

**HOUSEHOLD AND COLLECTIVE RESPONSES TO THE ABSENCE OF ELECTRICITY
SUPPLY IN INFORMAL SETTLEMENTS IN JOHANNESBURG: A CASE STUDY OF
MSAWAWA AND KYA SANDS**

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A Research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of Masters of the Built Environment in the Field of Housing.

Johannesburg, 2018.

Declaration

I declare that this Research Report is my own unaided work. It is being submitted to the Degree of Master of the Built Environment in the field of Housing to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

Signature _____ Day of the 11th September, 2018

Abstract

The South African Constitution gives every citizen a right to basic services, and this exclude electrification of every households. It covers basic human rights, and articulates them as Water, and Sanitation. The Department of Energy recognises electrification as basic right through electrification categories provided for informal settlements dwellers. However, many households in informal settlements live without electricity. This research is a case study of Kya Sands and Msawawa informal settlements, two informal settlements on the north western outskirts of Johannesburg that are not connected to formal electricity supply. It explores how their communities respond to the absence of electricity. The study took a qualitative approach based on interviews with residents, business owners and leaders of Msawawa and Kya Sands informal settlements.

The finding is that household responses differ across the two informal settlements, in part depending on the strategy adopted by the informal settlement community and the leadership, and in part determined by the sources of energy or fuel in the area. This research reveals a variety of energy sources, and questions the common perception that all informal settlement dwellers have informal electricity connections.

Dedication

I would like to dedicate this Masters Research report to my wife, Mrs. Zama-Nyuswa Pamela Nxumalo, for her inspiration and insight, and my children Langelihle “Mafungwaswe kababa” and Likhonithemba “Ntombazane kababa” Nxumalo. There is no doubt in my mind that without their continued support, I could not have reached this milestone.

I cannot forget my 83 year-old father, Mr. BG “Ilwane” Nxumalo, my late mother, Adelaide “Mdo” Bongekile Nxumalo, my brother Khuthazela “VA” Nxumalo, and my nephew Mvelo “Ibhubesi” Nxumalo, to whom I also dedicate this research report. My dear brother Tshidiso Seoposengwe: “TC”, thank you for your undivided support. God Bless you, you are a very kind man, the likes of which I have not encountered before in the education sector. Last, to my dearest nephew Lwandle Nyamane the long hours we worked this milestone together were important for this dissertation to see the light, thank you Mthombeni.

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In God I trust and believe; it has been a tough journey and through Him I succeeded, for that I will forever cherish Him.

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I would also like to acknowledge the support and assistance provided to me by the leadership, general communities and businesses owners of Msawawa and Kya Sands informal settlements; our journey has just begun. I cannot forget to acknowledge the overwhelming support I received from Mr. Phalanndwa known as “Sugar”, by the Msawawa community, an outstanding leader of Msawawa informal settlement; in you I have found a permanent friend and I remain humbled by your knowledge and your leadership qualities.

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List of Acronyms

ANC	African National Congress
CoJ	City of Johannesburg
DA	Democratic Alliance
DoE	Department of Energy
EDRC	Economic & Development Review Committee
FBAE	Free Basic Alternative Energy
FBE	Free Basic Electricity
GEA	Global Energy Assessment
GEAR	Growth, Employment and Redistribution
GPDMC	Gauteng Provincial Management Centre
IBT	Illinois Business Tax
INEP	Integrated National Electrification Programme
KB	Kya Sands Business Owner
KL	Kya Sands Leadership
KR	Kya Sands Resident
LPG	Liquid Petroleum Gas
MB	Msawawa Business Owner
MDG	Minimum Development Goals
MIG	Municipal Infrastructure Grant
ML	Msawawa Leadership
MR	Msawawa Resident
MW	Mega Watt
NDOH	National Department of Health
NERSA	National Energy Regulator South Africa
PM	Particulate Matter
RDP	Reconstruction and Development Programme
SAPS	South African Police Services
SERI	Socio-Economic Rights Institute of South Africa
SIP	Strategic Integrated Projects
UISP	Upgrading of Informal Settlement Programme
UN	United Nations
WHO	World Health Organisation

Chapter 1

1.1. Introduction

The South African Constitution provides every citizen with a right to basic services. This includes electricity, “and this is regardless of location and social status. It is the responsibility of Government to ensure that people living in informal settlements are also provided with basic services as they form part of the country’s society” (Department of Energy, 2015:3). Nearly 10 per cent of South Africa’s households which is roughly estimated to be more than 1.2 million households live in informal settlements located not far from the city centres. The said residents “live under very precarious conditions, which pose serious threat to their health, safety, and security” (Department of Energy, 2015:3).

Contrary to this, and according to the statistical figures of 2015, the informal settlement population for South Africa is estimated at 16.2 million (Dlamini, 2016). The 44 million South African population has subsequently increased into an estimated figure of 56.5 million by mid 2017 (Statistics South Africa, 2017), of which the said 16.2 million people make up 28.7 per cent. The Department of Energy (2015:3) notes that “[t]he actual number is probably significantly higher than this figure [the 2015 10% figure cited above] suggests”. The actual reach of electricity supply to informal settlements lags far behind targets, with many households having to manage their daily lives with alternative sources of fuel or energy.

The research focused on Msawawa and Kya Sands informal settlements on the north western outskirts of Johannesburg (see Figure 1 below), and a closer look at the responses of households and communities with respect to the absence of electricity in the two settlements.



Figure 1.1 An aerial photo of Msawawa and Kya Sands, indicating that the settlements are not far apart, and that Kya Sands is bigger than Msawawa (Source: Google Maps).

1.2. Background

Msawawa and Kya Sands are informal settlements located in Region A of the City of Johannesburg (CoJ), in the north western part of the City. They both closely border on the Bloubastrand residential suburb, near the upmarket suburbs of Randburg, Dainfern and Fourways (Nenweli, 2015). Kya Sands and Msawawa are two of many settlements that were not planned for and have no formal permission to exist (Weakley, 2012), although part of Kya Sands is a relocation created by the municipality. Weakley (2012:1) notes that Professional Mobile Mapping reports that “Kya Sands is made up of 16,238 people living in 5,325 dwellings”. This figure is at least six years old and is likely to be outdated. The exact population size of Msawawa is not documented. However, I assume it to be equivalent to half of Kya Sand’s population.

It is noteworthy to mention that Kya Sands and Msawawa have no formal electricity connections. Weakley (2012:1) attributed shack fires in both settlements to households using “open flames for lighting and cooking”. There have been subsequent fire incidents. In October 2014 approximately “700 shacks were destroyed after a massive fire swept across Kya Sands” (News Day, 09 October 2014:1). Figure 1.2 below shows the effects of shack fire in Kya Sands. It is alleged that the fire was instigated by informal electricity connections in the settlement (News Day, 09 October 2014).



Fig 1.2: A man plays loud music on a solar powered radio while cleaning the remains of his property.

Source: News Day 09 October 2014.

1.3. Problem Statement/Rationale

Globally, shack fires in the informal settlements lead to major loss of homes and belongings and remain an enormous challenge especially for non-electrified settlements. The electrification of informal settlements has been recognised as a possible solution to shack fires in these settlements (Twigg, Christie, Haworth, Osuteye and Skarlatidou, 2017). Electricity is a basic right which needs to be provided to all South African citizens by government regardless of what

dwelling one chooses or is compelled to stay in or call a home. However, most informal settlement communities in Gauteng Province do not have electricity.

It is often assumed that informal electricity connections are common in the informal settlements and that households in the informal settlements have informal connections from electricity mains. There appear, however, to be a wide range of strategies that households and communities apply to have basic household energy. Nenweli (2015) refers to the extensive use of generators in Msawawa, the leadership and community agreed that there will be no informal electricity connections. During a 2016 class visit to Kya Sands, I observed that there were households that were using solar panels, others were using open fires and other sources of energy.

It is, therefore, useful to develop an understanding of households and their collective strategies in dealing with the absence of formal electricity supply; and understanding of which other forms of energy are being used; for example the use of generators, batteries, paraffin and coal, to name a few. The study will add to the body of knowledge by providing not only a study at a household level, but by engaging the leadership in the two informal settlements and examining the extent to which there are collective responses and decisions on options for household energy use. While this is primarily an academic research, the results of this research could be used to determine ways to support and improve informal settlement communities in developing energy strategies for their settlements. This could assist not only in reducing incidents of fire but could also address questions of affordability and sustainability.

Msawawa informal settlement has a collective leadership and community agreement decision, that there will be no informal electricity connections, within the settlement (Nenweli, 2015). Msawawa residents are mainly using paraffin, candles, and generators mainly by those who own businesses. A few residents use solar systems but only during the day because these systems' batteries are too small to store energy that can be used later at night. On the contrary, Kya Sands has no restrictions on the kind of energy source that may be used in the settlement. Hence, most

households in Sections B and C of Kya Sands are informally connected to electricity while in Sections A and D there are no households that are connected to the informal electricity. Therefore, Sections A and D of Kya Sands and the whole of Msawawa share similar conditions; namely, there are no informal electricity connections (Personal communication: Kya Sands Community Leader, 29 November 2017).



Figure 1.3 Kya Sands informal settlement showing sections and local names. (Source: Google Map)

1.4. Aim of the Study

The broad aim of the study is to identify commonly used sources of energy in the chosen settlements and to contribute to the search for better energy solutions in informal settlements. To this end, the objective of the study is to develop an understanding of approaches that households and communities have developed in the absence of electricity supply in the informal

settlements. The study hopes to reveal various forms of energy and fuel that are used by households in the absence of electricity and how decisions are made about these.

1.5. Research Question

1.5.1. Main Question:

How do households individually and communities collectively respond to the absence of formal electricity supply in their settlements?

1.5.2. Sub-Questions

- a) What is generally known about the way households respond to the absence of electricity in informal settlements?
- b) How differently do the Kya Sands and Msawawa community leadership handle the issue of the absence of formal electricity?
- c) To what extent do these strategies depend on the context of the settlement?
- d) How do households differ in their response to the absence of electricity?
- e) To what extent are these choices the result of the strategies adopted by the leadership?

1.6. Methodology and Research Approach

Wagner, Kawulich, and Garner (2012) explain that qualitative research may consist of a wide range of data gathering techniques, including interviewing, focus groups and observation, to mention a few. The views and experiences of the households and the leadership of both Msawawa and Kya Sands are important for this study. Qualitative methods are therefore best suited to this research, which relies on two purposively selected case studies.

This grounded research is based primarily on a descriptive approach. The information was collected in the form of a small number of in depth interviews obtained by identifying and approaching relevant participants from the two settlements. The participants were purposefully selected by me, first to meet the sampling requirements in line with my overall research approach and to avoid bias that may arise where the participants were to be selected by the leadership. The respondents consisted of two leadership members from each settlement, two business operators and two residential members from each settlement. The outcome was a total of 12 qualitative interviews, as illustrated in Table 1.1 below, which further indicates the age range of participants.

The names and identities of the participants are not disclosed for reasons of confidentiality, with exception of one community leader from Msawawa who had no problem in having this his name disclosed. There were no participants below the age of 21 years. The questions were all prepared in English. However, during the interviews I had to clarify and explain questions by using isiZulu and isiXhosa. All interviewees gave me permission to record the conversations by using a cell phone. I later transmitted the recordings to my laptop computer, and transcripts were generated from the recordings.

At a basic level, observations I made during the fieldwork were incorporated into the interview questions as supplementary question/s, the purpose of which was to seek clarity where it was deemed necessary. This approach assisted in refining the initial interview questions, which are included in Appendix page 106.

1.6.1. Case studies

The approach to the case studies was balanced in that I had an equal number of participants from each settlement and who held similar status in their respective settlements. The main reason for choosing two case studies is as follows: The leadership of Msawawa took a resolution, which was supported by the community, that there will be no informal connection of electricity. In Kya Sands

there is no evidence that there ever was such a proposal. The two unique approaches to the absence of formal electricity supply in the informal settlements resulted in diverse findings from each settlement and this would potentially result in an insightful conclusion.

1.6.2. Interviews and analysis

The interviews were semi-structured and the questions generally open ended, allowing for a focused conversation to unfold. The aim was to elicit views and opinions from the participants (Creswell, 2009). The advantage of the interview data collection was that it allows a researcher to control the line of questioning (Creswell, 2009). The sample selection was based on the understanding that the participants are knowledgeable, experienced, and have relevant views regarding the situations in Msawawa and Kya Sands informal settlements. For each category of respondents, I developed a separate set of questions that were submitted to the ethics committee along with the ethics clearance application.

The fieldwork was preceded by a desktop study which involved a literature review on the electrification of informal settlements and other sources of energy. Academic journals formed the main source of literature in addition to grey literature, reliable newspapers, and government policy documents. Some prior academic work had been conducted in both Kya Sands (Weakley, 2012) and Msawawa (Nenweli, 2015) which I reviewed carefully in preparation for the field work. I also requested the previous researchers, as explained later in the chapter, to introduce me to the leadership of each settlement.

Table 1.1 below indicates the age group of the participants I interviewed from Msawawa and Kya Sands. The age ranges of the participants were between 35 and 55 and all the participants had been residing for well over five years in their settlements and one of the persons who has been resident for the longest was a Msawawa respondent who had lived there for about 16 years, initially as a tenant in the farm house before the settlement began to emerge.

Table 1.1 Profile of survey respondents

Respondent Type	Age Group (Yrs.)	No
Msawawa Informal Settlement: Leadership	40 – 45	2
Msawawa Informal Settlement: Business Owners	35 – 45	2
Msawawa Informal Settlement: Residents	50 - 55	2
Kya Sands Informal Settlement: Leadership	40 – 50	2
Kya Sands Informal Settlement: Business Owners	35 – 50	2
Kya Sands Informal Settlement: Residents	40 – 50	2
TOTAL	N/A	12

The interviews were all recoded and were coded manually according to themes that are related to my research questions. The analysis is based on the individual insights that were provided by each respondent on each theme. I was mindful that I cannot generalise my results based on a small sample of two households per informal settlement, and my research does not deviate from the participants' input and experiences. The community leaders and business owners were also comfortable to be interviewed about their life as households in both informal settlements. All my participants were residents of the two settlements, and there were no outside participants.

1.7. Ethical Considerations

As required by the Wits University Ethics Committee, all research is to be conducted ethically. I therefore adhered to all ethical requirements as prescribed, to make this research credible. Formal ethical clearance was obtained prior to the commencement of the fieldwork and was granted by the Ethics Committee in the School of Architecture and Planning (refer to ethics clearance certificate provided in Appendix, 82). Obtaining informed consent from participants in this research was also vital. During the fieldwork study I disclosed my identity as a part-time university student and explained the purpose of the study to the participants before engaging them in interviews. The participants were given a choice of providing or withholding their consent, or to withdraw at any time during the interview.

The Msawawa participants were very receptive and welcomed the study. The first selected participants from this community continued with me until the study was concluded. This was in sharp contrast to when I arrived in Kya Sands, where the participants were less receptive and I had to go through a number of potential participants before I could conclude my final list of participants. The main issue that was mentioned to me at Kya Sands was that I need permission from their community leader who was the person who had to introduce them to me. In some of my interviews, especially in Kya Sands where there are informal electricity connections, Sections C and D, I had to request the Msawawa community leader, Mr Phalanndwa, who is also known as “Sugar”, to accompany me in order for him to introduce me to the other leaders from Sections B and C of Kya Sands (this was because I was unable to make contact by myself with the information that I had received from Weakley and Nenweli). This introduction was important because my initial contact who is one of the community leaders of Kya Sands Section C, introduced through Weakley, was injured when he was hit with a brick when he tried to resolve a fight at night between two individuals, and he was in hospital for a week and two days. He has since recovered from the injuries.

During the interviews, sensitive questions relating to informal electricity connections, for example, who is supplying electricity cables used to connect electricity informally?; were avoided. However, one of the business owners from Section C in Kya Sands was open about his informal electricity connections and more details on this are shared in chapter four of this research. Anything that possibly could raise the hopes of the interviewees on the outcome of the research, especially regarding the electrification situation in both informal settlements, was also avoided. However, when I interviewed community leaders about the leadership's position on non-electrification of the settlements, the Msawawa leadership emphasised that there are no informal electricity connections in their settlement, while the Kya Sands leadership's responses did touch on issues of informal electricity connections and they explained in detail that in Sections A and D there are no informal electricity connections while in Sections B and C there were informal connections and there was nothing being done by the leadership with regard to reprimanding those that are informally connected.

1.8. Limitations of the Research

The interview schedules were prepared in English, but the interviews were carried out in different languages as needed, namely: English, Zulu and Xhosa, the languages in which I am reasonably proficient. I encountered situations where some of the participants spoke other South African languages like Venda and Tsonga. This did not prove to be a challenge as they requested me to go ahead and conduct the interviews in English, in which they were fluent.

As I have explained under ethical considerations, I avoided direct questions about informal electricity connections but some of the participants in Kya Sands were eager to take the conversation in that direction and more details will be provided in chapter four later. I asked my respondents before the interview to indicate to me when we entered terrain that they were uncomfortable with, and no one felt uncomfortable with any of the questions. It was only a matter of my participants requesting clarity in some of my questions and throughout the

interviews I provided clarity where it was requested by the participants. Also, my presence did not influence the respondents to reply in a way that was regarded by the society as morally good; rather, I had a strong sense that they explained the situation in the way that it is. Despite limited time and resources to carry out this research, I set out to do effective research within these limitations.

1.9. Outline of the Report

The research is comprised of five chapters, and chapter one is the introduction and the road map of the research, for example, background of the study, problem statement, aims of the study, method/s that the study will peruse, research questions and ethical considerations are all discussed in chapter one. Chapter two deals with a literature review on the challenges of electrification of informal settlements, government policy on electrification, sources of energy and fuel in the absence of domestic electricity. Chapter 3 provides the background context of Msawawa and Kya Sands informal settlements within the City of Johannesburg geographically location, and in relation to applicable governance and policies. Chapter 4 provides the two case studies, namely Msawawa and Kya Sands respectively. The detailed results from the interviews, discussion and interpretations are also discussed in chapter 4. Chapter 5 is an analysis and discussion of the case study, concludes the report and makes recommendations in relation to the study and recommend topic for future research.

Chapter 2: A Literature Review on Government Initiatives and Policies And Sources of Energy and Fuel in the Absence of Electricity

2.1 Introduction

This chapter contains a literature review on the key themes of relevance to the study. The literature review focuses on the following areas: Government Initiatives and Policies relevant to informal settlements, and sources of energy focusing on energy practices in the informal settlements.

South African socio-economic development heavily relies on energy production which has been instrumental in providing heat and power to households among others, power to the country's industry and businesses sectors, and it has yielded prosperity to the country (Davidson, Winkler, Kenny, Prasad, Nkomo, Sparks, Howells, and Alfstad, 2006). According to Davidson et al. (2006), it is imperative when considering energy policies to trace back from before the apartheid era, starting from 1948 to 1994, to further consider the first democratic dispensation 1994 to 2000 and lastly from 2000 up to the present. The energy policies in each period were unique to those periods, however, these energy policies interventions added to the development of the energy sector to this date, but not necessary for all South Africans (Davidson et al., 2006:23). All three periods will be discussed briefly in the section to follow.

Notwithstanding these efforts at policy level, the impoverished communities have not truly benefited from South Africa's energy framework. In the informal settlements there is a high level of energy poverty (energy poverty is defined later in the chapter) even though we are over 20 years into democracy (Sustainable Energy, 2014).

A study commissioned by Habitat for Humanity International (Ziblim, 2013) found that there is a significant increment in migration from rural to inner-city areas, especially among the youth. The migration as a result further aggravates the shortage of housing in the cities. The same situation was confirmed by Sustainable Energy (2014), namely that South Africa continues to experience rapid migration from rural areas to urban areas with an estimated rate of urbanisation of 64% of the country's population. Figure 2.1 below illustrates the current situation where 40% of migration is to the metropolitan municipalities. It is forecast that by 2030 the urban population will reach 70% of the national population.

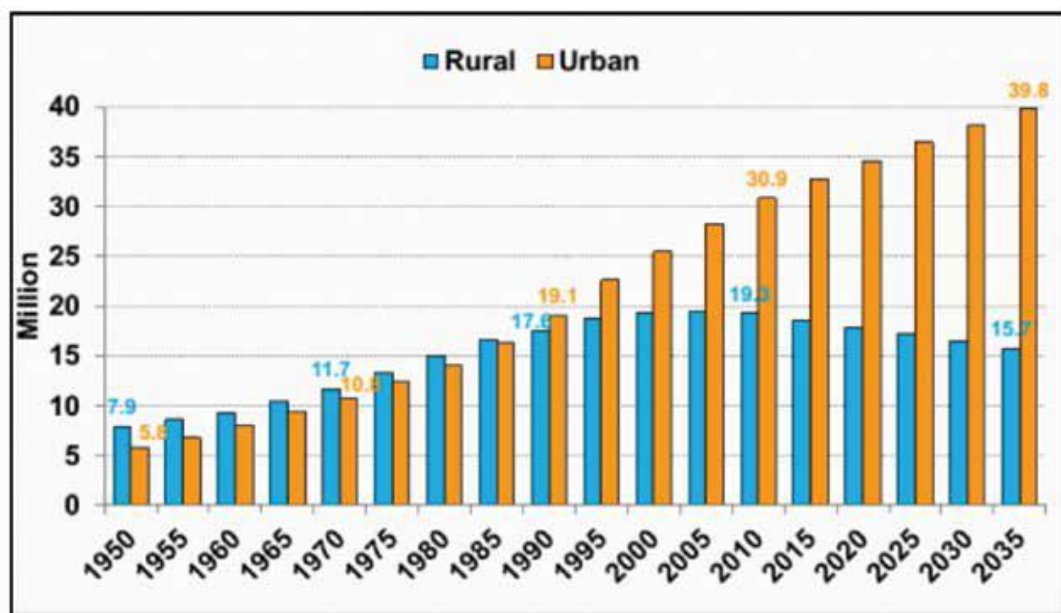


Figure 2.1: Urban versus rural population growth in South Africa from 1950-2035. Source: (Sustainable Energy Africa, 2014:6).

2.2 Informal Settlements: An Overview

Definition in Global and South African Context

Informal settlements are found all over the world, it is estimated that 1 billion of the global population resides in the informal settlements. (Meyer, 2010). Each country uses unique name/s when referring to informal settlements. In Brazil informal settlements are called favelas and they

are commonly situated on hillsides, are made of cupboard, wood, iron and they are defined on shortage of water, sanitation and electricity (Meyer, 2010). In Kenya, they are called shanty town or squatter camps (Nabutola, 2004). In South Africa, informal settlements are named among many other names as *emikhukhweni*, *emijondolo*, *ematshotshombheni* and all these names refer to informal settlements.

Informal settlement has no standard definition, however, there are common factors that are commonly found in each definition, which are poverty, lack of basic services, poorly located and they are situated near cities or place of employment (Human Settlement Development, 2005). Nabutola (2004) defines informal settlement, based on Kenyan background and understanding, as follows:

“... a dwelling put up without authority of the owner of the land, usually without a formal design and without conforming to any specification as to laid down rules and regulations, planning standards, generally accepted methods of workmanship, construction and is more often than not temporary. These would not have access to public utilities like electric power, clean, running piped water, sewerage, and drainage” (Nabutola, 2004:2).

Nabutola (2004) qualifies his definition of informal settlement by mentioning that inadequate land administration and planning is the reason for informal settlements. In South Africa, we have several definitions for informal settlements. Almost every Metropolitan and housing related department and NGOs has their own unique definition as its own definition of informal settlement as follows: The Housing Development Agency, (2013 :7), Statistics South Africa defines informal settlement as “An unplanned settlement on land which has not been surveyed or proclaimed as residential, consisting mainly of informal dwellings (shacks)”

Meanwhile City of Johannesburg defines an informal settlement as follows:

“An impoverished group of households who have illegally or without authority taken occupation of a parcel of land (with the land owned by the Council in the majority of cases) and who have created a shanty town of impoverished illegal residential structures built mostly from scrap material without provision made for essential services and which

may or may not have a layout that is more or less formal in nature.” (Informal Settlements in Gauteng, 2013:7).

Mpe and Ogra (2014:590) make reference to Huchzermeyer and Karam’s (2006) definition, “settlements that were not planned by nor have formal permission from government to exist” The South African National Department of Human Settlements in their quest of consolidating informal settlement into one collective definition, note:

“The 2009 National Housing Code’s Informal Settlement Upgrading Programme identifies informal settlements on the basis of the following characteristics:

- Illegality and informality;
- Inappropriate locations;
- Restricted public and private sector investment;
- Poverty and vulnerability; and
- Social stress”

(Housing Development Agency, 2013:7).

The National Department of Human Settlements mention that, an informal settlement that has any of the above features qualifies as an informal settlement (Ziblim, 2013).

Informal settlements in South Africa

The relocation of people from small towns and rural areas has led to the creation of informal settlements in the cities. The reasons of migration are due to better employment opportunities, which are much better available in the cities when compared to small towns and rural areas (Todes, Kok, Wentzel, van Zyl, and Cross, 2008). The migration to cities is twofold, we have domestic migrants, from small towns and rural areas of South African. The international migrants are those who migrate from outside the boarders of South Africa (Biney, 2016).

In South Africa the informal settlements are located mostly near city centres, and not far from the industrialised areas, places of employment of both skilled and semi-skilled workers (Biney,

2016). The illegal setting up of informal settlements closer to cities and or closer to industries, is for dwellers because they save on transport cost when going to work and also more beneficial to those who are still looking for employment.

The informal settlement as defined by Nabutola (2004) is the most relevant and specific to the research topic because it includes mention of the frequent absence of formal electricity supply.

Government Initiatives & Policies

There is no right to electricity in the Constitution, but there is an electricity right mentioned under basic municipal services and is found under section 73 of the Municipal Systems Act. It is therefore imperative that municipalities prioritise electricity to all communities residing in South Africa, rich or poor (Local Government Action, 2014:1).

The above is further emphasised on the Darries and Others verse City of Johannesburg and Others, 2009. The arguments revolved around “the right to receive electricity as a basic municipal service” (Darries and Others verse City of Johannesburg and Others, 2009:18). The order of the court issued on the matter was that “the termination of electricity supply to Ennerdale Mansions on 8th July 2008 is declared to be unlawful. The respondents were ordered to reconnect the electricity supply to Ennerdale Mansions forthwith” (Darries and Others verse City of Johannesburg and Others, 2009:41).

2.2.1. Energy Policies: The Apartheid Period

During the apartheid period, the provision of energy services was predominantly limited to white minority settlements and this discriminatory approach left the majority of the people isolated when it comes to energy utilization (Davidson, 2006). The other significant energy provision was

channelled to industries to boost the economy; this was done because the focus, at the time, was the security of the minority rights (Davidson, 2006).

Electricity is one of the cleaner sources of energy and it should be made available to all South African citizens regardless of social standing (Davidson, 2006). During the apartheid period, the then Eskom Act (Electricity Act of 1922) made prominence in providing electricity in an affordable manner and the Act was silent when it comes to the provision of electricity to the majority of South Africans (Davidson, 2006).

2.2.2. Energy Policy after the 1994 Elections

The democratic government, post national elections in 1994 made dedications to ensure governance and authorities to uphold new democratic South Africa's Constitution including providing basic services to previously disadvantaged majority South Africans, who were grossly marginalised by the apartheid government (Davidson, 2006).

2.2.3. The White Paper on Energy

Economic and Development Review Committee (EDRC), developed the White Paper on Energy through series of stages including consultations and writings, followed by productions and approvals. These stages involved several stakeholder(s) forum(s), leading to a discussion document(s) as a basis for public comment, post a period for inviting public comment, a National Energy Summit was held and in 1998 the White Paper on Energy was introduced and issued preceded by the publication of the Energy Policy Discussion Document in August 1995 (Department of Minerals and Energy, 1998).

The White Paper on Energy was crafted to bring clarity on government policy on supply and consumption of energy in South Africa (Department of Minerals and Energy, 1998). "Free Basic Electricity (FBE), Free Basic Alternative Energy (FBAE) and a national electrification and housing

programme were part of the Energy White Paper” (Sustainable Energy, 2014:1). The Parliamentary Portfolio Committee held a sequence of public hearings, and which led to the publication of the final White Paper at the end of 1998 (Davidson, 2006:25). “The White Paper consisted of four parts: (1) context and objectives for energy policy, (2) demand sectors, (3) supply sectors, (4) cross-cutting issues” (Davidson, 2006:26). For the objective of this study, I will briefly explain the context and objectives of energy policy and the demand sector.

2.2.4. Context and Objectives for Energy Policy

The Energy White Paper acknowledges national energy and economic demands, whilst accommodating the global energy agenda and the requirements to identify suitable energy supply and use. (Department of Minerals and Energy, 1998).

“The following five policy objectives were agreed upon:

1. “Increasing access to affordable energy services.
2. Improving energy governance – clarifying the relative roles and functions of various energy institutions in the context of accountability, transparency and inclusive membership, particularly participation by the previously disadvantaged.
3. Stimulating economic development – encouraging competition within energy markets.
4. Managing energy-related environmental and health effects – promoting access to basic energy services for poor households while reducing negative health impacts arising from energy activities.
5. Securing supply through diversity – promoting increased opportunities for energy trade, particularly within the Southern African region, and diversity of both supply sources and primary energy carriers”

(Department of Minerals and Energy, 1998: 28-29).

Ziblim (2013) reminds us that South Africa subscribed to the UN Millennium Development Goals that sought to see the lives of 100 million people living in informal settlements around the globe

be sufficiently improved by the year 2020. With this and the new Sustainable Development Goals of 2015 we therefore have an obligation to improve our informal settlements. The South African Government aims to reach the “target of universal access (97%) to energy by 2025”, however, much work needs to be done before universal access is attained (Sustainable Energy 2014:37).

Energy poverty is defined as “lack of access to modern energy” (Kimemia and van Niekerk, 2017:2). However, there are various definitions and the South African Department of Energy profiles energy poverty among South Africa households using three approaches:

“(i) the energy poverty ratio that categorises an energy-poor household as one that 'spends more than 10% of their net income on energy procurement'; (ii) a subjective approach (based on household experiences and difficulty with the costs of their basic energy requirements); and (iii) an approach based on the thermal comfort levels of households relative to social needs, i.e. the physical state of dwellings that contribute to thermal efficiency” (Kimemia and van Niekerk, 2017:2).

“Energy poverty means the lack of access to modern energy” and is predominant “in dense low-income settlements predominantly found in developing countries, including South Africa” (Kimemia and van Niekerk, 2017:289). “The dirty fuels that the ‘energy-poor’ depend on are burnt in inefficient and on risky combustion devices, at times leading to health issues, burns and injuries” (Kimemia and van Niekerk, 2017:289).

2.2.5. South African Policy on Electrification

As implicitly stated earlier with regard to the Constitution of the Republic of South Africa and other government policies, it is the responsibility of Government to ensure that people living in the informal settlements are also provided with basic services as they form part of the country's society (Department of Energy, 2015). The objective of "Policy Guidelines for the Electrification of Unproclaimed Areas" adopted in 2015 is to provide clear guidelines about the electrification of informal settlements as part of the Integrated National Electrification Programme (INEP) (Department of Energy, 2015:7). The order of the court issued on the Constitutional Court of South Africa: Case CCT 43/09 in the matter between Joseph and others referred as applicants versus City of Johannesburg and others referred as respondents on the matter. was that "the termination of electricity supply to Ennerdale Mansions on 8th July 2008 is declared to be unlawful. The respondents were ordered to reconnect the electricity supply to Ennerdale Mansions forthwith" (Darries and Others verse City of Johannesburg and Others, 2009:41).

Approximately 10% of South Africa's population are living in urban informal settlements, meaning over 4.4 million people, and it should be taken into consideration that these figures are difficult to establish with any assurance as to accuracy and the likelihood is that they are much higher than reported (Gaunt *et al.*,2012). The "*Policy Guidelines for the Electrification of Unproclaimed Areas*" emphasise that municipalities need to arrange informal settlements according to the Table: 2.1 below, which shows the categories that are followed when electrifying the informal settlements.

Table 2.1: Electrification Categories of informal settlements in South Africa

Source: The table has been reproduced from Department of Energy (2015:10).

Category	Condition/ status	Response
Category 1:	On suitable land (complies with the set criteria and is likely to go through <i>in situ</i> upgrading)	Will be subsidised for electrification.
Category 2:	Settlements that do not need immediate relocation and will therefore go through the process of regularisation which is pre-formalisation (putting in basic services with plans to relocate in future)	Will be subsidised if the settlement will not be relocated in the next 3 years.
Category 3:	On unsuitable land (do not comply with the set criteria, areas such as those on dolomitic land, in toxic areas, or in a dangerous area) and in need of relocation	Settlements that have been there for a reasonable amount of time will be considered on a case by case basis upon application to the Department.

2.2.6. Energy Policy Challenges

Governments around the globe lack the financial resources, the institutional capacity, and often the political will required to extend coverage of basic services to informal settlements (Narayanan *et al.*, 2017). The ever rising urban growth, according to Gaunt *et al.* (2012:2), is one

other major task for electrification, which is “mostly unplanned because the demand exceeds the capability of existing national and local government to proactively implement infrastructure consistent with the rates of population growth and urban migration in South Africa”.

According to Kovacic, Smit, Musango, Brent and Giampietro (2016:12), existing drawbacks in electrification of informal settlements are as follows:

“(i) technical issues associated with grid expansion and service provision in low density areas (ii) the impact on the load profile and difficulty in estimating energy demand in illegal settlements and (iii) securing revenues for utility providers from informal settlement dwellers”.

2.3 The 1994 White Paper on Housing

The Constitution of the Republic of South Africa Section 26 of 1996, preserves everyone’s right of access to suitable housing (SERI, 2011:8). To this date, housing is still a major problem, even though the government has provided “2.3 million housing units to nearly 11 million people. South Africa still has a housing crisis” in providing houses to the ever-growing number of people waiting for houses and lacking basic services is also a standing problem (SERI, 2011:8).

As a result of huge backlogs in housing, the “StatsSA’s 2009 General Household Survey reported the following:

- The Western Cape has 134 000 households living in shacks in informal settlements,
 - The KwaZulu-Natal has 176 000 households living in shacks in informal settlements
 - The Gauteng has 481 000 households living in shacks in informal settlements”
- (SERI, 2011:36).

The White Paper on Housing states that:

“despite the constraints in the environment and the limitations on the fiscus, every effort will be made in order to realise this vision for all South Africans whilst recognising the

need for general economic growth and employment as well as the efforts and contributions of individuals themselves and the providers of housing credit, as prerequisites for the realisation thereof” (Department of Housing, 2005:19).

The White Paper on housing, adopted by the African National Congress (ANC) led government after the 1994 democratic elections, was the first post-apartheid housing policy. It sought to:

“...create viable, integrated settlements where households could access opportunities, infrastructure and services, within which all South African people will have access on a progressive basis, to: (a) a permanent residential structure with secure tenure, ensuring privacy and providing adequate protection against the elements; (b) portable water, sanitary facilities including waste disposal and domestic electricity supply” (Department of Housing, 2015:19).

In 1996, the democratic Government endorsed and launched an economic strategy named Growth, Employment and Redistribution Strategy (GEAR) (Robbins, Aiello, Goodenough, Hadingham and Klug, 2005). “GEAR was aimed to strengthen economic growth, to broaden employment, and to redistribute economic opportunities” (Robbins et al. 2005: vii).

Post five years of GEAR inception, the structural alterations achieved the aims, but resulted in consequences of considerable losses in the formal employment in both private and public domains, which resulted in the reduction of resources available to respond optimally to the rising social needs (Robbins et al. 2005). Nevertheless, most recently a long-term social benefits of GEAR has been realised and evidenced by alarming budgeting allocations to social development, and relative inflation (Robbins *et al.* 2005).

In the efforts to reduce poverty alleviation, and the redress of the past imbalances from apartheid regime, the democratic government through the Department of Provincial and local government released and produced Urban and Rural Development policy guidelines frameworks in and around infrastructure, housing and local economic development, in 1996 (CISR, 2002).

“The MIG is an infrastructure transfer mechanism and is aimed at making the system of transfers to municipalities more efficient, designed to support the capital budgets of municipalities, and to facilitate integrated development planning” (Robbins *et al.*, 2005:12). “The Municipal Infrastructure Grant (MIG) allows government to expand and improve the quality of service delivery relating to water provision, sanitation, roads, solid waste and electricity (lighting)” (Robbins *et al.*, 2005:12). The MIG is set to enable the merger on the following Municipal Infrastructure:

“Consolidated Municipal Infrastructure Programme, in support of internal bulk, connector infrastructure and community facilities to poor households; Electrification funding, in support of addressing the electrification backlog of permanently occupied residential dwellings that are situated in historically undersupplied areas” (Robbins *et al.*, 2005:12).

The recent positive judgement on Upgrading of Informal Settlement Programme (UISP) of Slovo Park settlement, it is a beacon hope for the Msawawa and Kya Sands communities, to mention a few. The Acting Judge Strauss instructed the Gauteng Government to apply for the funding as per the terms of the Upgrading of Informal Settlement Programme (UISP) which is found in National Housing Code of 2009 (SERI, 2018:1). This judgement came after 20 years of uphill battle between Slovo Park Community Development Forum (SPCDF), the Socio-Economic Rights Institute of South Africa (SERI), versus City of Johannesburg, City Power, and provincial and national government officials from the Department of Human Settlements (Seri-sa.org, 2018:1). The Acting Judge Strauss mentioned that the UISP was binding on the City and that its decision “to completely ignore” the policy was “unreasonable”, “not inclusive” and in breach of the housing rights of the Slovo Park residents (Seri-sa.org, 2018:1).

Figure 2.2 below illustrates the budgeted expenditure on infrastructure in the South African municipalities.

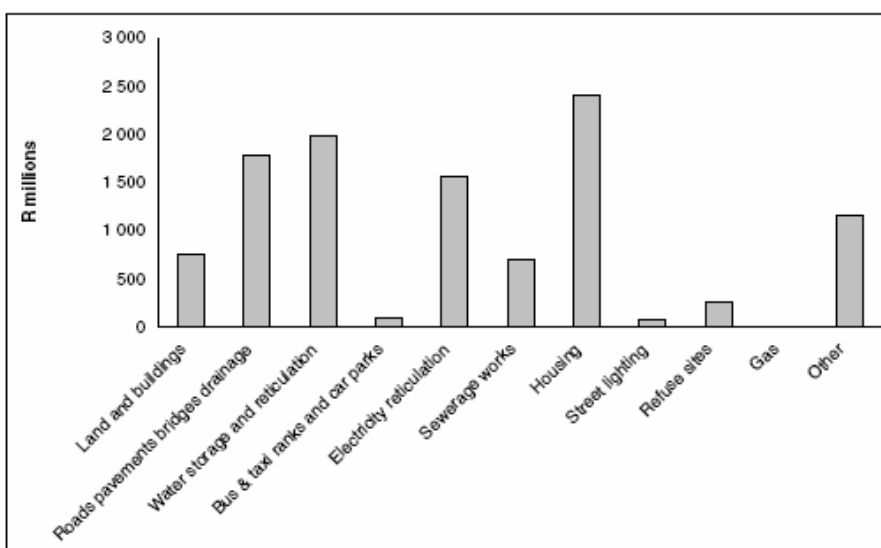


Figure 2.2: Total budgeted expenditure on infrastructure in South Africa municipalities

Source: Reproduced from National Treasury Intergovernmental Fiscal Review, (2004:23).

2.4 Shack Fires

Globally, fires cause over 300 000 deaths annually and are the fourth largest cause of accidental injury after road accidents, falls, and drowning (*ibid*). Twigg, Christie, Haworth, Osuteye and Skarlatidou (2017:1) maintain that approximately over 95% of mortalities and burn injuries take place in the in low- and middle-income countries. South Africa is no different from other countries that have informal settlements when it comes to shack fires. There are many root cause of shack fires. However, sources of energy that are used in the informal settlements due to absence of electricity remain the main problem (Murray, 2009). Twigg *et al* (2017) proceed to articulate that a high percentage of urban population lives in low-income and informal settlements which are frequently densely inhabited, and have a high susceptibility to fires (Twigg *et al.*, 2017).

They argue that in the informal settlements, fires can start and spread easily due to a number of reasons, including cooking using open fires or using unbalanced stoves, use of combustible fuels which are highly flammable, unsafe and or informal electrical connections, lack of knowledge of safety precautions, alcohol intoxication which lead to drowsiness when cooking usual late at night, overcrowding and high building density which in the case of fire results in the inability of fire services to bring fire-fighting equipment through narrow manmade passages (*ibid.*).

The incidences of fire both internationally and nationally in informal settlements remain high and the main cause is lack of formal electrification in the informal settlements (Twigg *et al.*, 2017:2). In South Africa, an informal settlement in Cape Town called Joe Slovo experienced shack fires in successive years (2005, 2008 and 2009) and over 3600 homes were destroyed over this period. Similarly, in Valparaiso, Chile, “in 2014, 2500 homes were destroyed by fire and the most affected was the informal settlement in hillside ravines” (Twigg *et al.*, 2017:2).

The Gauteng legislature in 2015 deliberated about shack fire incidences in Gauteng Province. This revealed that a total of “7 518 shacks have burnt down in Gauteng in the three years from 2012 to 2015” (Randfontein Herald, 10 June 2015:1). Most incidences of shack fires took place in the informal settlements in areas of Emfuleni, Johannesburg and Ekurhuleni. The breakdown on shack fires incidences as reported by the Gauteng Province was as follows:

- Emfuleni: 2 316
- Johannesburg: 2 246
- Ekurhuleni: 1 538
- Tshwane: 982
- West Rand District: 319
- Midvaal: 64
- Lesedi: 53

(Randfontein Herald, 10 June 2015:1).

The Gauteng Province currently provides short term relief to shack fire victims, by providing blankets, food parcels and bringing in mobile units from the Department of Home Affairs to assist with identify documentation (Randfontein Herald, 10 June 2015). The mitigating factors that are to be rolled out by the Gauteng Province, to all municipalities in the Province, to fight shack fires is through the use of fire fighting devices, and the following initiatives by Gauteng Provincial Management Centre (GPDMC) will be implemented:

- “Fire hydrants in the formalized informal settlements,
- Creation of space between informal dwellings, including firebreaks, and
- Smoke detectors given to each informal dwelling”

(Randfontein Herald, 10 June 2015:1).

Honourable Bloom, a DA representative and a member of Gauteng Legislature, welcomed these initiatives but he felt that instead of tents being provided, housing material should be provided by the GPDMC, to rebuild shacks, as had been done in Cape Town. Honourable Bloom appealed to Premier Makhura, “To give a higher priority to helping people rebuild their lives after terrible shack fires” (Randfontein Herald, 10 June 2015:2). Figure 2.3 provides evidence of the trauma and impact of shacks burning to the ground.



Figure 2.3: Shacks burning to the ground. (Source: Reproduced from Randfontein Herald, 10 June, 2015:1)

2.5 Sources of Energy

Energy is power derived from the utilisation of physical or chemical resources, especially to provide light and heat to work machines; one example is when panels turn solar energy into electricity (Singh, Wang, Mendoza and Ackom, 2014). Approximately 1.3 billion people around the globe still lack access to electricity, and 2.6 billion do not have access to clean cooking facilities (*ibid.*). The Department of Environmental Affairs (2001) mentions similar challenges as Singh *et al.* (2015) related to lack of access to electricity. In particular, it leads to informal settlements and rural communities practising alternative sources of energy which more often than not are harmful and dangerous (Singh *et al.*, 2015).

Regarding South Africa, Lloyd (2014) comments that low-income households are still using traditional sources of energy. He points out that on the Highveld these involve mainly the use of coal, in coastal regions mainly paraffin, and in rural areas predominantly wood (*ibid.*). Narayanan, Rajan, Jebaraj, and Elayaraja (2017) estimate that globally 828 million people, or 33 per cent of the urban population in developing countries, reside in informal settlements without access to basic services such as electricity. In most countries, including South Africa, government agencies have a responsibility to provide access to basic services such as water, sanitation, and electricity. Yet, the provision of these services remains a challenge in most informal settlements (Narayanan, 2017).

According to Singh *et al.* (2014:341), the Global Energy Assessment (GEA) defines 'energy access' as "the affordable and stable services of cleaner energy options that are delivered in a reliable fashion and ensure consistent quality". This definition of 'energy access' would not embrace traditional sources of energy, given that Lloyd (2015) associates the use of traditional sources of energy with chronic respiratory tract infections, suffocation by carbon monoxide and massive fires that destroy not only homes but also lives.

The urban population growth worldwide is increasing at an alarming rate. This results in high demand for energy access, which has long exceeded the supply (Singh *et al.*, 2015). Figure 2.4 shows that the population growth concentrates in regions that are regarded as poor. It is also estimated that by 2050 least developed regions will account for over 80% of urban population growth (Singh *et al.*, 2015).

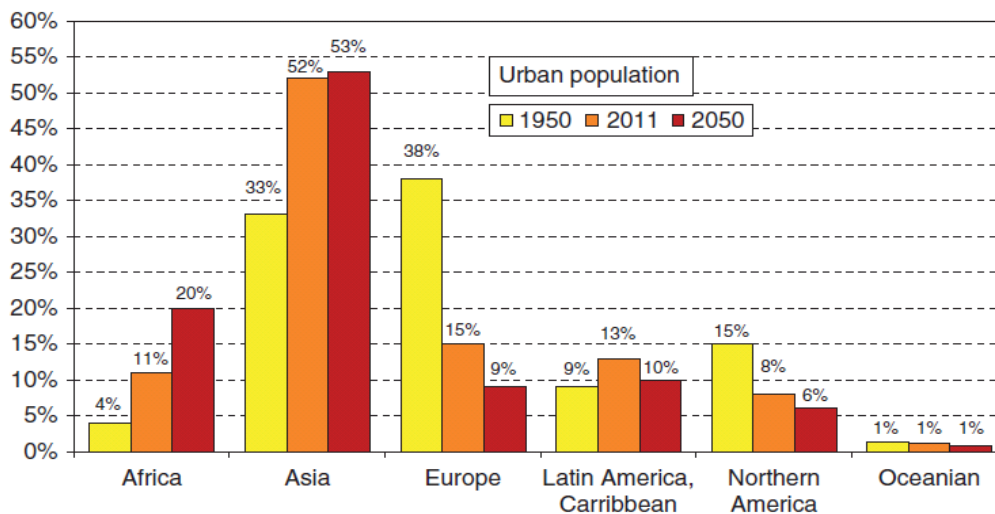


Figure 2.4: Distribution of the world's urban population by major area.

Source: The graph has been reproduced from Electricity (in) accessibility to the urban poor in developing countries (2015)

Figure 2.5 below shows the sources of energy which mainly include electricity, coal, paraffin, candles, wood and natural gas (gas) (Department of Environment, South Africa, 2001). In 2001, it was reported that approximately 2.5 million households used candles for lighting and approximately 737 000 households used paraffin and, on average, 25% of households used wood fuel for cooking and heating and while approximately 18% used paraffin for the aforementioned purposes and only 11% of households used coal (*ibid.*). This highlights the significant number of people who still rely on wood, coal, and paraffin for their energy needs due to lack of electricity access in the informal settlement they reside at.

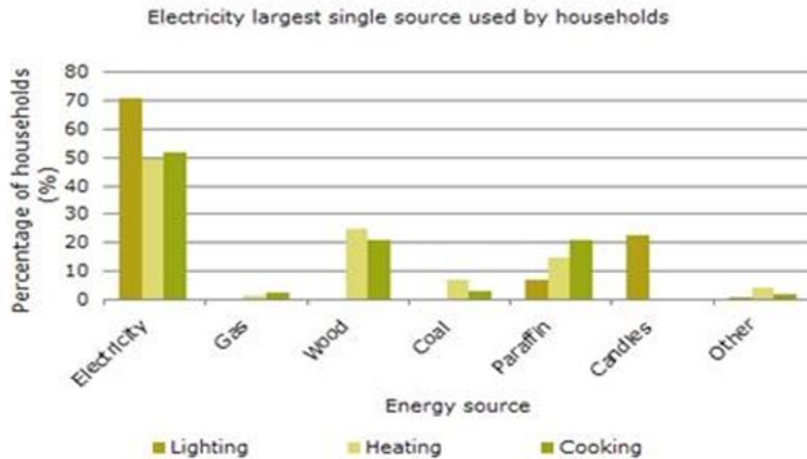


Figure 2.5: Energy source by household for lighting, heating and cooking, illustrating types of source of energy in 2001. South Africa.

Source: The graph has been reproduced from Department of Environmental Affairs (2001)

2.6 Energy Practices

Energy practices are the actions that influence how energy is used. I will focus on electricity, coal, gas and paraffin energy practises for the purpose of this study. According to Moagi (2015:92), it is predicted that the energy practices in a typical urban household in “South Africa to be 41% on cooking, 32% water heating, 12% space heating, 10% refrigeration and entertainment and 5% lighting”.

Regarding the national based statistics, Ntsoko (2016:1) found that the percentage of households that uses electricity for cooking increased from “58% in 2002 to 78, 1% in June 2015”. Alongside this, the use of paraffin and firewood dropped. Paraffin declined from “16, 2% in 2002 to 5%, and to 4% in 2015,” while the percentage of households that used firewood decreased from “19, 3% to 9% in 2002, and 3% in 2015” (Ntsoko, 2016:1). The percentage of households that used gas increased from 2, 2% in 2002 to 3% in 2002, and 5% in 2015 (*ibid.*). Please see the Table 2.3 on the next page.

Table 2.2: Energy Practices in Percentages between 2002 and 2015

Source: The table has been created by the author based on national statistics in Ntsoko (2016)

	Year	Percentage (%)	Year	Percentage (%)
Electricity for Cooking	2002	58%	2015	78,1%
Paraffin	2002	16,2%	2015	4-5%
Households using firewood	2002	19,3%>9%	2015	3%
Households using Gas	2002	2,2%<3%	2015	5%

Electricity as the source of energy is the leading energy practice in urban areas (Singh, 2015). The fast-tracked electrification of households in South Africa after 1990, which over time has attained over 95% of urban settlements, did not eradicate the burning of solid fuels for heating and cooking purposes in the informal settlements (Makonese, Masekamani, Annegarn and Forbes, 2017). Msawawa and Kya Sands are concrete examples of informal settlements that to date do not have formal electricity supply.

2.7 Electricity

There are three sectors of electrification namely: “rural electrification, formal urban electrification and the electrification of informal urban settlements” (Gaunt, Salida, Macfarlane, Maboda, Reddy and Borchers, 2012:1). A study by Gaunt *et al.* (2012) focuses on the household sector in South Africa, which is growing at a relatively fast rate, and the provision of proper housing is failing to keep up with the demand (Gaunt *et al.*, 2012).

The state intervention for providing free basic electricity proved to be expensive to the state and it does not contribute to a better solution, most especially to informal settlement dwellers whose homes have no formal electrification (Lloyd, 2014). It is, however, confusing

as to why the state is not implementing its policies drawn from the Department of Energy, which states that the state shall install electricity into every household regardless of social standing and location. This part of the electrification policy dealing with subsidies has been discussed in this chapter under government initiatives and policies.

South Africa is one of the most electrified countries in Africa, however, there is still more work that needs to be done in electrifying the informal settlements. According to the (2011) national census figures and DoE 2013 survey, “87%” South African households have access to electricity. This figure was based on those using electricity for lighting and includes approximately “1.1 million” households that are not formally connected to the grid. According to the national census (2011), the proportion of electrified households declines from 87% to 77% when this figure is added to the 2.2 million households not receiving electricity (Sustainable Energy, 2014:40).

Table 2.2 below shows the electrification backlog in South Africa from each province. The figures illustrate the impact, and forecast that the government will face challenges in accomplishing its “target of 97% electrification by 2025” (Sustainable Energy, 2014:37). It also highlights the challenges in the data and the problems the Integrated National Electrification Programme (INEP) programme faces (Sustainable Energy, 2014).

The ever-increasing electrification costs and limited available funding plays a significant role in hampering the government’s goal of providing universal access to electricity. The impacts on the electrification of informal settlements was also affected as “the DoE’s stated policy approach is such that they will not ‘double fund’ an electrification project” (Sustainable Energy, 2014:39). The double funding means that the DoE will only fund the electrification of a settlement once in their lifetime. When it happens that they be relocated into and new area the DoE will not fund the installation of electricity of the same settlement in a new permanent area. (Sustainable Energy, 2014:39).

Table 2.2: Electrification backlogs per province in South Africa

Source: Reproduced from Sustainable Energy, (2014).

PROVINCE	PROJECTED HOUSEHOLDS	BACKLOG (FORMAL HOUSES)	% ACCESS ON FORMAL HOUSES	BACKLOG (INCLUDING INFORMAL HOUSES)	% ACCESS ON INFORMAL HOUSES
Eastern Cape	1 725 713	437 874	74,65	613 113	64,47
Free State	855 508	107 043	87,49	200 435	76,57
Gauteng	3 370 177	412 816	87,75	878 725	73,93
Kwazulu Natal	2 510 605	527 997	78,97	829 737	66,95
Mpumalanga	910 505	124 467	86,33	214 409	76,15
Northern Cape	283 663	23 255	91,80	44 397	81,35
Limpopo	1 293 462	157 807	87,80	270 877	79,06
North West	879 888	73 942	91,60	157 419	82,11
Western Cape	1 401 279	42 178	96,99	212 552	84,83
TOTAL	13 230 800	1 907 379	87,04	3 421 664	76,52

2.8 Coal Energy

In the central Highveld part of South Africa, the combustion of coal in open braziers (stoves, Figure 2.5 below) is among the largest sources of particulate matter (PM).

“In South Africa, particularly on the interior Highveld plateau, combustion of coal in open braziers is among the largest sources of PM and black carbon emissions. Coal is still used as a primary cooking and heating fuel for the majority of the population. There are two ignition methods for lighting a coal fire, namely the traditional bottom-lit updraft (BLUD) method and the reduced smoke top-lit updraft (TLUD) method, locally known as the *Basa njengo Magogo* (BnM)” (Makonese *et al.*, 2017:3).

Coal as a source of energy is still used as a principal cooking and heating fuel for most of the poor population (Makonese *et al.*, 2017). Lloyd (2014), in agreement with Makonese *et al.* (2017), notes that in the Highveld area of South Africa, which includes most of Mpumalanga, Limpopo, Gauteng, North West and Free State and some parts of KwaZulu-Natal, coal is widely employed among the poor for cooking and space heating. The poorest make use of braziers (*imbaula*), a metal drum with a simple grid to support the coal, and holes in the side of the drum to admit air. The *imbaula* are illustrated in Figure 2.6 below.

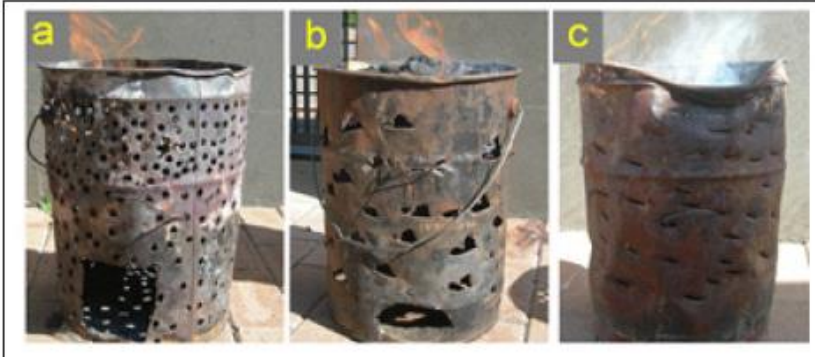


Figure 2.6: Photographs of braziers (*Imbaula*) Source: The photo has been reproduced from Emission factors of domestic coal-burning braziers. Source: Reproduced from (Makonese *et al.*, 2017:2)

The *imbaula* is ignited outdoors and allowed to burn until it has almost ended smoking and it is mostly blazing. It can be used outdoors or indoors for cooking, and finally is taken indoors for heating at night (Lloyd, 2014). However, there are health risks related to this practice. The burning of solid fuels releases harmful products such as carbon monoxide, particulate matter, and volatile organic compounds (Makonese *et al.*, 2017). It has been reported that 3 billion people worldwide are exposed to harmful emissions from burning solid fuel such as coal (Makonese *et al.*, 2017).

The World Health Organisation (WHO) in 2012 reported that approximately 4.3 million people globally died prematurely due to household air pollution (World Health Organisation, 2012). In the 1990s in the Highveld regions, especially in Soweto during winter months, no three weeks would pass without a newspaper reporting a loss of at least three family members who died accidentally from inhaling *imbaula* fumes in their sleep at night (Lloyd, 2014). The *imbaula* emits as much as 1600ppmv (parts per million by volume) CO (2000mg/m³) (milligram per cubic meter), which is above acceptable levels, where fatalities are said to occur (Makonese *et al.*, 2017).

2.9 Paraffin Energy

In areas where it is a challenge to find coal due to limited supply, for example coastal areas, paraffin (kerosene) is the preferred urban choice of fuel. It is used, like coal, primarily to burn stoves for cooking, warming water and heaters (Lloyd, 2014). It is estimated that about 400 000 tons of paraffin is sold per year, and an ordinary user is estimated to be purchasing 5 litres per month. There are numerous hazards associated with the use of paraffin, and all are fatal (*ibid.*). The main challenge is that paraffin is sold mainly in 1 or 2 litres of old cold drink containers and young children confuse paraffin in such bottles with cool drinks and would accidentally drink paraffin. The consumption of paraffin by young children often leads to pneumonia because paraffin attacks the lining of lungs and this may result in death (Lloyd, 2014).

Paraffin stove designs are usually produced with many defects, which are associated with factory faults. Once the defectiveness manifests, the situation becomes extremely hazardous, which can lead to strong and uncontrollable fires (Lloyd, 2014). Under normal circumstances paraffin burns at a high enough rate to give an output of over 1MW (Mega Watt) and at this rate the temperature inside the shack can be well above 400°C within 40 seconds. At such a level of heat a shack can be destroyed within 15 minutes (Lloyd, 2014). The strong heat can easily ignite nearby structures and spread out to several other buildings. Lloyd, (2014) states that even though there is no tangible statistics it is estimated that between 50 000 and 100 000 homes are destroyed by fire annually in the South African informal settlements.

Kimemia and van Niekerk (2017) state that paraffin stoves are most common, dangerous and harmful energy appliances and predominantly used by the poor and are the sources of fires and burn injuries. To avert incidences and accidents caused by paraffin stoves and heaters that are “non-pressured, in 2006 the SABS (South Africa Bureau of Standards) established a national standard for non-pressure paraffin stoves and heaters” which was to be declared a compulsory specification for users (Kimemia and van Niekerk, 2017:290).

However, there are a few “wick-type paraffin stoves that have been approved for manufacturing and distribution in South Africa” and they are not meeting the SABS requirements that certify the safety for domestic usage (Kimemia and van Niekerk, 2017:290).

In Fig 2.7 below is the image of (A) New paraffin stove – note the fuel leak. (B) In-use stove with a damaged self-extinguishing mechanism and flame snuffer.

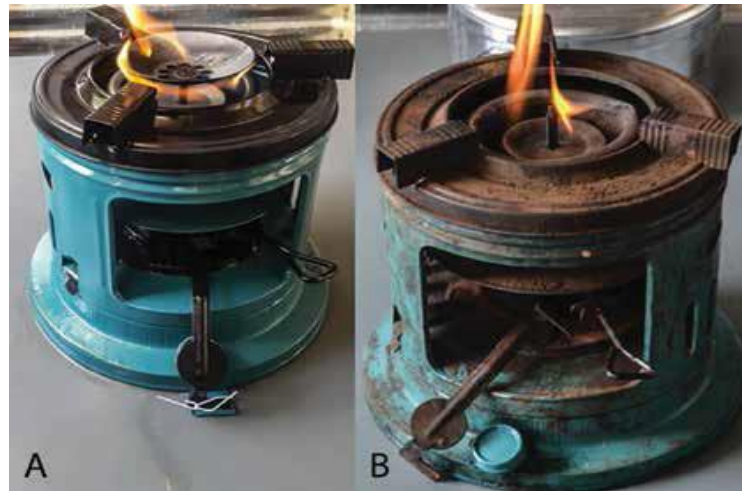


Fig 2.7. (A) New paraffin stove – note the fuel leak. (B) In-use stove, with a damaged self-extinguishing mechanism and flame snuffer. (Source: Reproduced from Kimemia and van Niekerk, 24th September 2017: 290).

2.10 Universal Access to Energy

The South Africa government has incorporated a universal access approach to energy for households, establishing a target that will assist in achieving universal access to energy by 2025 (Sustainable Energy Africa, 2014). The universal access will incorporate modern energy, for example electricity and other types of renewable energy. However, sources of energy like paraffin, candles, and firewood are not going to be included (Sustainable Energy Africa, 2014). There are two important aspects leading into access to electricity, 1) the number of households connected to electricity, and 2) the affordability of that electricity. The

government had to implement policies to address the two factors that may hinder access to electricity (Sustainable Energy Africa, 2014).

2.10.1 Integrated National Electrification Programme (INEP)

The main aim of the Integrated National Electrification Programme (INEP) was to distribute electricity to as many households as possible, most especially to those in poor communities. The government recognised that due to infrastructure and electricity generation constraints, rural/urban migration and increasing growth rates in households' electricity demand that the goal of universal access would be difficult to achieve within the initial timeframe. (Sustainable Energy Africa, 2014).

2.10.2 Free Basic Electricity Policy (FBE)

The government anticipated that not all poor households will benefit from free basic services due to the backlog in electrification of some informal settlements. The Free Basic Alternative Energy (FBAE) policy was introduced in 2007, with the objective of providing indigent households with "R56.29 per month of alternative fuels/ technology such as paraffin, Liquefied Petroleum Gas (LPG) and other energy forms considered appropriate by the municipalities" (Sustainable Energy Africa, 2014:49). The number of households benefiting from FBAE is small and this policy was never intended for Metropolitan municipalities, it was only meant for rural households. Municipalities are finding it hard to roll out FBAE as it is very difficult to administer and monitor and human capital is a challenge (Sustainable Energy Africa, 2014:49).

It is noteworthy to mention that the available data is not reliable, and this is partly due to varied approaches employed by municipalities in defining indigent households as well as implementing FBE (Sustainable Energy Africa, 2014:40). Other local and metropolitan municipalities make use indigent database to determine the recipients of FBE, while other municipalities provide FBE based on electricity consumption thresholds, "for example using less than 450kWh per month, enables a household to be eligible for FBE" (Sustainable Energy

Africa, 2014:40). The difference in definition and implementation approach by municipalities has resulted in not all poor households being classified as indigent or in all cases receiving the benefit. The affording households also benefiting from FBE because of their low electricity consumption levels. (Sustainable Energy Africa, 2014:41).

2.10.3 Inclining Block Tariff (IBT)

In 2010 National Government, National Energy Regulator South Africa (NERSA) introduced the IBT with the intention of using sliding scale electricity. The aim was to protect low income electrified households from the expensive electricity prices and enhance efficient use of electricity in high income households. However, only Eskom and 30% of municipalities have implemented IBT, the other municipalities went ahead to use a flat billing system (Sustainable Energy Africa, 2014).

It should also be considered that many of the poorest households in the country do not have access to electricity. They are unable to access the intended pro-poor benefits of the IBT. At the same time, municipalities were losing revenue from the high earning households who were taking advantage of the sliding scale by reducing their energy consumption (Sustainable Energy Africa, 2014).

Although it was meant to be a pro-poor policy instrument, the IBT is placing poor households in a less favourable position. In cases where multiple households share a single meter for example backyard dwellers, they may be paying high electricity prices due to the fact that they are in a higher electricity consumption blocks, and this prove to be unjust the poor customers (Sustainable Energy Africa, 2014:51).

The impoverished households in the in South Africa do not have access to electricity; therefor they are unable to access the intended pro-poor benefits coming with IBT implementation. Experience has shown that the low-use customers targeted for cross subsidies in this policy do not always correlate with the poor households that most require cushioning from the rising cost of electricity. IBTs is a subsidise for affording customers and irregular users of electricity such as customers who own “holiday homes” (Sustainable Energy Africa, 2014:51).

2.11 Conceptual Framework

Conceptually, this study gives prominence to policy as part of the context of informality. Particular policy concepts are the provision of electricity and the upgrading of informal settlements, alongside rights and obligations as determined in applicable policies.

In the analysis, the concept of grassroots practices, in particular energy practices are the main focus. This relates to living experiences at individual and household level as well as the collective strategies that informal settlement leadership develops and applies.

The literature review has provided key understanding of applicable concepts and provisions in policy, while also providing insight into what is known about energy practices on the ground, as well as the vulnerabilities and hazards. This has helped define the way that I engage with poverty in the two informal settlements.

2.12 Conclusion

Electricity as a source of energy has not been distributed fairly to all South African citizens. This can be confirmed by referring to the White Paper of 1998 on energy policy. During the apartheid era the energy policies had only served the minority of South Africans and the apartheid government also was more focused on energy segregation than anything else. When the democratically elected government took over in 1994, its mandate was to redress the ills of the past and this process necessitated policy reviews. Energy policy was among the urgent policies that needed to be reviewed and rolled out on an urgent point of view. The democratic government, in the period between 1994 and 1999, established the National Electrification Programme and this was followed by the White Paper on energy and energy guidelines for unproclaimed areas.

However, in spite of all the initiatives and milestones that have been attained in providing electricity to all South Africans, a backlog still remains, mostly in the informal settlements surrounding Metropolitan cities. As a result, several of South Africa's poor communities are still using alternative sources of energy due to absence of electricity installation in their residential areas. The use of alternative sources of energy other than electricity is dangerous and hazardous; for example, paraffin and candles are the main sources of shack fires and health complications when consumed. Coal as the energy source, is also hazardous for respiratory functioning when people are regularly or excessively exposed to it, and the *imbaula* fires are made from coal and *imbaula* have in the past years taken many of innocent lives, through inhalation.

It is therefore relevant to examine the plight of households in response to absence of electricity supply in the urban informal settlements.

Chapter 3: The physical and policy context of the two informal settlement cases

3.1 Introduction

This chapter contextualises the study in Msawawa and Kya Sands informal settlements, which are located within the City of Johannesburg (CoJ). The focus will be on their geographic location and policy context.

Misselhorn (2008) provided the following overview of informal settlement population in 2008. In the mid-1990s South African cities, notably the six metropolitan areas, were undergoing fast urbanisation. It had been calculated in 1994 that an annual growth of new households was at a minimum of one hundred and fifty thousand (150 000) units. The 2001 census gave the number of households in informal settlements as 1 376 706 or approximately 5.23 million people, representing 12% of the then population. “The 2007 Community Survey claimed that there was a drop in the percentage of informal dwellings from 12.3% in 2001 to 9.7% in 2007. The year 2004, the State of the Cities Report (2007) reported close to the 1.1 million households without access to formal houses” (Misselhorn, 2008:14). The above figures advocate some disparity in the informal settlements. Klug and Vawda (2009) put forward the following possible reasons for this:

- “Research from the municipalities is conducted differently from national surveys. For instance, in Cape Town the number of informal settlement households was estimated at 65,113 by the 2004 General Household Survey, whereas the City estimated it at 94,972.
- Actual dwelling units are counted, and not the households or families within a dwelling unit.
- Statistics South Africa’s data is based on those willing to identify themselves. In many of the urban centres there is a high level of foreign migrants who refuse to be identified fearing this would lead to punishment and repatriation”

(Klug and Vawda, 2009:38).

The National Development Plan 2030 emphasises that the migration of people from rural to urban areas is not necessarily due to bad rural policies but to the wide range of opportunities in the cities (Department of Planning, Monitoring and Evaluation, 2012). Most migrants first reside in the informal settlements because of the low cost of living in these areas. It is not guaranteed that migrants from rural areas and small towns will immediately find jobs in the cities and move out from the informal settlements (Department of Planning, Monitoring and Evaluation, 2012). During the early 1990s the migrants would stay a minimum of two to four years in the informal settlements before settling in better conditions. However, this time span has since increased to 10 years and above (Department of Planning, Monitoring and Evaluation, 2012).

3.2 Msawawa and Kya Sands Geographic Location

The three spheres of Government, namely National, Provincial and Local, are to ensure that people residing in the informal settlements are also provided with basic services because they, too, are part of the South African society and have rights to a decent life (Department of Energy, 2015:3).

Msawawa and Kya Sands are in Region A, which is in the north-eastern part of the CoJ. Informal settlements are estimated at 189 in Johannesburg with a probable “180 000 households and a collective population exceeding 500 000” (City of Joburg, 2018:1). Indicators show that 10 000 migrants arrive in Johannesburg every month from different parts of South Africa and the rest of the continent in search of better financial opportunities. This kind of migration puts pressure on the CoJ, which is expected to provide basic services such as electricity, water, sanitation and refuse removal, as well as housing, roads and other infrastructure (City of Joburg, 2018).

According to the City’s electricity utility, informal settlements account for 13% of power losses in Johannesburg because of informal electricity connections (CoJ, 2016). The focus of electrification in the informal settlements is primarily to achieve three main objectives: to stop unnecessary electrocutions (the injury or killing of someone by electric shock), to restore

people's dignity and to regularise power supply and prevent the loss of revenue caused by informal connections (CoJ, 2016). Most of CoJ's 189 informal settlements, except for those informal settlements which are scheduled to be moved, are to be electrified or put onto some power system at a cost of just over R1 billion. This important announcement was made by the CoJ member of the mayoral committee responsible for infrastructure and development (IOL, 10 May 2016). The relevant extract from the announcement was thus:

"We have discovered that people care more about electricity than housing. They are connecting illegally, not because they want to be spiteful about it, but because they have children who are attending school and need power to do homework and to stay clean and fed. We are losing money anyway, so by electrifying and putting in meters, at least we will be getting some revenue." (IOL, 10 May 2016:1).

In winter, residents living in informal settlements that are not formally electrified often perish from devastating fires caused by hazardous cooking and heating appliances. This means households' dignity is always challenged by shack fires which destroy their belongings and formal documentation, for example identity documents, passports and permit documents for foreigners. This further increases the difficulty of finding employment and imposes additional costs and time associated with acquiring new documents. The children are also affected with use of hazardous sources of energy, below is an extract observed from paediatric ward:

"The paediatric burn unit at Chris Hani/Baragwaneth hospital [in Soweto] is reputedly one of the best of its kind in the country. It is in this unit that one sees the true face of poverty. The beds are nearly always filled to capacity with children who have been burnt in ways that indicate that, had their parents had better life options, the injuries would have never occurred. The unit is particularly full during the winter months when families burn fuel to keep themselves warm" (Murray, 2009: 175).

Figure 3.1 below is a photo that was taken in Msawawa during the 15 November 2015 fires. Similarly, to the academic account in Murray (2009), Figure 3.1 gives a clear sight of the destruction caused by shack fires to property. The photo shows a mother with three children of which one is young enough to be at the back of her mother. Their belongings are scattered.



Figure 3.1: The photo gives a clear indication of the destitute caused shack fires:

Source: Reproduced from Sandton Chronicles, Msawawa 15th November 2015.

3.3 Overview of Msawawa

Twenty years ago, Msawawa was a private small holding on the banks of the Klein Jukskei River. It was there before most of Cedar Lakes (Lifestyle Estate) was built (Sandton Chronicles, 15 November 2015). According to Sandton Chronicles (2015), the area was a football field, and as people moved into the area to find work, shacks sprung up around this football field, which later was to be called Msawawa Informal Settlement (Sandton Chronicles, 15 November, 2015). The Sandton Chronicles author refers to this former football field (see Figure 3.2), which is now used as a waste dumping site and there also are some VIP toilets (portable toilets) placed in this former football field (Phalanndwe, 02 December 2017).



Figure 3.2: A former football field in Msawawa.

Source: Author's own photo, taken on 2nd December, 2017

Whereas it might have been a football field, where it is situated at present, Msawawa is on land that belongs to Mr. Deon Delport (Nenweli, 2015, citing an interview with Phalanndwe, local community leader in Msawawa). Msawawa is situated near the upmarket suburbs of Randburg, Dainfern and Fourways (Nenweli, 2015). The settlement was established after Kya Sands in 1999/2000. There have been continuous court battles resisting the landowner's attempts to remove the settlement (*ibid.*).

Since the land is privately owned, the CoJ mentioned to the Msawawa community leadership that it cannot provide much-needed improved basic services (*ibid.*), because the Msawawa settlement is earmarked for "relocation to a new development that will take place in Lion Park, Randburg, and approximately 15 kilometres away" (Nenweli, 2015:101). It is not known when this will take place as various promised dates have passed (*ibid.*). According to Nenweli (2015:101), "Msawawa informal settlement allegedly began with approximately 15 shacks in 2000, which increased to 501 shacks counted in 2004/05". The aerial photo map in Figure 3.3 below shows a few shacks on the left side of the small holding.



Figure 3.3: Msawawa's physical layout in 2003 (CoJ, 2014)

Source: Reproduced from Nenweli, 2015

“The shack numbers increased to 2 153 during the 2008/09 count undertaken by the local community” (Nenweli, 2015:101). This figure varies considerably with the estimate of approximately 1 500 shacks made by the City in 2010. The number was estimated to be approximately 8 000 in 2013 (while this seems to be an unrealistic figure, aerial photos in Figures 3.3 to 3.4 show the rapid growth) (ibid.).



Figure 3.4: Msawawa's physical layout in 2018 (AfriGIS (Pty) Ltd. Google, 2018)

The settlement attracted growth due to factors that include the opportunities for low-paid jobs in suburbs such as Dainfern, Randburg and Fourways. There is an under supply of low-income housing in the area, with little alternative to living in an informal settlement (Nenweli, 2015). Households settled in Msawawa because it was relatively peaceful at the time (*ibid.*). The settlement is densely developed, and it cannot grow outside the fixed boundaries of the erstwhile smallholding due to the walled nature of adjacent development on one side, and a river and a road on two other sides. The settlement could not grow onto the existing vacant land on the western and southern sides because it is privately owned, and the owners are continuously monitoring any form of invasion (*ibid.*).

Msawawa informal settlement has a collective leadership that took a decision that there will be no informal connections of electricity within the settlement. Therefore, Msawawa dwellers are relying entirely on off-grid electricity or fuel sources, which are paraffin, candles, gas, batteries and generators.

Due to the usage of paraffin, candles, gas and petrol for generators, Msawawa settlement is susceptible to fire (Weakley, 2012). This informal settlement was swept by fire in November of 2015. This destroyed more than 100 shacks and left many dwellers homeless. It was not the first instance of shack fires in Msawawa settlement. In 2014, approximately 15 shacks were destroyed when one of the shacks caught fire around midnight. There were no injuries and the officials urged communities to use their heating and lighting appliances with caution (IOL, 10 May 2014).

Lodge (2003) states that between 1994 and the start of 2001 over 1.1 million cheap houses eligible for government subsidies had been built, accommodating 5 million of the estimated 12.5 million South Africans without proper housing (Lodge, 2003). Over the past years, the Msawawa community has been promised some of these houses which have come to be known as Reconstruction and Development Programme (RDP) housing. Initially it was said that they would

be relocated to such houses in a nearby development called Cosmo City; but that promise did not materialise.

They were then promised to be relocated to the Lion Park development, which is further to the west of Cosmo City. The Msawawa community had already been given letters stating that they would be moving there (Sandton Chronicle, 16 November, 2015). However, relocation has not taken place and the community of Msawawa is still living in poor conditions and remains vulnerable to shack fires due to lack of electrification of the dwellings.

During my visits in both settlements, I noticed that more houses are now made of bricks and mortar, to avoid shack fires. Using bricks and mortar to build houses can be afforded by few residents, meaning that the majority of community members who cannot afford to do so are still vulnerable to shack fires.

3.4 Overview of Kya Sands

Kya Sands is an informal settlement located in Region A of the CoJ (Figures 1.3). It should be noted that some residents were placed in certain sections of the Kya Sands settlement by the CoJ, arguably giving those residents permission to live there (Weakley, 2012:1). Informal electricity connections are common in Kya Sands, and in addition, people depend on wood (leading to the destruction of trees in the vicinity), paraffin, plastic and coal as sources of energy. Kya Sands is divided into four sections (namely A, B, C and D as per figure 1.3). Sections A and D have no informal electricity connections while Sections B and C have many informal electricity connections. Figure 1.3 in chapter 1 is a map of Kya Sands showing all four sections. It is important to note that Sections A and D share similar conditions with Msawawa, as they have no electricity connection (Personal communication: Kya Sands Community Leader, 29 November 2017).

Randburg Sun (2016) reported that the residents of Kya Sands Informal Settlement have vowed to continue to connect informal electricity from the nearby suburb of Bloubosrand (Randburg Sun, 27 May 2016). The Kya Sands residents mentioned crime as a main factor for the connection of informal electricity after experiencing an increase in incidents of crime such as murders, housebreaking and robberies, which were possibly due to darkness at night (Randburg Sun, 27 May 2016). The ward 95 councillor had since proposed writing to the Speaker of the City, requesting that the Kya Sands informal settlement be formalised and streetlights be installed (Randburg Sun, 27 May 2016:1). At the time of my research, this had not had an impact.



Figure 3.5 Kya Sands' physical layout and boundary in 2018 (AfriGIS (Pty) Ltd. Google, 2018)

The Policy Guidelines for the Electrification of Unproclaimed Areas (Department of Energy, 2008) emphasises that municipalities need to arrange informal settlements according to the categories set out in Table 2.1. The policy guidelines are to be adhered to with the electrification of the informal settlements.

Both Msawawa and Kya Sands fall in the Table 2.1 category 3, even though Kya Sands can partly belong to category 2 because part of Kya Sands is semi-formal and has basic services inside their

yards, partly formalised by the municipality. When analysing the three categories of electrification of informal settlements, there appears to be nothing stopping CoJ from electrifying Msawawa and Kya Sands. Both settlements have been in existence for over 20 years and envisaged relocations were never carried through, and do not appear to be planned for in the immediate future. Twenty years is a reasonable amount of time, stipulated under “response” in category 3.

The informal settlements serve as a critical passage used by the poor to access the urban environment for employment opportunities at a very low cost. Msawawa and Kya Sands are very close to the industrial areas of the Northern Suburbs where unskilled and skilled people can gain employment while residing in the two informal settlements (Nenweli, 2015).

There are two important aspects leading to access to electricity, 1) the number of households connected to electricity and 2) the affordability of that electricity. The government had to implement policies to address the two factors that may hinder the access to electricity (Sustainable Energy Africa, 2014).

3.5 Conclusion

The chapter outlined the study area focusing on the spatial layout, socio-economic context and history of the City of Johannesburg where the two case studies are located, that is Msawawa and Kya Sands informal settlements. Little has been done to change the lives of Msawawa and Kya Sands community. Msawawa community has been residing illegally at the private property for over 15 years. All these years the government has not attempted to purchase the land for the Msawawa community. Unlike, Msawawa, Kya Sands land belong to CoJ. It should be noted that, the government is slow in providing improved basic services to informal settlements. The government has provided basic interim sanitation and water to both settlements; however, electricity installation has remained a challenge for both Msawawa and Kya Sands.

Chapter 4: Findings on the Impact of Non–Electrification of Msawawa and Kya Sands

4.1 Introduction

As mentioned, this study's focus is on the Msawawa and Kya Sands Households' collective responses to the absence of electricity supply in their settlements. Msawawa and Kya Sands households are the primary units of analysis. The fieldwork for my case studies took place in the two informal settlements over a period of 4 weekends in September and October 2017. The approach to the fieldwork was to interview 6 respondents in Msawawa and 6 in Kya Sands.

As already explained in Chapter one, in each of the two settlements, these consisted of 2 business owners, 2 ordinary residents and 2 community leaders. The total number of participants that were interviewed, for the purpose of this study, was 12 participants. It should also be noted that I do not use the participant's names for this study. Instead, I use codes as follows:

- A. Msawawa Business Owners = (MB1 and MB2), Kya Sands Business Owners = (KB1 and KB2)
- B. Msawawa Residents = (MR1 and MR2), Kya Sands Residents = (KR1 and KR2) and
- C. Msawawa Leadership= (ML1 and ML2). Kya Sands Leadership = (KL1 and KL2)
- D. Msawawa Leader (ML1) will also be referred to as "Sugar" which is a nickname of Mr. Itani Reckson Phalanndwe, who agreed that his name n be used in this research.

An illegal "electricity connection is considered illegal when it is made to the Eskom network without Eskom's permission" (Eskom, 2018:1). Good examples of illegal electricity connections are predominantly connected from "mini-substations or overhead pole with no permission from Eskom (Eskom, 2018:1). The term "illegal electricity connection", for the purpose of this study will be replaced by the acceptable term for this study namely, "informal electricity connection".

This chapter unpacks the themes and concepts that emerged out of the literature review and how they apply to Msawawa and Kya Sands. It also discusses additional themes that emerged from the participant responses.

4.2 An Analysis of the Interviews in Msawawa and Kya Sands

This section discusses the experiences and the views of the participants from Msawawa and Kya Sands. The analysis includes issues on shack fires, crime in Msawawa and Kya Sands due to absence of electricity, cost and inconveniences of not having electricity in the settlements and leadership outlook on the absence of electricity in the two informal settlements.

4.2.1 Shack Fires

On the 25th September 2017, I visited Msawawa Informal settlement as per prior telephonic arrangement with Mr Itani Reckson “Sugar” Phalanndwe who is a Chairperson of Msawawa Community Forum. I was given permission, as I have previously mentioned, by Mr Itani Reckson Phalanndwe to use his name for this research. For this research, I am going to use Mr Phalanndwe’s nickname “Sugar” and ML1 interchangeably. After a brief discussion, we walked into the informal settlement, and as we walked I looked for signs of recent shack fire incidents and did not find any. Sugar, who has been in the leadership of Msawawa for the past 5 years, explained that the last shack fire that was well covered by major media houses was in November 15, 2015. During our conversation, he mentioned that the shack fires, even though not regularly covered by the media like the one already mentioned, are one of the major challenges that community leaders have to deal with and that a month will not go by without an incident of shack fire.

“Shack fires destroy people’s belongings, most people here are struggling, and it is very difficult for them to replace their belongings. When your shack has burnt down you

have to rebuild your own shack and there is no government to assist with shack building material and it makes situation very bad for people who are not working” (Sugar, 24th September 2017).

There are three main causes of shack fires, which can be explained as follows:

Paraffin as an accelerator: Residents of Msawawa and Kya Sands agree that the main cause of shacks fires in their respective communities is paraffin. Paraffin is also the most used source of energy in both settlements, and these communities store large quantities of paraffin in their shacks for daily use. Business Owners from both communities confirmed that paraffin is the most used source of energy by the communities. The businesses in the settlements are holding large stocks of paraffin, which ranges between 250 litres and 450 litres.

“if we had electricity we’re going to have less of shack fires, remember that some of community members store large quantities of paraffin maybe 10 litres and sometimes more than 20 litres and candles in our houses” (MB2, 25th September 2017).

Informal electricity connections as a potential hazard due to exposed electric wires on the surface, children’s are the most exposed to this danger. It has been suspected that some of the shack fires, informal electrical connections are suspected to have played a certain role.

Primus stoves as a catalyst: This is a pressurised flammable hydrocarbon burner (i.e. paraffin) stove. The primus-stove are common in both settlements. It is likely that most people in both settlements have primus stoves in their shacks. A primus stove is associated with many shack fires and all participants from Msawawa and Kya Sands attested to this fact.

MB1 stated that the negative effects of primus stoves were experienced “...especially when people are drunk, they remember that they want to cook and light the primus-stove (paraffin stove). Because the person who is cooking is drunk, they will sleep while cooking and leave the

primus-stove unattended, the primus stove will fall to the ground and instigate fire” (MB1, 24th September 2017).

The City of Johannesburg (CoJ) has intervened through its Emergency Management Services (Fire Department); and has provided training to Msawawa settlement and some part of Kya Sands. KL1 assured me that the training is still ongoing for the other members who have not yet received fire prevention training. CoJ has not only provided training to the communities, they have also supplied community members with new types of safe primus-stoves free of charge. The only requirement was for the residents to attend the fire prevention training, and at the end of the training, the attendees would receive the said primus stove. The new improved type of primus stove automatically switches off, extinguishing the flame, when it falls onto the floor. The other improvement which contributes to safety is that the flame from the improved primus stove (Figure 4.1) burns soft when compared to the old primus stove.



Figure 4.1: A photo of Primus-stoves from left is the image of the new improved primus-stove.

Source: Author's own photo primus- stove, 24th September 2017.

ML2 came up with another perspective which he mentioned as a disadvantage of the new improved primus stoves. He mentioned that the flames of the new primus-stove is soft and weak when compared to an old primus stove and that it takes much more time to boil or warm water

when compared to the old primus-stove. He articulated that the people (users) have therefore lost faith in the improved primus-stove, because they have to wait longer in the morning to prepare bathing water before going to work or school. The disadvantage has made some community members to recall their old primus-stoves and this move has brought back the fear of shack fires.

The other challenge that was mentioned by KR1 and MB2 was that the fires spread easily and move from one shack to another, because the shacks are clustered together and or connected to each other. KR1 mentioned that the last fires which took place 3 to 4 years ago left her with nothing and the fires happened when she was at work. When one shack catches fire, fire will spread to other shacks. The pictures below (figure 4.2) illustrate how the shacks are clustered together in the informal settlements, pictures taken from Msawawa settlement and Kya Sands.



Figure 4.2 Photos of clustered and connected (linked together) shacks in Msawawa and Kya Sands, a possible fire hazard. Source: Author's own photo 24th September, 2017.

MR1 mentioned that about 7 to 8 years back the *imbaula* (braziers) were once a big problem when it comes to shack fires, most especially during winter months. However, the use of *imbaula*

has drastically declined and supplemented by the use of primus-stoves. He has been residing in Msawawa for the past 20 years and has experienced shack fires more than 5 times while residing in Msawawa. The Msawawa and Kya Sands residents agreed that the fires are no longer their main issue because they no longer occur as often as they used to in the past. Msawawa's leadership had agreed to participate in the fire prevention training provided by CoJ fire department and ongoing fire-safety awareness programme in the Msawawa settlement.

4.2.2 Crime in Msawawa and Kya Sands

This section describes the views and experiences of leadership, business people and residents of Msawawa and Kya Sands with respect to crimes which are perpetrated in both settlements as a result of non-electrification.

Leadership perspective on crime: The biggest challenge the two settlements are faced with is the high level of crime. ML2 went on to state that “*...crime is very bad my brother in this place, you can't enter Msawawa when is dark (sic)*” (ML2, 25th September 2017).

The comments from the leadership from both settlements were that of the difficulty they are faced with due to high levels of crime at night. They mentioned how difficult it is to perform their tasks during the night and that in most cases the crimes happen at night in the cover of darkness and can only be reported in the morning.

“...we attend mostly cases of fighting's, domestic violence and when they are happening at night it is a problem for us as leadership because we are worried about our safety. You see down there [pointing in the southern direction of the settlement] it is not easy to walk to that area when is dark, there is a high level of crime in that areas of the settlement; as leadership we are also human beings and we get scared for our lives (sic)” (ML2, 25th September 2017).

In a similar incident to the one already mentioned in Chapter 1, my contact a Kya Sands community leader (KL1) was recently injured when a brick was thrown at him at night, when he was coming from a leadership meeting. The brick hit him on the face and had to be admitted to hospital for a week. At the time of our interview, he had recovered and was back at work. This incident took place on the 21st October 2017 and the suspect had not been found, let alone arrested. All this was being attributed to the absence of functioning street lights. Kya Sands has high mast street lights that were installed by the CoJ; however, they are no longer in operation due to cable theft by individuals, locally referred to as *Izinyokanyoka*. The *Izinyokanyoka* steal electricity cables among other things, and it is believed that they are responsible for the disappearance of the cables in Kya Sands. The said cables were connecting Kya Sands' high mast lights and the surrounding areas (Figure 4.3 below illustrate this situation). SL1 expressed that "They [referring to *Izinyokanyoka*] took the cables that used to connect high mast lights and used them to do their own illegal connection to their shacks".

The connection is done from the transformers that supply electricity to Kya Sands industrial area, to the shacks of all those that are willing to pay for these unauthorised connections. Most of the shacks that are situated on the embankment of the Kya Sands industrial area have informal electricity. "As the Leadership we can't stop the community from stealing electricity, it is their basic right and we have been engaging the CoJ regarding the issue of electricity, toilets and water and we have been ignored when it comes to electricity" (SL1, 02nd December 2017).



Figure 4.3: From Left to Right photo showing informal connection of electricity to Kya Sands shacks that are nearby the industrial area where the electricity is being informally connected. Source: author's own photo 24th September 2017.

Households in Msawawa have no electricity and there are no high mast streetlights. The participants from Msawawa were speaking in one voice saying they are aware that the land they are staying in is a private land. They made an attempt to the Municipality to request high mast lights for the settlement so as to minimise crime that takes place in the cover of darkness. MB1 mentioned that the installation of streetlights could improve the safety of the settlement and spare more lives from the danger of being injured or from death.

“It would have been better to at least [have] street lights. Msawawa informal settlement is situated on a land that belongs to a private owner, and we as a community and a leadership acknowledge this fact. The lives of people are more important, there is no money that can replace the lives of the people.” (ML2, 25th September 2017).

“We are not saying [that] electricity should be installed in our shacks; all we are requesting for is the installation of street lights” (ML2, 25th September 2017).

A. Business Owners’ Perspective on Crime

MB2 mentioned that crime is very high in Msawawa during the night, he stated that there are incidences where people have lost lives; “one gentleman who luckily survived, was badly injured by criminals who robbed him of his wallet and shoes after they spotted him late at night leaving my tavern to his place” (MB2, 25 September 2017). Business owners from both settlements mentioned that crime is not only directed at their businesses, but also at their customers and that it affects their revenue generation, as customers do not feel safe at night.

The business owners that I interviewed during the research said that they themselves have been robbed more than once. Figure 4.4 below shows photos of two businesses that have been robbed. The Msawawa business photo on the left was said to have been robbed five times and the Kya Sands business on the right side of Figure 4.4 three times. In both businesses, the robberies were of a violent nature, firearms were used, workers were beaten up and their personal belongings, such as cell phones were taken during the robberies.



Figure 4.4: Photos showing crime-affected businesses in Msawawa (left) and Kya Sands (right).

Source: Author's own photo taken on the 02nd December 2017 (photographs authorised by the business owners).

MB1 mentioned that in all incidences, he had reported the matter to the police and the leadership of Msawawa, and to date of our interview no one had been arrested nor questioned about the robberies that took place at his business. The other business owners MB2 and KB1&2 had not reported their robberies to the police but they had reported them to their respective settlement leadership. MB2 mentioned that his reasons for not going to the police are that:

“I don't have a licence to operate the tavern, because I don't have a licence the police will come here and take my stock and I will have nothing left to sell, and my family will go hungry. The police have twice taken my stock because I don't have a licence, but they have never arrested me or shut me down, I think they take my stock and drink it, you know police these days” (MB2, 25 September 2017).

KB1 mentioned that he cannot go and report to the police because he is a foreigner and that foreigners usually are not treated well by South African Police Services (SAPS). KB2 said that he does not believe that the police have good intentions in protecting their businesses; he suspects that the police are working with criminals. When I persuaded him further to support his assertions, he did not provide any evidence to his allegations. All the participants could

not confirm whether the people who are robbing their businesses are from their settlements namely Msawawa or Kya Sands or not. However, they suspected that the robbers are working together with people from their settlement.

MB1 who was supported by all business people who participated in the study, strongly believed that the high level of crime is linked to the absence of electricity in the settlement. He stated that, "If we had electricity or at least street lights crime levels were not going to be this high, because we are going to see a person robbing us or other community members might notice a suspect and hint us where he went to after robbing our businesses" (MB1, 25 September 2017).

MB2 concurred and further added that:

"We are [in] inconstant fear of our lives, our customer's lives and that of our families. Because my brother what if one day they rob me at home in front of my kids?" (MB2, 25 September 2017).

MB2 cited that they cannot run away from the fact that due to the lack of street lights they are prone to crime at night. KB1 and KB2 mentioned that when the high mast lights were operational, crime levels in Kya Sands were not as high. He mentioned that there was a sense of relief and that even businesses were closing at 22h00 or sometimes after midnight. He emphasises that this is a different situation.

On the usage of solar systems as an alternative safe energy, KB1 mentioned that:

"Yes, it is a better energy and alternative to fixed electricity. Back [at] home in Limpopo in a village called Tshimbutse not far to Thohoyandou, they have solar system that was installed by a company called Solar Energy in collaboration with [the] Municipality. Our solar system works very well, at night we don't have a problem of electricity and we pay between R100 to 300 a month to [the] municipality. I wonder why we don't have the same system installed here in Kya Sands. ... It would have been better if our high mast lights were using solar systems same as [which are similar

to] the ones that are used in lighting Fourways street lights and some traffic lights around Randburg” (KB1, 02nd October 2017).

Figure 4.5 is a photo I took on my way from Kya Sands, it is a solar powered traffic light that uses solar instead of fixed electricity.



Figure 4.5: A photo of a solar powered traffic light in Randburg area R512.

Source: An Author's photo taken on the 02nd December 2017.

B. Residents' experiences with crime

The residents of Msawawa and Kya Sands experience violent crime relatively often if we consider the participants' comments on crime. I visited both settlements at night and Msawawa is pitch-black after sunset while some parts of Kya Sands on the border of Bloubostrand suburb are lit by street lights which provide some light to the front part of the settlement. Sections B and C situated next to the industrial areas have some form of light at night coming from the industrial area. However, the lights coming from the aforementioned areas do not penetrate the entire settlement. The households situated at the bottom end of Msawawa use communal toilets while households who are staying at the entrance or top part of Msawawa have toilets inside their yards. In Kya Sands the situation is different from that of Msawawa; the toilets in the greater part of Kya Sands

are inside the yards. Only those that stay across the river close to industries use communal toilets. The communal toilets in Kya Sands are not far from their shacks, which make them much safer when compared to Msawawa.

MR2 highlighted the challenges about crime as follows:

“It is very dangerous to walk here at night, for us who have no toilets inside our yards we have to go to communal toilet and we are being robbed and women are sometimes being raped. The way is so dark here at night you can’t even see a person coming your way” (MR2, 25th September 2017)

Figure 4.6 below show photos of communal and inside-yard toilets from both settlements.



Figure 4.6: Photos of toilets in Msawawa and Kya Sands

Source: Author's photos taken on the 2nd December, 2017.

MR1 and MR2 share the same sentiments of fear of being mugged when people are walking at night to the toilets; even though MR1 has a toilet inside his yard he still shares the pains of those that don't have toilets inside their yards: "I was once in their situation when we arrive[d] in this place 20 years ago" (MR1, 25th September 2017). SK1 revealed that in Kya Sands there are flushing toilets which were built by the CoJ (Figure 4.7) but two years had passed, and the new toilets have never been used. The CoJ is citing budget challenges for salary payment to people who will be cleaning the new communal flushing toilets.



Figure 4.7: Photos showing locked, un-used flushing toilets that were built by the CoJ

Source: Author's own photographs taken on the 02nd December 2017

4.2.3 Cost and Inconveniences of not having Electricity

This section describes the cost implications confronting business owners and communities of Msawawa and Kya Sands due to the use of alternative energies in the absence of electricity.

A. Cost of doing business in the absence of electricity: Business Owners perspectives.

Msawawa business owners that were interviewed mentioned that it is expensive to manage a business without electricity. MB1 during the interviews mentioned that;

“My shop is a general dealer, my beers and cold drinks need to be cold all the time, so I use a gas fridge and it cost[s] me a lot of money [to] refill gas [cylinders]. If my beers are not cold I lose customers, it is bad, very bad my brother not to have electricity” (MB1, 25th September 2017).

MB1 buys his gas cylinder from Mr Ngubane, who agreed that his name be used. Mr Ngubane also refills gas cylinders outside the Msawawa and Kya Sands settlements on selected days. MB1 continued to share that Mr Ngubane “has a spot where he refills gases next to ground (in the open soccer field).” Mr Ngubane drives to MB1’s property to deliver the cylinders, two 48 kg cylinders per month, because of their weight. MB1 mentioned that for all the other people Mr Ngubane provides his service them next to the football field across the road from Msawawa. Mr Ngubane charges R 1,200 for a 48 kg refilled cylinder and the price is considered by MB1 to be cheaper and indeed affordable, especially since the cylinders are delivered directly to his place of business. Figure 4.8 below shows Mr Ngubane’s gas refilling station, he also has a similar refilling station in Kya Sands and on other informal settlements.



Figure 4.8: A photo of a mobile natural gas refilling and selling station at Msawawa

Source: Author's own photo (2017).

MB2 mentioned that he also has a generator, which he only uses on weekends for lighting and for music, for his tavern customers. During the week, MB1 and MB2 use candles for lighting at night, and they also mentioned that the Msawawa shops close between 7pm and 8pm during the week but on weekends they close around 10pm or sometimes at midnight.

MB1 and MB2 agreed that the 'fastest moving' (highest demand) energy product in Msawawa is paraffin which is mainly used for cooking. At the time of the interview the current stock of paraffin was about 200 litres and 250 litres for MB1 and MB2 respectively. The paraffin suppliers deliver paraffin to business owners in both Msawawa and Kya Sands settlements.

Candles are widely used for lighting in Msawawa, however, this was not the case in Kya Sands, where some similarities and differences occur. KB1 is situated in the part of Kya Sands that has no informal electricity and his situation is similar to that of Msawawa. His stock of paraffin at the time of the interview was about 450 litres and he confirmed that paraffin is one of the fast-moving products at his business, second to bread. While this was the case with KB1, KB2 is located in the part of Kya Sands that has informal connection of electricity, almost every shack in his area is informally connected to electricity. He confirmed that he does not sell paraffin which he stopped selling almost two years ago; he stated that:

“I do sell candles, those [customers] that (sic) want paraffin they go to other tuck shop. Paraffin is not a fast-moving product on this side of Kya Sands” (KB1, 02nd October 2017).

Kya sands businessman KB1 concurred with business owners from Msawawa on the high cost implications of running a business without electricity. He further mentioned that he mostly uses gas in both of his businesses and this is costing him a lot of money. He further stated that:

“I use gas in all my businesses that are here in Kya Sands, I use a 48kg of gas, I order four 48kg of gas cylinders. Two for each business and I have to reorder every two weeks. I order my gas cylinders from Germiston because they deliver, and they are much cheaper than buying gas around Kya Sands” (KB1, 02 October 2017).

The KB1 added that he pays R750 per cylinder in Germiston which is cheaper when compared to buying from Kya Sands and the surrounding areas where he is expected to pay R1200 per 48kg cylinder. He mentioned that he occasionally buys from Kya Sands on an emergency basis and when the business is very busy. KB2 came with a different perspective from the rest of the business people I interviewed. KB2’s business is located in his house which also serves as his home. He is situated in a part of Kya Sands which is connected to informal electricity, across the street from Kya Sands industrial area. During my interview with KB2 he shared the following:

“I use electricity for all my fridges, and since I started having this electricity connection to my shop, my customers are happy [that] they get their beers, and cold drinks cold like the ones you buy from Checkers. I am also selling meat because I now [have] a freezer and the business is good ... I’m aware that the electricity I am using is illegal and I’m not paying for electricity, however the municipality must provide us with electricity [in the] same [way] as they provide us with water and toilets. I only paid once the connection fee of R500 to *Izinyokanyoka* and this arrangement is working for

me. The only problem [I experience] is when it is raining; other than that I'm fine with this arrangement" (KB2, 02nd October 2017).

The benefits associated with KB2 are that he does not pay for any operational cost like the other business owners. He believes he provides a good service to his customers in terms of cold beers, cold soft drinks and he also sells meat. The other business owners are finding it difficult to operate due to the absence of electricity. KB2 also mentioned that he closes his store at 10pm on normal days and on busy days he closes the store after midnight, around 1 am or sometimes at 3 am.

B. Households' living cost in the absence of electricity

"Life without electricity is a challenge and expensive, I have stayed in Msawawa for the past 20 years and each day is a challenge living without electricity, if you want to cook you need to think about paraffin and of late paraffin has started to make me sick sometimes" (MR1, 25th September 2017).

MR1 was retrenched seven years ago. He was employed as an Operator in one of the factories around Kya Sands. His wife is working in one of the farm houses around Msawawa and his eldest daughter is working somewhere in town and the rest of the four children are staying in Limpopo. He continued to say that "Things are tough since ever since I lost my job, I now keep myself busy by making holy tea and sell it to people who need it because it also serves as medication. The little money I get I am able to buy things like paraffin and some meat for the day" (MR1, 25th September 2017).

My second participant, MR2, is working as a gardener in one of the houses in Fourways and his wife is not employed. They also receive financial assistance from their son who stays in Johannesburg and works as a mechanic in one of the vehicle service centres in the city. "Without electricity life is not good in Msawawa it is expensive, but what can we do, we stay here [because] we call this place home" (MR2, 25th September 2017).

In Msawawa a litre of paraffin costs between R11.00 and R12.50 depending on where it is purchased, said MB1. This was later confirmed by MB2. MB2 mentioned that he uses almost one litre of paraffin per day. Consequently, a litre of paraffin at a cost of R12.50 x 30 days amounts to R375 per month per household. This excludes the expense on candles for lighting which comes at a cost of R2.00 per candle and 12.00 rand a packet which works out to an estimated amount of R48.00 per month. The aforesaid considered, the estimated expenditure per month for an average household on sources of energy is approximately R500 and month excluding groceries.

In Kya Sands, the difference was that both KR1 and KR2 are employed in the factories around Kya Sands. KR1 is employed permanently at Albany Bakery while KB2 is a temporary employee in the Tiling Company. The difference is that KR2 is staying where there are informal connections and he does not pay for electricity. "I occasionally buy gas [and] not paraffin [because] I don't use paraffin, I buy gas for cases where my electricity is not working due to rain" (KR2, 02nd October 2017).

KR1 is in a similar situation with his counterparts from Msawawa when it comes to the cost of purchasing paraffin and candles. KR1 also mentioned that he has the use of gas for cooking and for lighting, and he refills a 9kg gas cylinder at a cost of 260.00 which lasts him for a month.

The other alternative energy source that has gained a steady popularity is solar power, even though MB1 mentioned that the solar system I saw in the Msawawa settlement is not the kind of solar system that can store enough energy to be used during the night. The batteries they are using are too small to store enough energy, and MB1 called them "fake Solar" systems. Some households in Msawawa and Kya Sands have solar systems and when I asked my participants, MR1 and KB1, both confirmed that the solar systems that they are using are not good enough, because they can be used only during the day.

The charging of cell phones was said to be a big business in both settlements. One Sunday morning on one of my visits to Kya Sands, I noticed a long queue. I asked KB1 and he mentioned that it was a queue of people waiting to charge their cell phones. "I also charge

there, I use my cell phone as an alarm to wake up in the morning when I'm going to work; the cost of charging a cell phone in Kya Sands is R3.00 while in Msawawa it costs R5.00" (KB, 02nd October 2017). Figure 4.9 is a photo of a businessman who is charging his customers R5.00 to charge a cell phone. The Photo was taken in Msawawa and I was given the permission to take their photo and use it for my report.



Figure 4.9: A photo of the Zimbabwe national selling a service of charging phones.

Source: Author's photo taken on the 25th September 2017

In summary, residents use paraffin, candles obtained from local *spazas* (tuck) shops at a cost of R12.50 (monthly R375 per month). Households of unemployed individuals can find this cost to be very high and unaffordable. This further contributes to the high costs of alternative sources of energy as households are forced to buy paraffin.

Another problem noticed in both settlements, related to the lack of electricity is that food, not stored in refrigerators, spoils easily. This means that households must consume perishable foods very quickly after they have bought the food, and this is an expensive exercise as households cannot buy perishable food like meat in bulk.

‘It becomes a challenge. At times we cut it and put it at the top, or just half cook it so that we can preserve it so that we are able to eat it. Meat is worse, you have to cook it and finish it off. In this hot weather, you have to finish it off’ (MR2, 25th September 2017).

4.2.4 Leadership Outlook on the plight of informal settlements

The leadership of Msawawa and Kya Sands are elected by the community and are entrusted with the responsibility of being the spokespersons of the dwellers. The leadership responsibilities range from attending to the basic needs of the community to social matters of individuals. It is no doubt that their role as leaders is very important. The following discussion further manifests the necessity of community leaders in the informal settlements environment.

A. Leadership Approach on Basic Services: Msawawa and Kya Sands

Msawawa residents have been in this settlement for more than a decade and many still live without adequate water, sanitation and electricity services and infrastructure. The lack of basic services is a key characteristic of informal settlements. Municipalities provide a minimum level of service for informal settlements. However, the services tend to be very limited (Nenweli, 2015). The interviews indicate that residents of Msawawa face many challenges not just the absence of electricity. There is no proper layout of the settlement and in some parts of Msawawa shacks are clustered together, with no proper roads for vehicles which can be a problem during fires, as fire service vehicles are unable to reach the affected areas.

Sanitation is provided to individual households in parts of both Kya Sands and Msawawa, but other part of the settlements share toilets. It was reported by one the participants who reside in the settlement that the shared toilets are not safe during the night.

Figure 4.10 below shows dirty running water on the streets of Msawawa. The photo on the right shows an installed pipe in Msawawa, that was paid for by the monetary contributions of

the community members living nearby. This takes the running water down to the river. There is a clear contrast between the conditions displayed in first and the second photo.



Figure 4.10: A left photo showing dirty running water and the right-hand photo showing piped dirty running water, a community initiative in Mswawa. Source: Author's own photo taken on the 3rd December 2017

The Msawawa leadership (MB1) mentioned that they have been engaging the previous Msawawa councillor about basic services and they have been getting a slow response from the councillor and the City of Johannesburg. “Our previous councillor was forever reminding us that we are occupying a private land, therefore they can’t bring in other basic services like electricity without the permission of the present owner” (MB1, 25th September 2017).

The question that has been asked by the community is, how come the City is able to bring in services like water and sanitation onto private land but not electricity? ML2 mentioned that “In the last meetings with the previous councillor I told him that we are not looking for electricity for each household, but we are only requesting street lights, just for our community to be safe at night. The response was the same; he said that I should ask permission from the owner” (ML2, 26th September 2017).

The other challenge is that the owners of the occupied plot have been changing over the years without the community being informed. In 2017, a community leader is still not aware as to who is the current landowner is. “As I speak to you my brother I don’t know who owns Msawawa” (ML2, 26th September 2017). The better part is that in Msawawa there is sanitation and water, even though the leadership is not satisfied with the service and maintenance they are getting from CoJ. The taps are leaking and there is slow response from CoJ in fixing the taps, even though they are being continuously reported to the CoJ officials. Figure 4.11 is a photo of a leaking tap on one of the water stand pipea in Msawawa.



Figure 4.11: A photo of leaking stand water pipe in Msawawa

Source: Author’s own photo taken on the 2nd December 2017.

Kya Sands’ state of affairs is different from that of Msawawa. Kya Sands is situated on land that belongs to the CoJ. Services such as provision of sanitation and water infrastructure are provided in a similar manner as those of Msawawa by the CoJ. I noticed that the roads in Kya Sands are wider and more clearly laid out than the ones found in Msawawa, although some parts they are similar. Both Settlements have similar challenges when it comes to sanitation, Kya Sands has been supplied with state of the art communal toilet facilities, however these

toilets have never been used. The CoJ is citing the shortage of maintenance funds as the main reason why they are not operational.

B. Leadership Championing Employment among the communities

The basic conditions of living in Kya Sands are better than the ones I have seen in Msawawa. In Kya Sands most of the people whom I have engaged with during my study are employed, this includes KB1 who works in a bakery. The two community leaders I interviewed are also employed, whereas this was not the case in Msawawa informal settlement. During my discussion with ML1, he mentioned that there are initiatives that they are working on in collaboration with the ward councillor. For example, “There are now people called waste pickers and in Msawawa we have about 35 of them working in the project” (ML1, 02 December 2017). The 35 community members are getting a salary of R2 500.00 a month, which is better than nothing” (ML1, 02 December 2017).

Figure 4.12 shows waste that has been dumped by the community and a sign saying, “Please don’t dump here”, apparently the waste pickers are the ones who have put up signs. The 35 appointed waste pickers collect waste from this place and various other waste stations around the settlement, and later disposed of it in the new landfill site that has been recently created in the settlement. The other photo on figure 4.12 is showing the magnitude of work that is still to be done by the 35 waste pickers in and around Msawawa settlement.



Figure 4.12: Photos showing waste in the settlement and work that is still to be done with regard to waste management.

Source: Author's own photos taken on 2nd December, 2017.

There are community members who survive through waste recycling. “They collect waste and sort it accordingly and go and sell to the relevant points” (ML1, 02 October 2017). Figure 4.13 is showing a place where they prepare their waste before taking it to the place where they sell it.



Figure 4.13: Photo showing a waste sorting site out the settlement. It belongs to community members who do recycling as a source of income.

Source: Author's own photo taken on 2nd December, 2017.

4.2.5 Recommendations Voiced in the Interviews

MB1, MR1 and MR2 acknowledge that they are occupying private land, however this should not be used against them, for instance by making them not eligible for basic services. Installation of electricity in each house may be expensive for government on a land that is privately owned, yet all the Msawawa community is asking for are high mast streetlights using solar power to minimise the City's electricity costs.

Kya Sands community also voiced the same sentiments as those of Msawawa community, requesting that all existing high mast street lights should be supplied with solar panels instead of normal electricity, due to the high number of so-called *Izinyokanyoka* in the area. The community leader (KL1) once again mentioned that the CoJ is now reluctant to fix the high mast street lights because there are no guarantees that *Izinyokanyoka* will not once again poach the cables. The Business owner (KB1) from Kya Sands mentioned that back home in Limpopo they have solar electricity pannels installed on every house in his village. It was a collaboration of their village local municipality and the company called Solar Vison. The Solar Vision solution can also be recommended to the Gauteng Provincial government and the CoJ, which will benefit all the affected residents.

4.3 Conclusion

In Conclusion, the participants of Msawawa and Kya Sand collectively agreed that electricity installation can solve most of their problems, such as crime, shack fires and their households' economic sustainability.

Crime was mentioned as a major concern in both settlements; all participants unanimously stated that crime was a major issue. Msawawa participants mentioned that all they request from the municipality is to provide them with street lights, even though they would like to have electricity inside their houses, but they understand that it cannot be done immediately.

Shack fires were also mentioned as a concern, but it is no longer happening frequently like in the past years; at least this was a general view from both settlements. The reduction in shack fires had to do with the regular fire training provided by the CoJ to both settlements.

Proper solar installation was also mentioned as an ideal solution, taking into consideration that most of the people are not working and may not be able to afford to buy electricity on regular basis. The current popular solar systems that are dominating the settlement are not able to store energy during the day to be used later during the night. It is also clear that the alternative sources of energy and fuel are not the best solution due hazards and dangers that are associated with alternative energy and fuel, solar is the only alternative energy that is safe in the absence of electricity.

The participants of Msawawa and Kya Sands collectively agreed that electricity installation can solve most of their problems, such as crime, shack fires and their household's economic sustainability. Proper solar system installations were also mentioned as an alternative to electricity from the grid, taking into consideration that most of the people are not working and may not afford electricity in the long run. It was evident that other alternative sources of energy and fuel are not the best solutions to due hazards and dangers that come with their use and storage.

Chapter 5: Conclusion

5.1 Introduction

In this last chapter of my research, I discuss my empirical findings and reflect back on the objectives that I set out for the study. The chapter will conclude by making recommendations arising out of the findings and will close with the final conclusion of the research.

5.2 Discussion of Empirical Findings

This study, carried out in Msawawa and Kya Sands informal settlements, involved a qualitative study and practical fieldwork investigation. The literature review chapter discussed the energy policies tracing the energy policies back during the apartheid times up to current energy policy. What transpired was that the energy policies has improved from the apartheid times, where it was only servicing the few minority South Africans, currently the energy policies services all South Africans and electricity in particular has been incorporated into the Republic of South Africa's Constitution as a mandatory basic right, including water and sanitation. However, the implementation of energy policy objectives has not been forthcoming, especially electrification of informal settlements. A case at hand Msawawa and Kya Sands has water and sanitation, and both have no electricity.

In South Africa, shack fires are as a result of non-electrification of informal settlements. In most cases shacks fires are as a result of the usage of paraffin for cooking and candles for lighting. The Msawawa and Section A of Kya Sands fieldwork results confirmed that the source of energy predominantly used by both settlement communities is paraffin. The primus stoves operate by use of paraffin and they are common in the informal settlements that are not electrified. When the primus stoves are left unattended the strong heat coming out of primus stoves can easily ignite nearby structure and spreading the fire inside the shack. Because the informal settlements are commonly congested and clustered together fires easily spread from one shack to another. However, in sections B and C of Kya Sands, these are the

areas where there are a high number of informal electricity connections; there also are fewer incidences of shack fire through primus stoves. The community do not usual use primus stoves and paraffin, they use electrified equipment.

The fieldwork provided an insight into the alternative sources of energy that are used by different households in the two settlements. In Msawawa most of the dwellers are not in the informal employment and some are not working at all and the main source of energy is paraffin. This was also found to be the case in Kya Sands in sections A, B and C; where the residents are using electrified equipment and very few households are using primus stoves and paraffin. The businesses from both settlements are mostly using gas for their fridges and generators are mostly on weekends for disco sound and this is done mainly by the alcohol businesses. In my interaction with the participants, these participants strongly voiced their unhappiness since they do not have electricity.

The businesses complained about losing out on potential revenue that they would be making if there was electricity because they would be closing later than the current situation. Ordinary community members who are employed complain about their cell phones that require to be charged on a daily basis because they also use their cell phones as alarm clocks for waking up in the morning to go to work or preparing for children to go to school.

The participation of community leaders from Msawawa and Kya Sands in this research provided the necessary insight on their roles regarding the absence of electricity in their settlements. The Msawawa community leaders have handled their frustrations with regards to the absence of electricity in a civil manner. The community has always trusted their leadership to be their voice to CoJ authorities. To this date all their attempt in requesting the CoJ to install electricity in the settlement has failed. The reasons that they have been given for the past years was that Msawawa is privately owned land and the CoJ is unable to install electricity. This according to Msawawa leadership is an excuse because CoJ has been able to install water and sanitation, and therefore they ask why CoJ cannot supply electricity. In contrast to Kya Sands leadership's point of view, Kya Sands settlement is situated on the land that belongs to CoJ; however, their situation is similar to that of Msawawa, as both Settlements are not electrified.

Kya Sands community leaders have tried all negotiation channels including protests. In their view, all they have received in return were empty promises from the officials. Msawawa and Kya Sands residents and leadership on several occasions have been told that their settlements will be relocated to another place where they will be issued with so-called RDP (Reconstructive Development Programme) houses, with water, sanitation and electricity. However, up to the time of my fieldwork in 2017, the government had not made clear commitments to deliver on this promise.

The leadership of Msawawa took a decision that no household will be allowed to informally connect electricity. Firstly, the leadership and community understand that they are occupying private land without authority. Secondly, they have been promised to be moved to a suitable location where they expect that services like formal electricity connections will be installed. This is unlike Kya Sands, where residents are occupying land that was set aside by CoJ. At the time of my research in 2017, there was no household or business operating in Msawawa that was informally connected to electricity. This was the result of a standing agreement between the leadership and Msawawa community. Msawawa, is a close-knit community, and from what I could establish through my interviews and observations, the Msawawa leadership works on a basis of consensus which it establishes with the community. It appeared that all issues that affect community are discussed freely during community meetings. There were no formal rules as such that prevent informal electricity connections. Instead, it is the general understating of the Msawawa community not to connect informally to the electricity grid.

In Kya Sands informal electricity connections are no secret, and informal connections are made in front of the Kya Sands leadership. There appeared to be no consensus between the leadership and the Kya Sands community on this matter. As discussed in the previous chapter, in Sections B and C of Kya Sands there are existing informal electricity connections and the leadership has not condemned the practice. While Sections B and C of Kya Sands have informal connections, at the time of my research, in Sections A and D there was no evidence of informal electricity connections. It was observed that Section A and D are far from the industrial area which is used as source of informal electricity connection by other Kya Sands

sections. Section A of Kya Sands was supplied with high-mast Apollo lights that are no longer functioning due to cable theft.

The community of Msawawa is smaller than that of Kya Sands and according to the Msawawa leadership, most residents know each other in Msawawa. This may make it easier for the leadership to instill discipline. Kya Sands is made up of three sections and in total is much larger than Msawawa. The situation in Kya Sands is made even more complex by the fact that Section A and D, by demarcation, is in a different ward than Sections B and C. Sections B and C of Kya Sands are in the same ward as Msawawa and they report to the same councillor.

The business owner I interviewed from Section C of Kya Sands has an added convenience and cost advantage when compared to businesses that are using alternative energy sources, for example Gas and Generators, for instance in Section A or in Msawawa. There is remarkable revenue that was mentioned by the business owner from section C of Kya Sands who uses his informal electricity connection to operate his business. His operating hours are longer when compared to the other business owners in same type of business, namely sale of alcohol. Another important fact was that a business owner from Section C stated his service was always acceptable because his stock is always cold. He uses informal electricity which he does not pay for, while other business owners from section A and Msawawa are using Gas and Generators and they buy these sources of energy at cost.

It is evident that informal electricity connections has cost advantage and allows for long free energy source as compared to the gas, paraffin, and fuel generators sources of energy as these will be treated differently allowing for restricted usage in the efforts to cost savings. In areas that are not electrified, residents are not likely to stay up late, as opposed to informal electricity powered residents.

At the outset of this study, I did not anticipated crime to be one of the main challenges which the Msawawa and Kya Sands communities associate with the absence of electricity. However, in Msawawa and in Kya Sands, crime was mentioned as a very serious challenge facing the two communities. Kya Sands has high mast electricity lights that were installed with the sole aim of reducing crime at night and making it possible for people to move with ease during the

early mornings and at night when they are going to or coming from work. However, in Kya Sands the so-called *Izinyokanyoka* have stolen all the electricity cables. High mast lights in Kya Sands are therefore no longer working, which brings the situation of Kya Sands to a similar level as that of Msawawa, where high mast lights had never been installed. There is a part of Kya Sands that has informal connections but has no street lights, and according to my respondents, they were also experiencing the same level of crime after dark.

With the exception of informally connected electricity, it is important to note that electricity is not 100% free to the users. All households need to pay for electricity, be it pre-paid or pay after usage, without disregard of the basic government subsidized minimum electricity units to the indigenous as discussed in chapter 2 above. The challenge that is facing most of the informal settlement communities is that the majority of the dwellers are not employed or have low and irregular incomes in the informal sector or through piece jobs, and this may lead to unaffordability in paying for basic services, including electricity, once this is formally supplied.

Deducing from this research, alternative sources of energy other than formal connected electricity remains hazardous to dwellers of Msawawa and Kya Sands. I paragraphs above was confirmed by the business owners of Msawawa and Kya Sands that they store large quantities of paraffin.

The CoJ has introduced new technological improvements which are assumed to reduce fire risk emanating from Primus-stoves, are not necessarily experienced as improvements on the ground, and therefore uptake may be low and fire risk not actually reduced, as it been discussed above that the dwellers have actual gone back to old primus-stoves usage.

5.3 Returning to the Research Questions

The research was guided by five sub – questions and one main research question. The research questions are answered below, starting with 5 research sub-questions and ending with the main research question.

a) What is generally known about the way households respond to the absence of electricity in informal settlements?

The households in informal settlements respond by using alternative sources of energy. The affordability of each household usually determines the type of energy they will use at a certain times. However, the use of paraffin and candles dominates the two informal settlements. In Kya Sands, certain sections are using informal electricity connections and use fewer of the alternative sources of energies. This is not the case with Msawawa where there are no informal connections. It is also equally important to note that some households use wood mostly in winter for heating. Gas and generators are used by business owners.

b) How differently do the Kya Sands and Msawawa community leaderships handle the issue of the absence of formal electricity?

Kya Sands, leadership has no rules on the sources of energy that should be used by the community. Hence, there are sections that use informal electricity connections and there is no interference from the leadership. A large part of Kya Sands relies on alternative sources of energy since there are no informal connections. The leadership had been engaging the municipality with regards to supply of electricity in Kya Sands.

The Msawawa leadership has developed consensus with the community that there will be no informal connections of electricity. Due to promises of relocation the leadership had not been engaging the municipality about electricity supply to Msawawa.

c) To what extent do these strategies depend on the context of the settlement?

The Msawawa leadership strategy of not allowing informal electricity connection is currently working well. The other advantage of Msawawa is that the settlement is not expanding any more due to boundaries surrounding the settlement. There appeared to be no new people joining the settlement to build new shacks. One of the things I noticed is that households mostly know each other and they are used to having no electricity. Msawawa is not as large as Kya Sands and appears to be more manageable as an informal settlement. The only disadvantage is that Msawawa is situated on private land, and this situation holds back some of the basic services, for example Street lights installations. To answer the research question, the context of settlement size and the boundaries which contain the settlement appear to make it possible for the leadership to develop and implement rules that govern electricity. In addition the fact that there is no formal electricity supply nearby has also made it easier to enforce the agreement to refrain from informally connection to the electricity grid. At the same time, the private ownership has prevented the municipality from providing formal electricity for high mast lighting. In other settlements where these are supplied, they are known to be tapped into for informal access to electricity.

Kya Sands has no formal rules like Msawawa, and the leadership strategies are visible and strong on aspects other than electricity connections. For example, the leadership was able to negotiate with CoJ for flushing toilets containers and installation of street lights. While these were not tapped for informal electricity supply, the municipality and the leadership failed to prevent so-called *Izinyokanyoka* - the electricity cable thieves. Due to cable theft no street lights were working at the time of my fieldwork in 2017. Kya Sands is larger and more complex than Msawawa, making it difficult to manage by a small leadership team.

d) How do households differ in their response to the absence of electricity?

The households' responses to the absence of formal electricity supply differ on the types of alternative energy they use at a certain particular time. Affordability emerged as an important determining factor. Only in Kya Sands, some community members have the choice to connect informally to the electricity grid.

e) To what extent are these choices the result of the strategies adopted by the leadership?

My study in the two informal settlements revealed that the effective prevention of informal electricity connections in Msawawa led households in that settlement to use a variety of alternative sources of energy, depending on access and affordability. However the same sources of energy were being used in Kya Sands, with the exception that in certain areas, households, and in particular businesses, were resorting to informal electricity connections. It should be added that both settlements had been subjected to shack fires, which is a result of the use of hazardous forms of energy, or hazardous practices in the use of alternative energy sources.

Main Question: How do households individually and communities collectively respond to the absence of formal electricity supply in their settlements?

Kya Sands and Msawawa are both informal settlement that have one common challenge, there is no formal electricity supply. This situation has not been addressed by the municipality. One reason put forward for the absence of certain basic services is the private ownership of the land.

Kya Sands is situated on municipal land. . Despite a policy for the electrification of unproclaimed areas, Kya Sands also does not have formal electricity supply, other than high mast lighting which at the time of my research in 2017 was dysfunctional due to cable theft.

The individual households' responses to the absence of formal electricity connections depend on the affordability of each household, and the kind of alternative source of energy they can afford at any particular moment. This may vary across one month as poor households' available resource fluctuate. The limitation of each household is also determined by the availability or accessibility of a particular source of energy, for instance from the nearby tuck shops. In Msawawa, gas was accessible to households who could afford it, due to a supplier selling at the settlement on particular days. Thus supply also determined the actual energy practices of individual households.

As a collective, the households are affected by a high level of crime; during my fieldwork, the participants mentioned the inconveniences caused by the lack of electricity from as small as failing to charge a cell phone and failing to iron clothes; but crime was the most important and common to all my participants from both settlements. The emphasis was made that streetlights are the most urgent service they need. However, the experience and everyday fear of shack fires also signified an urgency for implementation of the existing national policy for electrification of unproclaimed areas.

5.4 Recommendations

It is evident that the electrification of both Kya Sands and Msawawa informal settlements would improve the well-being of the informal settlements on several fronts. The National Energy ACT 34 of 2008 takes to account all sources of energy and focuses on poverty alleviation

“To ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements...”
(Department of Energy, 2008:2).

From this study, the following recommendations can be derived, noting that some interventions can be further developed through additional research:

In the case of Msawawa the CoJ should engage with the landlord and finalise the matter of purchasing the land and upgrading it for Msawawa community, as per provisions under the UISP. In an unfortunate circumstance where the landlord is not willing to sell, the CoJ should consider expropriation, particularly if the land is found to be geotechnical suitable for development, or it can be rehabilitated to make it suitable as per provisions in the UISP. Relocation to alternative land has been mentioned officially to the Msawawa community. However, the relocation, as per the UISP, must be a last resort and should not disadvantage the community by requiring them to travel long distances to work or sources of livelihood and to attend school. The fieldwork in this report gave evidence of vulnerability of household economies and therefore it is likely that relocation, even if electricity is supplied in the reception area, would impact them negatively.

Kya Sands is situated on a government land. It therefore can be recommended that CoJ commence with funding applications for the upgrading of the settlement, and treats the electrification of the settlement as a main priority.

CoJ should heed a plea from the informal settlement dwellers regarding the high level of crime affecting informal settlement communities. This can be curbed to some extent by installing high-mast lights using solar energy to prevent so-called *izinyokanyoka* from stealing electricity cables. To ensure coordination and success, the CoJ, community leadership forum and ward councilor should work together on issues related to lighting and electrification of Msawawa and Kya Sands settlements. It is noted that crime can only be curbed through a multi-pronged strategy. Permanent demarcations for each stand should be implemented with a toilet inside each yard, as this will help prevent unnecessary criminal activities at night, due to the fact that toilets are far from the homes.

The City should undertake research and development on solar energy for the two settlements. This is due to the fact that most people who are residing in the two informal settlements are not formally employed. Once the CoJ has installed electricity in the two

settlements, it will expect the households to pay for the usage of electricity on a prepaid basis. While an extended social package policy allows indigent households to receive a certain amount of electricity for free, in the case of a solar system the burden on the bureaucracy is lessened, given that many households in the settlements will be applying for free basic services.

On the need for alternatives to unemployment, the CoJ needs to promote self-employment initiatives; for example waste recycling, waste management and agriculture – (gardening) and sewing programmes. Such initiatives can assist in ensuring households are able to switch to safer forms of energy use. Once a settlement is electrified, such programmes will help households in purchasing of prepaid electricity and other services.

Further research could focus on the gaps of my research. The scope of this study allowed me only to interview a small selection of households. However, a household survey with standardised questions may help strengthen findings by being able to add percentages to the different experiences, practices and conditions, including vulnerability to fire. This could be used more convincingly to persuade authorities to take action.

Another approach will be to undertake this kind of research in a larger selection of different informal settlements. Given that the situation in these two settlements is so different, one can assume there being many situations that these two settlements did not reveal. There may also be the need to continue research after electrification to understand to what extent energy practices and household vulnerabilities change or remain the same.

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Appendix 1

Letter Request for Participation on the Research

Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands

Good Day

My name is Feza Nxumalo and I am currently a part time student studying towards a MBE (Housing) in the School of Architecture and Planning (SOAP) at the University of Witwatersrand. I am currently investigating the extent to which the absence of electricity affects the settlement residents.

I am inviting you to be part of the study through an interview process.

The interview will take no longer than 30 minutes of your time. The interview will take place in the informal settlements at a convenient time that will be discussed between yourself as the participant and myself as the researcher. During the course of the interview you will be asked questions regarding, your daily challenges you encounter due to the absence of electricity in your settlement.

The interview will be recorded using an audio recorder, if you give approval for this. I will also take hand written notes where necessary.

You have been selected to participate in this study because you have a business in the informal settlement and you also stay in the settlement.

Your participation is voluntary, you may refuse to answer any questions that make you uncomfortable, and you may withdraw at any time without penalty or loss. You will receive no payment or other incentives for your participation.

Your participation will be completely anonymous, meaning you will not be personally identified in the final report. I will refer to you only as 'resident 1', unless you would like me to mention you by name. However, the settlement will be identified. Please indicate if you say something that should be treated as off the record. I will make sure not to quote or refer to such statements in my report.

Further, any information that you share will be kept confidential, meaning it will not be given to anyone else. It can only be accessed by me on a password protected computer. There are also no foreseeable risks associated with your participation.

The research is only for academic purposes and once completed will be available electronically and can be accessed publicly.

If you have any questions, concerns, or comments or if you would like a copy of the final report, please feel free to contact me at nxumalofh@gmail.com or my supervisor Marie.Huchzermeyer@wits.ac.za.

NAME: Feza Nxumalo
DEGREE: MBE (Housing)

PARTICIPANT INFORMATION SHEET: Community leader

Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands.

Good Day

My name is Feza Nxumalo and I am currently a full-time student studying towards a MBE (Housing) in the School of Architecture and Planning (SOAP) at the University of Witwatersrand. I am currently investigating the extent to which the absence of electricity affects the community leadership in the informal settlements.

I am inviting you to be part of the study through an interview process.

The interview will take no longer than 30 minutes of your time. The interviews will take place in the informal settlements at convenient time that will be discussed between the participant and myself. During the interview you will be asked questions regarding, the responses of community leadership in the settlements regarding the absence of electricity in the informal settlements.

The interview will be recorded using an audio recorder upon approval from the participants and hand-written notes where necessary.

You have been selected to participate in this study due to your leadership in the community.

Your participation will be completely anonymous, and you will not be personally identified in the final report. You will be referred to as the participants. However, the settlement may be identified.

The results of the interview and your personal views will not be linked to you in the final report. *If I use direct quotations from this interview, please note that your identity will not be revealed. Any comments that you make that you deem "off the record" or similar, will not be quoted. Further, any information that you share will be kept confidential and can only be accessed by me on a password protected computer. There are also no foreseeable risks associated with your participation.*

The research undertaken is solely for academic purposes and once completed will be available electronically and can be accessed publicly.

If you have any questions, concerns, or comments or if you would like a copy of the final report, please feel free to contact me at nxumalofh@gmail.com or my supervisor Marie.Huchzermeyer@wits.ac.za.

NAME: Feza Nxumalo
DEGREE: MBE (Housing)

PARTICIPANT INFORMATION SHEET: Business Owner

Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands.

Good Day

My name is Feza Nxumalo and I am currently a part time student studying towards a MBE (Housing) in the School of Architecture and Planning (SOAP) at the University of Witwatersrand. I am currently investigating the extent to which the absence of electricity affects the business owners residing and operating in the informal settlements.

I am inviting you to be part of the study through an interview process.

The interview will take no longer than 30 minutes of your time. The interview will take place in the informal settlements at a convenient time that will be discussed between yourself as the participant and myself as the researcher. During the interview you will be asked questions regarding, the responses of business owners living and operating businesses in the informal settlement in the absence of electricity.

The interview will be recorded using an audio recorder, if you give approval for this. I will also take hand written notes where necessary. You have been selected to participate in this study because you have a business in the informal settlement and you also stay in the settlement.

Your participation is voluntary, you may refuse to answer any questions that make you uncomfortable, and you may withdraw at any time without penalty or loss. You will receive no payment or other incentives for your participation.

Your participation will be completely anonymous, meaning you will not be personally identified in the final report. I will refer to you only as 'business man 1', unless you would like me to mention you by name. However, the settlement will be identified. Please indicate if you say something that should be treated as off the record. I will make sure not to quote or refer to such statements in my report.

Further, any information that you share will be kept confidential, meaning it will not be given to anyone else. It can only be accessed by me on a password protected computer. There are also no foreseeable risks associated with your participation.

The research is only for academic purposes and once completed will be available electronically and can be accessed publicly.

If you have any questions, concerns, or comments or if you would like a copy of the final report, please feel free to contact me at nxumalofh@gmail.com or my supervisor Marie.Huchzermeyer@wits.ac.za.

NAME: Feza Nxumalo

DEGREE: MBE (Housing)



Consent Form: Business owners operating and living in the settlement

For participation in the study, entitled: “Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands”

This consent form confirms that I have been briefed, have read and understood the scope of this research study. I have also been informed of:

- ☐ the nature of my participation in the form of an interview
- ☐ the place and duration of the interview
- ☐ the reasons for why I was selected to participate in the study
- ☐ the voluntary nature of my participation, meaning I may refuse to answer, and may withdrawing from the interview at any point
- ☐ that there are no payment or incentives related to my participation
- ☐ that there are no loss, benefits or risks related to my participation
- ☐ confidentiality (meaning what I say in my interview will not be given to anyone else)
- ☐ anonymity (meaning my identity will not be disclosed unless I give permission to do so)
- ☐ how the research findings will be disseminated

I _____ (respondent's name) hereby agree being interviewed

I agree/disagree [cross out as relevant] to have the interview audio-recorded

I agree/disagree [cross out as relevant] to my name being used.

Signature of Participant: _____

Date: _____

Signature of Researcher: _____

Date: _____



Consent Form: Community leader living in the settlement

For participation in the study, entitled: *“Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands”*

This consent form confirms that I have been briefed, have read and understood the scope of this research study. I have also been informed of:

- ☐ the nature of my participation in the form of an interview
- ☐ the place and duration of the interview
- ☐ the reasons for why I was selected to participate in the study
- ☐ the voluntary nature of my participation, meaning I may refuse to answer, and may withdrawing from the interview at any point
- ☐ that there are no payment or incentives related to my participation
- ☐ that there are no loss, benefits or risks related to my participation
- ☐ confidentiality (meaning what I say in my interview will not be given to anyone else)
- ☐ anonymity (meaning my identity will not be disclosed unless I give permission to do so)
- ☐ how the research findings will be disseminated

I _____ (respondent's name) hereby agree being interviewed

I agree/disagree [cross out as relevant] to have the interview audio-recorded

I agree/disagree [cross out as relevant] to my name being used.

Signature of Participant: _____

Date: _____

Signature of Researcher: _____

Date: _____



Consent Form: Settlement residents

For participation in the study, entitled: *“Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands”*

This consent form confirms that I have been briefed, have read and understood the scope of this research study. I have also been informed of:

- ☐ the nature of my participation in the form of an interview
- ☐ the place and duration of the interview
- ☐ the reasons for why I was selected to participate in the study
- ☐ the voluntary nature of my participation, meaning I may refuse to answer, and may withdrawing from the interview at any point
- ☐ that there are no payment or incentives related to my participation
- ☐ that there are no loss, benefits or risks related to my participation
- ☐ confidentiality (meaning what I say in my interview will not be given to anyone else)
- ☐ anonymity (meaning my identity will not be disclosed unless I give permission to do so)
- ☐ how the research findings will be disseminated

I _____ (respondent's name) hereby agree being interviewed

I agree/disagree [cross out as relevant] to have the interview audio-recorded

I agree/disagree [cross out as relevant] to my name being used.

Signature of Participant: _____

Date: _____

Signature of Researcher: _____

Date: _____



Ethics Clearance

SCHOOL OF ARCHITECTURE AND PLANNING HUMAN RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE PROTOCOL NUMBER: SOAP054/06/2017

PROJECT TITLE: Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A case study of Msawawa and Kya Sand

INVESTIGATOR/S: Feza Nxumalo (Student no #0416529Y)

SCHOOL: Architecture and Planning

DEGREE PROGRAMME: Master of Built the Environment (MBE)

DATE CONSIDERED: 18 July 2017

EXPIRY DATE: 18 July 2018

DECISION OF THE COMMITTEE: APPROVED

CHAIRPERSON

(Professor Daniel Irurah)

A. Williamson

pp A.K. Williamson

DATE:

cc: Supervisor/s: Marie Huchzermeyer

DECLARATION OF INVESTIGATORS

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to endure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

Feza Nxumalo
Signature

Date 11/12/2017

Sample Interview Structure

Topic: Household and collective responses to the absence of electricity supply in informal settlements in Johannesburg. A Case Study of Msawawa and Kya Sands

The in-depth, open ended qualitative interview questions:

The questions were designed in manner that will pursue participants to feel comfortable to reveal more information relevant to the study. The questioners were divided into three categories, General residences questioner, Community Leadership questioner and Business Owners questioner for Msawawa and Kya Sands informal settlements.

Hello, thank you for agreeing to this interview. As mentioned in my participant information sheet, I am interested in understanding your daily challenges and how do you manage residing in a settlement without formal electricity supply.

Informal settlement general residences working outside the settlement

1. How long have you lived in this shack?
2. How many people live with you in the shack? What age are the children, if there are children?
3. What time does your household go to bed and get up?
4. What source of energy do you use to cook? Where do you source this, and what does it cost you per month?
5. What do you use for light?
6. How do you keep your groceries fresh?
7. What do you do in winter to keep warm?

8. How do you charge your cell phone?
9. Do you listen to the radio or watch television? If so, how is this powered?
10. What about households that are poorer, what forms of energy do they use?
11. What about households that have bigger incomes – do they access different forms of energy to you?
12. Can you explain particular challenges you face with this situation?
13. What would you say is the biggest problem around sources of energy?
14. What is the cause of this?
15. Is this issue discussed in the community?
16. Is this an issue that the leadership knows about and is trying to address? If so, what is their approach?
17. Has the community ever considered protesting about these issues? If there were protests, what were the outcomes?
18. Is there anything else you think I should know about energy use in this settlement

Informal settlement community leaders interview guide.

1. How long have you been part of the leadership?
2. What are the community structures in this settlement?
3. What are the most important issues that the leadership has to deal with?
4. In what ways does the leadership have to deal with the absence of electricity?
5. What regulations has the leadership come up with in relation to the different sources and use of fuels and energy?
6. Could you explain the reasons for this?
7. Could you explain to what extent you are enforcing such rules, and how?
What other approaches has the leadership adopted in relation to energy use in the informal settlement, and have they worked?
What is the current thinking among the leadership on this topic?
8. As the informal settlements community leadership, have you ever engaged Johannesburg Metropolitan Municipality regarding the formal installation of electricity in the settlements?
And if so, what was their response?
9. According to the Department of Energy and the Constitution of South Africa electricity is a basic right. Have you ever taken into task the Johannesburg Metropolitan Municipality using this right and what was their response?
10. Has the leadership ever approached courts regarding the deprivation of your Constitutional right to electricity? And if so, what was the outcome?
11. There are several NGOs that are working with informal settlement communities. As the leadership do you have any relationships with such NGO and to what extent?

12. What in your view are the challenges that prevent the installation of electrification of Informal settlements?
13. What are the main causes of shack fires?
14. How often do shack fires incidents happen?
15. What has the leadership done to try and prevent such fires from happening?
16. Are there any other challenges do you think I should know about in relation to energy use in this settlement?

Informal settlement business owners interview guide

1. What kind of a business do you operate?
2. How long have you had this business?
3. What are your operating hours?
4. Are you satisfied with the quality of service that you are providing? Please expand
5. How do you cope in the absence of formal electricity supply?
6. What forms of energy or fuel do you depend on?
7. What forms of energy are generally used in the settlement?
8. Where do you source these, or who supplies these? Can you expand on some of the logistics and costs?
9. What would you say are the advantages or disadvantages of these?
10. How would you say business owners in general in this settlement respond to the absence of formal electricity supply in the Settlements?
11. Is there a business forum?
12. If so, in when last did you discuss the electricity situation in the settlement?
13. Does the settlement committee have a position on the use of electricity in the settlement? If so, what is this?

14. Are there any regulations applied in the settlement to the use of any fuels or forms of power, including electricity?
15. Is there a longer-term position? What are the plans for energy supply for the future?
16. Have you ever engaged the informal settlement community leadership regarding the progress on formal installation of electricity in the settlement?
17. When using fuel as an alternative source of energy do you store fuel in your premises? And how much quantity of fuel do you keep in your premises?
18. How is the level of crime directed to businesses in the informal settlements? Have you ever experience crime in your business and what transpired? Have you ever connected these to the energy/fuel situation in the settlement?
19. How often are the shack fires incidences occur?
20. What are the main causes of shack fires?
21. Are there other challenges you could share that relate to the absence of electricity in the settlement?
22. Is there anything else you think I should know about in relation to energy use in this settlement?