff/

Eskom. (2022b). *Eskom Retail Tariff Plan for the Restructuring of Eskom tariffs: For Implementation 2023/24*.

Fine, B. and Z. Rustomjee (1996). *The Political Economy of South Africa: From Minerals-Energy Complex to Industrialization*.

Habib, A. (2013). *South Africa's Suspended Revolution: Hopes and Prospects*. Wits University Press.

Hallowes, D. and V. Munnik (2017). *The Destruction of the Highveld*.

Hermanus, L., G. Montmasson-Clair, M. Patel and P. Wolpe (2022). *Local Government Toolbox for a Just Energy Transitions in South Africa*.

Hermanus L. and G. Montmasson-Clair (2021). *Making sense of jobs in South Africa's just energy transition: Managing the impact of a coal transition on employment*. www.tips.org.za

Kam Chetty, Strategies for Change and MCA Urban & Environmental Planners (2015). *Financing the transition to a new infrastructure paradigm in fast-growing secondary cities in South Africa: A case study of the Saldanha Bay Municipality*.

Knox, A.J., J.R. De Groot and N. Mohlakoana (2018). *Post-apartheid spatial inequalities and the built environment Drivers of energy vulnerability for the urban poor in South Africa*. https://www.ebsco.com/terms-of-use

Kubushi, E.M. (2022, October 20). *Case Number 63393/2021*. The Judiciary Republic of South Africa.

Ledger, T. (2021a). *A Just Distribution: The Overlooked Role of Energy Distribution Policy and Governance in Achieving a Just Energy Transition in South Africa*.

Ledger, T. (2021b). *Broken Promises*. https://rekordeast.co.za/318517/claiming-free-electricity-promise-north-residents/

Marais, L. and J. Cloete (2020). Labour migration, settlement and mine closure in South Africa. https://Doi.Org/10.1080/00167487.2013.12094371, 98(2), 77–84. https://doi.org/10.1080/00167487.2013.12094371

Mdluli, T. and C. Vogel (2010). Challenges to achieving a successful transition to a low carbon economy in South Africa: examples from poor urban communities. *Mitig Adapt Strateg Glob Change*, *15*, 205–222. https://doi.org/10.1007/s11027-009-9195-4

Mohlakoana, N. and P. Wolpe (2021). *A Just Energy Transition to Facilitate Household Energy Access and Alleviate Energy Poverty*. www.tips.org.za

Moodliar, L., I. Davidso and E. Buraimoh (2022). *A Cost to Serve (CTS) Study at eThekwini Municipality*. https://www.ameu.co.za/Cost to serve study eThekwini Municipality - Leshan Moodliar.pdf

Morris M. and L. Martin (2015). Political economy of climate-relevant change policies: The case of renewable energy in South Africa. *Institute of Development Studies; University of Cape Town; South Africa.*, *(128) 1-81*. IDS Evidence Report

NERSA. (2019). *Municipal Tariff Guideline Increase, Benchmarks and Proposed Timelines for Municipal Tariff Approval Process for the 2019 / 20 Financial Year* (Issue March).

Nkanjeni, U. (2021, August 11). *Battling to afford electricity? Here's how you could get 50kWh free & how much it can get you*. Sunday Times. https://www.timeslive.co.za/news/south-africa/2021-08-11-battling-to-afford-electricity-heres-how-you-could-get-50kwh-free--how-much-it-can-get-you/

Oosthuizen, A.M., R. Inglesi-Lotz and G.A. Thopil (2022). The relationship between renewable energy and retail electricity prices: Panel evidence from OECD countries. *Energy*, *238*, 121790. https://doi.org/10.1016/J.ENERGY.2021.121790

Pachauri, S. and D. Spreng (2011). Measuring and monitoring energy poverty. *Energy Policy*, *39*, 7497–7504. https://www-sciencedirect-com.ez.sun.ac.za/science/article/pii/S0301421511005313

PCC. (2022). *A Presidential Climate Commission Report: A Framework for a Just Transition in South Africa*.

PMG. (2004, November 5). *Regional Electricity Distributor One (RED 1): briefing*. Parliamentary Monitoring Group. https://pmg.org.za/committee-meeting/4250/

Pye, S., J. Brajković, A. Dobbins and R. De Miglio (2015). *Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures*.

The Constitution of the Republic of South Africa, Pub. L. No. 108 of 1996 (1996).

The White Paper on Local Government, (1998).

Republic of South Africa, T.P. (2022). *South africa's just energy transition investment plan (jet ip)*.

***White Paper on Reconstruction and Development* (1994)**. (testimony of RSA). https://www.gov.za/sites/default/files/governmentgazetteid16085.pdf

SALGA. (2014a). *The role of municipalities as service authorities for electricity provision*.

SALGA. (2014b). *The role of municipalities as service authorities for electricity provision*. https://www.scribd.com/document/324899964/The-Role-of-Municipalities-as-Electricity-Service-Authorities-Draft2-SALGA-Aug-2014-docx#

Sasol. (2005, August 24). *Sasol produces 1,5 billion barrels of synthetic fuel from coal in fifty years*. Sasol Website. https://www.sasol.com/media-centre/media-releases/sasol-produces-15-billion-barrels-synthetic-fuel-coal-fifty-years

SEA. (2017). *Sustainable energy solutions for South African local government: A practical guide*. Sustainable Energy Africa.

SEA. (2020). *State of Energy in South African Cities 2020*.

SEA. (2021). *Small-Scale Embedded Generation: A Guide for South African Municipal Distributors*. www.msolarpower.co.za

SEA. (2022). *A feasibility study exploring energy access through community-led socially owned renewable energy development in South Africa*.

Sovacool, B.K. (2012). The political economy of energy poverty: A review of key challenges. *Energy for Sustainable Development*, *149*, 272–282. https://www-sciencedirect-com.ez.sun.ac.za/science/article/pii/S0973082612000373

StatsSA. (2011). *Local Municipality | Statistics South Africa*. Statistics South Africa 2011 Census Data. https://www.statssa.gov.za/?page_id=993&id=emalahleni-municipality-2

StatsSA. (2018, June). *Energy and the poor: a municipal breakdown | Statistics South Africa*. Statistics South Africa Department. http://www.statssa.gov.za/?p=11181

StatsSA. (2019a). *Inequality Trends in South Africa: A Multidimensional Diagnostic of Inequality*. www.statssa.gov.za

StatsSA. (2019b). *National Poverty Lines 2019*. http://www.statssa.gov.za/publications/P03101/P031012019.pdf

StatsSA. (2022, August 23). *Quarterly Labour Force Survey (QLFS) – Q2:2022*. Quarterly Labour Force Survey. https://www.statssa.gov.za/?p=15685

Strambo Claudia, Burton Jesse, A. A. (2019). *The end of coal? Planning a "just transition" in South Africa*.

Sulla, V. (2020). *Poverty & Equity Brief Sub-Saharan Africa: South Africa*. www.worldbank.org/poverty

Sulla, V., , P. Zikhali and P.F. Cuevas (2022). *Inequality in Southern Africa: An Assessment of the Southern African Customs Union*.

Thom, C. (2000). Use of grid electricity by rural households in South Africa. *Energy for Sustainable Development*, *iv*(4).

Thom, C., N. Mohlakoana, M. Dekenah and S. Heunis (2001). *Case studies on the impact of electrification in rural areas*.

Trimble, C., M. Kojima, I. Perez Arroyo and F. Mohammadzadeh (2016). Financial Viability of Electricity Sectors in Sub-Saharan Africa: Quasi-Fiscal Deficits and Hidden Costs. *Financial Viability of Electricity Sectors in Sub-Saharan Africa: Quasi-Fiscal Deficits and Hidden Costs*, *August*. https://doi.org/10.1596/1813-9450-7788

UN. (2015). *The Millennium Development Goals Report 2015*.

Winkler, H. (2009). *Cleaner energy cooler climate - developing sustainable energy solutions for South Africa*. Human Sciences Research Council, Cape Town, South Africa.

Wolpe, P. and Y. Reddy (2014). *Tackling Urban Energy Poverty in South Africa*.

World Bank. (2020). *Poverty and Equity Brief Sub-Saharan Africa: South Africa*.

World Bank Group. (2018). *Managing Coal Mine Closure: Achieving a Just Transition for All*. https://documents1.worldbank.org/curated/en/484541544643269894/pdf/130659-REVISED-PUBLIC-Managing-Coal-Mine-Closure-Achieving-a-Just-Transition-for-All-November-2018-final.pdf

Yes Media. (2022). *The Local Government Handbook South Africa 2022* (O. Main (ed.); 12th ed.). Yes Media. https://issuu.com/yesmedia/docs/localgovernmenthandbook_southafrica2022

Agence française
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5, rue Roland Barthes
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