

The impact of load shedding on ICT enterprises in Matlosana

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PREFACE

Acknowledgements

The completion of this research would have never been achieved had it not been for the hand of God upon me and my family. Against all odds I managed, not because of my own doing but only by the Grace of the Almighty. It was indeed difficult, however, I made it my business to remain positive in all I did. I consider myself very much blessed when I think of the support that I received from my parents, uncle and aunt, brothers, all entrepreneurs who took part in the study, study mates, friends and relatives, the Language editor (Ms Hellen Thomas) my two children and my beloved husband. It is my hope that one day I will be able to repay you all in some way but as for now, it seems impossible to match what you have done for me.

I would be quite ungrateful if at this point I do not mention my supervisor Prof. T. Assan. Your work ethic is unmatched and it was evident that the comments you made came from a large bulk of intelligence. I pray that you move from strength to strength.

Abstract

The study focuses on the impact of load shedding on Information and Communications Technology based enterprises. The problem that enterprises have is that they are heavily dependent on electricity which, during load shedding, is not always available thereby causing stoppages to day to day business transactions that the enterprises need to carry out. In light of the last stated problem the study was guided by the question: What is the impact of load shedding on ICT based enterprises in Matlosana?

This study is a qualitative study which implies that only factual data was collected from a sample drawn from around Matlosana. The sample was made up of five entrepreneurs in the ICT sector who were purposefully selected. They took part in semi-structured interviews which were used to collect their perceptions. The analysis of the data was made following procedures for qualitative data analysis.

The study found that load shedding has a negative impact on ICT based enterprises. The entrepreneurs lose financially because they spend a lot of money on alternative power sources, payments of overtime to employees and at times, they need to replace broken devices that break because of load shedding. Furthermore, the qualitative analysis uncovered that the brand image of the enterprises gets tarnished as a result of load shedding which also renders the enterprises vulnerable to security threats because some of the security features depend on electricity. All these facts are important because at the moment, there is not much empirical work that has been done on this issue seeing that the concept of load shedding is still new and unfolding.

The study was concluded with a set of recommendations for all stakeholders to undertake in order to mitigate the impact of load shedding on ICT based enterprises.

Key terms

Load shedding; Eskom; Electricity Supply; Power; Power insecurity; Information and Communication Technology; Entrepreneurs; ICT based Enterprise; Profitability.

ACCRONYMS

| | |
|---------------|--|
| CEO | - Chief Executive Officer |
| COSATU | - Congress of South African Trade Unions |
| GDP | - Gross Domestic Product |
| ICT | - Information and Communications Technology |
| MW | - Mega Watts |
| NERSA | - National Energy Regulation of South Africa |
| NUM | - National Union of Mine Workers |
| PC | - Personal Computer |
| RDP | - Reconstruction and Development Programme |
| UK | - United Kingdom |
| UPS | - Uninterruptable Power Supply |
| NUM | - National Union of Mine Workers |

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CHAPTER 1

Orientation and overview of the study

1.1 Background of the study

Eskom first spoke about the possibility of load shedding in 1997 (Prinsloo, 2015). It warned the government that if power stations are not built in time there might be rolling blackouts to keep the grid functional (Kenny, 2006:12). The demand of electricity at that time was increasing rapidly. Although Eskom managed to produce 39 000 Mega Watts (MW), in 1997 the demand was well over 28 000 (MW) and quickly catching up (Green & Flanagan, 2008:21). New houses were coming onto the grid because houses were electrified in line with the Reconstruction and Development Programme (RDP) and subsequent economic policies of the African National Congress (Tshingilane, 2014:6). No new power stations were built to sustain this growth in electricity demand. The government wanted to introduce private power producers into the electricity supply business; however, even by 2004 no new power generators were found (Prinsloo, 2015). The plan had failed.

In 2007, the government acknowledged that they had made a mistake by not beginning with the building of power stations back in 1997 when Eskom asked for them (Green & Flanagan, 2008:21). What Eskom had said would happen if power stations are not built, namely; intermittent power outages started in January 10 2008 (Enslin-Payne, 2008:16). There were rolling power cuts that became known as load shedding because they were intended at lessening the load on the power supply system (Thakali, 2008:2). Electricity in towns was cut off following a sequence plan meaning that town 1 would experience load shedding while town 2's lights were on and on the specified time, town 2 would be the one experiencing load shedding while the lights in town 1 are switched on. As a result of this the supply would be stabilised. This was intended to be a reality until the new powers station namely; Kusile and Medupe had been built (Kalenga, 2014). This however, had some problems. The building of the power stations was hit by delays because of workers' strikes and other matters beyond the control of Eskom (Nada,

2014). The building was still underway in 2014, which means that load shedding still continues.

When load shedding happens, both households and business get affected. This study will particularly search for its impact on the Information Communications Technology (ICT) sector with specific reference to the district in Matlosana in the North West Province. These businesses depend mainly on Eskom power supply and hence with the unreliable electricity supply, the study intends to investigate how the entire operations of these enterprises have been affected.

1.2 Statement of the problem

A lot of hardware in Information Technology requires a constant flow of electricity to function. In the absence of electricity, it implies that there is no business for an enterprise whose trade depends on devices such as computers, printers, scanners etc. Devices such as the ones just mentioned are sensitive and prone to be damaged if they are switched on and off from time to time, as it happens when load shedding takes place (Thakali, 2008:2). This statement gives the idea that enterprises such as internet cafés and small print companies are bound to lose money when there is load shedding. Load shedding therefore, can be harmful to enterprises that trade with Information Technology. In fact, many companies, even those that are not in the field of ICT, tend to have more information technology problems when load shedding takes place (Mgibisa, 2008:8). Damaged equipment is usually replaced or repaired at a cost to enterprises which brings about loss in turnover of small enterprises (Prinsloo, 2015).

Other businesses in general are negatively affected, but small enterprises which will form the sample of this study are more affected than big businesses. Many small enterprises cannot cushion themselves against the blow delivered by load shedding (Mgibisa, 2008:8). The reason is that they need to use generators as counter measures but these consumes into their profitability (Bisseker, 2008:8). If that state of affairs continues, it might end up threatening the sustainability of the enterprises themselves (Mgibisa, 2008:8). This is something the South African economy can ill-afford at the moment because more enterprises are needed to create employment in the country.

Economists have sounded a warning that the impact of load shedding will result in the liquidation of small enterprises as well as the debt insolvency thereof (Mgibisa, 2008:8).

Another issue of agitation with Eskom's load shedding is that outage information is sometimes inaccurate (Bisseker, 2006:46). Power outage information is very important for enterprises to plan for load shedding in the endeavour to mitigate the impact. If not planned for, load shedding can cost a lot of money as was made evident above. In addition to damaged equipment, enterprises may have to pay all employees who come to work even though they might do nothing due to power outages (Bisseker, 2006: 46). This can be counted as loss of income because the business could not generate any money during outages but they still have to take out money to pay employees a whole day's wages.

Electricity insecurity makes it difficult for business people to invest in expanding or new business ventures thus affecting employment openings in the economy (Scot et al, 2014:1). The fact is that potential employers see load shedding as a major risk, especially in enterprises which requires the use of machinery, they tend to be reluctant in hiring new people (Eberhart, 2014:5). The overriding perception of most business people seems to be that if electricity cannot be guaranteed then they might find themselves having to pay for labour not rendered (Scot et al, 2014:2)

The problem of load shedding is experienced all over South Africa (Eybers, 2014:8). This study looked at enterprises around Matlosana local municipality. The main focus of the study is to understand the impact of load shedding on the enterprises that deliver Information Technology services such as internet cafes, small printing companies and repair shops.

The problem to be specifically addressed by this research is that there is little knowledge available on the results of load shedding on enterprises in small cities such as Matlosana. Literature does not cover these towns a lot and there is little scholarly work that has been done thus far on load shedding, perhaps the reason might be that it is still an unfolding phenomenon therefore this research will bring facts from Matlosana into the existing body of knowledge.

1.3 Specific questions

The key research question in this study is:

What is the impact of load shedding on ICT based enterprises in Matlosana?

In the effort to get a thorough understanding of this phenomenon the main question was linked to the following secondary questions:

- What is the nature and characteristics of Eskom power supply management on ICT based enterprises in Matlosana?
- What influence does load shedding have on ICT based enterprises in Matlosana?
- What strategies can ICT based enterprises use to manage the impact of load shedding on their enterprises?

1.4 Aims of the study

The main aim of the study was **to investigate the impact of load shedding on ICT based enterprises in Matlosana in the North West Province.**

To this effect the objectives of the study are:

- To determine the nature and characteristics of Eskom power supply management on ICT based enterprises in Matlosana
- To establish the influence of load shedding on ICT based enterprises in Matlosana
- To determine the strategies that can be used by the enterprises to reduce the impact of load shedding on their enterprises.

1.5 Significance of the study

Studies have been conducted on topics similar to this one such as the one by (Bisseker, 2006); however, they were done in other geographical areas around the country. This study was an attempt to work out such an impact on the area of Matlosana with the hope that the results would add more knowledge and understanding of the impact of Eskom power management and the effect on ICT enterprises.

The findings of this study will benefit as with every task, researchers who have to adhere to particular standards that direct their conduct during the study. These particular standards are known as a paradigm which is defined as being a set of fundamental points of view characterising a particular science (Babbie, 1998:42). This means that research has to be designed according to basic rules and those rules are applied to the design as according to the researcher's point of view. For a study that is meant to bring about an understanding by seeking to explain the meaning that the participants attach to the subject matter such as this one, it is important to adopt the interpretive paradigm. Interpretive paradigm is aimed at discovering how participants of the study understand their life (Babbie, 1998:281). Documenting the points of view to figure out how they make sense of the oil price fluctuation will be kept in mind when designing the study.

1.6 Research design

Research design refers to the consideration put into methods that were used to gather data and the creation of appropriate procedures and techniques that were used for obtaining and interpreting, reliable, objective and valid data by which a clear understanding about a phenomenon can be reached (Cohen & Manion, 1997:14). Research design, judging by the previous statement, has to do with the planning of how the study was carried out meaning the way in which the sample was selected, data was collected and analysed.. When making this consideration, it is important to keep in mind that for the experimental inquiries or proving a hypothesis, quantitative research is suitable but for interactive studies such as this one, qualitative research is more appropriate (Maree & Van der Westhuizen, 2010:34).

The research design was influenced by the researcher's paradigm. As with every task, researchers have to adhere to particular standards that direct their conduct during the study. These particular standards are known as a paradigm which is defined as being a set of fundamental points of view characterising a particular science (Babbie, 1998:42). This means that research has to be designed according to basic rules and those rules are applied to the design as according to the researcher's point of view. For a study that is meant to bring about an understanding by seeking to explain the meaning that the

participants attach to the subject matter such as this one, it is important to adopt the interpretive paradigm. Interpretive paradigm is aimed at discovering how participants of the study understand his/her life (Babbie, 1998:281). Documenting the points of view to figure out how they make sense of the load shedding situation will be kept in mind when designing the study.

This study was not an experiment or aimed at proving a hypothesis but focused on the respondent's ideas, beliefs and opinions in order to create an understanding about the impact of load shedding on ICT-based enterprises in Matlosana as qualitative researchers always seek to do (Leedy & Ormrod, 2010:135). Quantitative methods cannot serve these purposes. The study gathered the participants' views on the matter and analysed them to come to an understanding.

Up to this point it is clear that qualitative research was suitable for this study. By definition qualitative research is a concept under which there are multiple forms of inquiry that help researchers to understand and explain the meaning of social phenomena with as little disruption to the natural settings as possible (Merriam, 1998:100). It is an approach that is used when the study is being guided by the interpretive worldview (Creswell, 2003:3). Given that fact and other facts stated above, it is ideal that qualitative techniques be used.

There are ways of applying qualitative research but this study adopted the case study design. A case study is an in-depth examination of a single individual, group or society and its chief purpose is to describe (Babbie, 1998: 282). The advantage derived from case study design is that this study focused on a group of ICT based entrepreneurs in the Matlosana area. This was an in depth look into how they manage the impact of load shedding on their enterprises. Therefore because they were studied in exclusion from entrepreneurs from other areas, using case study makes sense.

1.7 Population, Sample and Sample Techniques

Population is the theoretically specified total of study elements from which a sample for research is drawn (Babbie, 1998:201). The sample is a detachment from the overall population who serve as a set of actual observations for the study (Howell, 1989:3). The

sampling technique that was employed for the purpose of this study was one known as purposive sampling. Purposive sampling means the selection of the sample based on the researcher's own judgment and knowledge of the participants so that they can fit into the aims of the research (Babbie, 1998:195). In this case, the sample had to fit into the ICT-based enterprise category.

ICT-based enterprises around Matlosana formed the sample for the purposes of this study. These entrepreneurs are close to the researcher and some are known as acquaintances and social contacts. Five participants took part in this study. They were interviewed separately. The participants own enterprises that include internet cafés, printing company, Computer sales and repair shop. This sample is located in different parts of Matlosana.

1.8 Data collection strategies

The data for this study was collected by means of semi-structured interviews and questionnaires. Interviews are a flexible tool for collecting data as it enables multi-sensory channels such as those for non-verbal, spoken and heard to be used (Cohen, Manion & Morrison, 2007:40). This makes interviews a good tool for data collection because it takes the structure of a conversation between the researcher and the participants. To conduct interviews one must have a set of questions but in semi-structured interviews, the interviewer has the flexibility to ask further questions should they need to (Kornuta & Germain, 2006:126). Unlike in questionnaires, when the participants don't seem to understand, the interviewer can clarify and vice versa. This flexibility gives the interviewer a chance to get rich data out of the participants.

Field notes were gathered as well as this is important to facilitate data analysis regardless of what collection method is chosen (Gay & Airasian, 2008:218). These notes were used in putting together questions for this study. In other words notes were collected to familiarise with the research sites. Field notes will give information from observation. This is important because natural settings must not be disturbed in any way.

1.9 Data analysis & interpretation procedures

Qualitative data analysis is a process in which findings progressively emerge from the data through a relationship that exist between the researcher and the source of data (Mertens, 1998:348). There are no predetermined subjects under which data is clustered. As a researcher one should start the research with an open mind. The objective of analysing qualitative data is to establish categories, relationships, and assumptions that inform the worldview of the participants in the matter under study (Patton, 2002:431).

The above is achieved through a process known as coding in which line by line of the transcribed data is read through carefully after which it gets divided into meaningful analytical units (Neuwenhuis, 2010:105). These meaningful analytical units are the ones that are referred to as categories in the previous paragraph. In the coding process, all the text that can be associated with a similar idea is grouped together so that it can be examined jointly and different cases compared in that respect (Neuwenhuis, 2010:107). At this point the next step was necessary.

After the categories have been completed they have to be grouped under a label or a word that unites them, meaning codes (Neuwenhuis, 2010:107). This will make it easy to make findings at a later stage. When codes are attached to the different facets of the data in order to identify resemblance of opinions in the data, it is called inductive coding (Neuwens, 2010:107). It is inductive because, as stated previously the codes are brought on by what is contained in the data not by the researcher themselves. There are no set ideas beforehand. The data is allowed to speak for itself.

In this case, all the processes which relate to analysis were done manually.

1.10 Access and Ethical Considerations

In dealing with ethics of research in order to protect the rights of participants (Huysamen, 1994:178-186) recommends that researchers should do the following:

- Informed consent was agreed on with the participants in writing when they sign a consent form detailing the purpose of the study and the role they are expected to play;

- Their participation was voluntary as no one was forced to participate;
- Participants were not exposed to any psychological or physical pain and discomfort given that the questions will not seek deeply personal information;
- The participants' privacy was respected because they did not have to answer deeply personal questions and the raw data will not be handled by third parties.
- No part of the data was falsely represented on the findings and the participants received a copy of the analysis and the findings to see if they correspond with what they have said
- No information about the study was withheld from the participants and they were given a chance to ask questions about anything they wish to know more about.

1.11 Summary

This chapter had to familiarise the reader with both the topic under study and the method of research implemented to answer the research question. The study as shown above is a qualitative case study focused on enterprises around the Matlosana in the North West province. The ICT based enterprises were the most preferred sample and they were chosen purposefully to meet the aims of this study. The following chapter will dig deeply in so far as literature is concerned with regard to Eskom and load shedding. The chapter will look into the written documents to make a case for this study.

Chapter 2

Review of the Literature

2.1 Introduction

In the previous chapter much attention was paid to introducing the study to the reader. Different aspects of the purpose of the study, problem statement and significance of the study were discussed. In this chapter the focus is on reviewing the literature to give an idea of what authors and other researchers have discovered already while working within the areas of ICT enterprising and electricity as well as what policies and action plans are in place to combat the problem of load shedding. This is important to show the gap in the current body of knowledge that this study will fill.

2.2 Background of power supply in South Africa

Electricity was predominantly used by mines previously and by 1909 the need was recognised for a national utility to supply power to rail road (Coutsoukis, 2004). Eskom was set up in 1923 to supply electricity across industries and households in South Africa (Anonymous, 2015). The first power stations commissioned to supply electricity were Witbank, Colenzo, and Salt River power stations (Eskom, 2010). Since then it has supplied households, enterprises and major industries with electricity (Coutsoukis, 2004). South Africa depends mainly on Eskom to supply electricity.

The demand for the supply grew faster than the GDP after the Second (II) World War (Coutsoukis, 2004). The supply of electricity however, mainly concentrated in urban areas during the apartheid era. The government funded the expansion of the electricity grid which was stalled a bit in 1985 because of sanctions and by then only 40% of the population had electricity (Coutsoukis, 2004). With the advent of democracy, things had to change. Electricity had to be supplied to both urban areas and villages (Brochersiet *al.*2001). This has been ongoing since 1994. By 2001, 2.7 million houses had been added to the national grid (Department of Minerals and Energy, 2008:8). The supply capacity was not expanded much during that period of grid expansion. Politicians wanted the privatisation of Eskom to take place and while the political wrangling was going on, the demand for electricity was growing. In 1997 the demand for electricity was

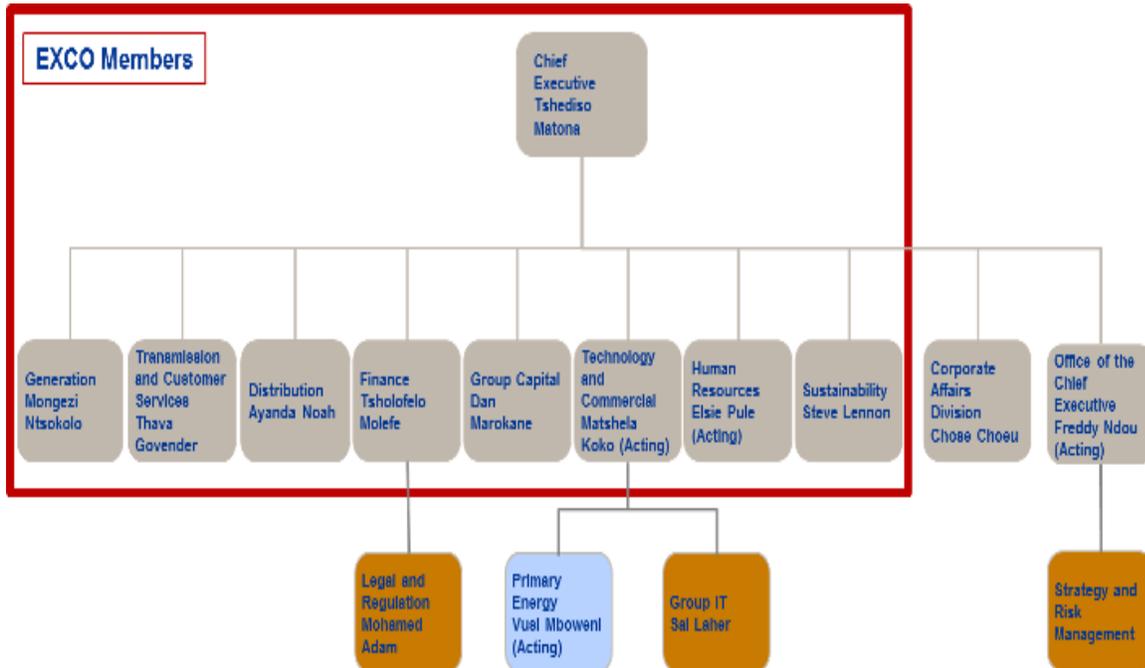
at 28 330 MW and because electrification was moving at a very fast pace, it was evident that the demand would go beyond the supply capacity which at the time stood at 39 000MW in a short space of time (Green & Flanagan, 2008:21).

Today Eskom continues to provide 96% of the electricity in the country which is distributed by Eskom itself, municipalities and other distributors who are licensed (Department of Minerals and Energy, 2008:8).

2.3 Nature and characteristics of Eskom power supply management

a) The role of Eskom’s management

Figure 1: Management structure at Eskom



(Source: Eskom, 2015)

The reason why it is important to mention the management of Eskom is that it does contribute to the problem of load shedding. Recently the Eskom board fired its CEO (SAPA cited in City Press a, 2015:2). He was blamed for some of the problems that exist in Eskom although he had only been at the helm of the parastatal for a few months (Yelland, cited in City Press b, 2015:1). It did not end there. A few weeks later the

chairman of the board was fired (Yelland, cited in City Press b, and 2015:1). This reveals that there are serious managerial problems that are in existence in Eskom.

The activities that are mentioned in the previous paragraph were not new. In the past when the problem of load shedding was still new, Mr Jacob Maroga was forced to tender his resignation following fallout with the chairperson of the board at the time, Mr Bobby Godsell (Mooki & Nhlabathi, 2009). This is further evidence that there are some problems at the top, with incompetent officials being paid a lot of money for not doing much to curb the problems that were faced by Eskom at the time.

There is a need for stability in Eskom's top management so that it can deal with problems head on. It was revealed to the public recently by the former CEO, Tshidiso Matona that there has not been efficient maintenance on power stations from 2008-2015 till now (Van Rensburg, 2015:4). This had yielded problematic consequences. Because of Eskom's policy of "keeping the lights on at all costs" maintenance of power stations was neglected and this resulted in a situation that diesel was overly relied on to generate electricity meaning more costs to be undertaken by Eskom (Van Rensburg, 2015:4).

If management is in shambles it is probable that output of a company may suffer thereby hurting the survival of the company itself or the client base that relies on its services (Froese, 2014:23); then systems should be put in place to correct such mishaps. This is what happened in this case. The management of Eskom is in shambles and as a result ICT companies are suffering. It means that the problems of Eskom emanates from the top and the way in which load shedding has been handled thus far reveals lack of good leadership which the management is supposed to offer.

b) Distribution networks

Eskom shares the role of distributing electricity with municipalities, and other licensed distributors (Department of Minerals and Energy, 2008:8). Many municipalities do not currently have power generating capacity so the generation aspect is handled by Eskom. Distributors must be approved by the National Electricity Regulator (Eskom, 2009:6) to enter into the business. Eskom supplies electricity at high voltage to these

distributors and municipalities who then supply customers (Eskom, 2013:1). About 180 municipalities distribute 40% of electricity sales to 60% of the customer base (Department of Minerals and Energy, 2008:8).

The use of electricity in South Africa is currently divided between domestic (17.2%), agriculture (26%), mining (15%), industrial (37%), commercial (12, 6%), transport (2, 6%), and general (12, 3%) (Department of Minerals and Energy, 2008:8).

c) The principles of load shedding

Load shedding is a last resort measure that Eskom (the power utility) takes to ensure stability of the country's power system by switching off parts of the network in a planned and controlled manner to lessen the demand for electricity (Eskom, 2015). Power is switched off in some parts of the country whilst others are kept on to make sure of the reduction of the number of users who can be accommodated by the generators of electricity without them being over worked (Slabbert, 2014). In basic terms load shedding is a plan that Eskom implements when the national power grid is under pressure to ease that pressure by turning off electricity supply from one place to the next.

2.4 Reasons for load shedding

By switching off parts of the power grid in a controlled manner, the power grid is ensured to be stable at all times (Eskom, 2015). Therefore the limited power available was shared equally among the users. However, the main reason why we have load shedding in the first place is that the government was too slow in heeding the warning that Eskom sounded in the late 1990s that if new power stations are not built in time, the country might experience power supply problems in 2007 (Calldo, 2008:7 & Prinsloo,2015). The government at that time wanted private electricity producers to be allowed to supply electricity to the national grid but very little was done to incentivise the private power producers and by the year 2000 none had invested in private power generation (Green & Flagan, 2008:21).

At the time when the Department of Minerals and Energy invited proposals in 2004 for independent power producers to help meet about 1 000 Mega Watts required annually from 2007, the private sector did not respond well because Eskom still wanted to retain 70% dominion on the power production of the country (Caldo, 2008:7 & Prinsloo, 2015). Government could have come in between and ensured that there is a functional relationship between Eskom and private producers (Green & Flanagan, 2008:21). It seemed that the government did not view the electricity issues with urgency and as a result ignored Eskom's warnings.

In the meantime South Africa was experiencing a steady growth in the demand for electricity due to economic growth which took place at the time (Eskom, 2015). In addition to the economic growth, new houses were added into the grid rapidly (Tshingilane, 2014:6). Essentially the demand side was expanding whilst the supply side stayed the same. The government seemed unmindful of the fact that by 2004 economic growth was at a much faster pace than expected and as a result the demand for electricity was growing as well (Caldo, 2008:7). There was a slow reaction to the pending power demand crisis of the late 1990s on the part of the government and there was still a slow reaction to the increasing potential for increased power demand in the early 2000s.

Former president Thabo Mbeki admitted that the government made a mistake in 2007 (Green & Flagan, 2008:21). However, at that time, load shedding was inevitable. Essentially, what has been explained till now is that the government's failure to respond timeously in mitigating the possibility of load shedding as well as to facilitate a profitable entry of independent power suppliers into the grid contributed to the problem of load shedding as it is today.

When Eskom finally prepared to meet challenge of more demand, they did not have enough skilled people in their work force (Caldo, 2008:7). This may be taken as another contributory factor to the electricity supply crisis. This is due to the fact that it took some time to sort out that problem of unskilled labour as well as the one for lack of good leadership which Eskom had at that time (Van Wyk, 2011: 10). Eskom's work force had

fallen from 60 000 to half of that when its expansion began to pick up momentum (Calldo, 2008:8).

What is paramount is that the shortage of workers at Eskom resulted in badly maintained power stations, as was evidenced by the shutdown at Koeberg nuclear power stations in Cape Town, which could have been avoided if picked up in time (Calldo, 2008:8). The fault at Koeberg, with its sketchy details, took about 1 000 MW from the grid (Carvallo, 2015). Such matters are deemed to increase the possibility of load shedding.

Despite challenges that were faced by Eskom, building of new power stations was hit by strike actions of workers working in the construction sites (Yende, 2011:10). This delayed the expansion programme of Eskom. The construction was scheduled to last eight years but was behind schedule because of those strike actions (Yende, 2011:10).

A less serious causative problem that Eskom had back in 2008 was that it had a short supply of coal, only 12 days' worth of coal to be exact, but this was quickly resolved and the stock pile was increased to 40 days (Van Wyk, 2011:10). This and other reasons as stated above are behind load shedding.

2.5 Key energy legislation and policies in South Africa

The government of South Africa has put policies in place to move energy efficiency forward (De la Rue du Can *et al*, 2013:3). In this case policy and legislation that has been promulgated signify the intention of the government to create good standards for electricity generation (Glazewski, 2005:1 & Prinsloo, 2015). Policies are triggered by something in most cases. The trigger in this regard had been the advent of load shedding (De la Rue du Can *et al*, 2013:3).

It was evident that load shedding was inevitable when most of the policies that were discussed herein were formulated and action was needed from all sectors of society, from residents to big industries (Scott *et al*. 2014:17). The government has recognised that low prices at which electricity is sold in this country kept investors away and sought to remedy that by instituting the National Energy efficiency strategy in which the price of electricity

was increased significantly to make investment in the electricity production of the country attractive and establish a cost reflective electricity tariff by 2015 (De la Rue du Can *et al*, 2013:3).

To achieve that objective, legislation and policies which are to be reviewed, were established. The problem with the South African government is that when it comes to formulating policy they are very good but there seems to be a big problem when it comes to implementation of such laws (Montalto, 2015). This applies to many policies that have been created by government. So it seems as if South Africa does have good policies as were shown herein but despite that the country still has a problem of load shedding. It is not just the nature and characteristics of Eskom power supply management that has an impact on ICT based enterprises but, as shown above, government policy plays a role as well.

2.5.1 The constitution of South Africa

The Constitution is the supreme law of the country and it means that all laws and conduct in South Africa must conform to the Constitution. The Constitution of South Africa states that the state has to draw up a national energy policy to make sure that national energy resources are made the most of to benefit everyone in the country. In the effort to go along with this requirement of the constitution the government set up policies and legislation to guide the process of energy operations in the country. The Constitution sets out principles to be followed when drafting policies and laws (Glazewski, 2005:3). This is why it was important to start this subsection by first mentioning the Constitution upon which all the following policies and legislation with regard to the provision of electricity are based. These laws will be examined in relation to the phenomenon of load shedding as this is the major focus of the study.

2.5.2 The white paper on energy policy for South Africa of 1998

Unlike South Africa's policy in the past which focused on energy and security supply, the White paper on energy policy currently focuses on making sure that there is enough supply to cover even the previously disadvantaged people of the country (Department of Environmental Affairs and Tourism, 2005:8). In essence, it represents a comprehensive

and holistic perspective of South Africa's official overall energy needs and options (Glazewski, 2005:1 & Prinsloo, 2015). This policy emphasises the need to widen the electricity grid to be inclusive of all people in South Africa without any discrimination.

One of the main goals of the white paper is to create energy security and increase access to affordable energy services inclusive of electricity, by diversifying the energy supply and carriers (Glazweski, 2005:3). However, in the process of making sure that the energy supply to previously disadvantaged communities, the government neglected issues of energy security in the country (Green & Flanagan, 2008:21). The electricity grid was widened without boosting the capacity of generation of electricity (Montalto, 2015). This is why the country experiences load shedding today.

2.5.3 The Energy Efficiency Strategy of the Republic of South Africa

The Energy Efficiency Strategy is the first consolidated Governmental document aimed towards the development and implementation of energy efficiency practices in South Africa and it takes its directive from the *White Paper on Energy Policy* and links energy sector development with national socioeconomic development plans as well as being in line with other Government departmental initiatives (Department of Environmental Affairs, 2005:9). In simpler terms, the strategy can be understood as the government's approach towards creating a competency in South Africa in the efficient use of energy.

The policy sets out clear and practical guidelines for the implementation of efficient practices within the economy of South Africa, including the setting of governance structures for activity development, promotion and coordination (Department of Environmental Affairs, 2005:9). The strategy in essence aims to assist in the provision of energy for all South Africans, by reducing energy consumption through efficient practices and sustainable energy development (Glazewski, 2005:4).

This policy is relevant when one is dealing with matters of load shedding because the policy in itself focuses on balancing the need to use energy by everyone and the need to ensure that there is enough of it for everyone. This was to be done through putting into practice the enabling instruments and interventions set out in the policy which

include, financial and legal instruments, efficiency labels and performance standards, energy management activities and energy audits (Glazewski, 2005:5).

Through this strategy Eskom has been given the role of administering electricity saving programmes (De la Rue du can, 2013:3). These include financial incentives given to consumers that apply stipulated measures to lessen their dependence on electricity such as using solar geysers and other such measures (Glazewski, 2005:4). The financial incentives also apply to industrial consumers who take the initiative to reduce their usage (De la Rue du can, 2013:3). The less the dependence is on the national grid the more avoidable load shedding becomes.

Eskom was able to reduce the dependency on the grid by agreeing with big users of electricity such as mines and smelters to cut their energy usage by 20% (Blaine, 2014). The problem with this is that the big users were targeted and the residential consumers were not placed under the same obligations (De la Rue du can, 2013:29). However, residential consumers were given free energy efficient lights that helped to ease the pressure on the national grid as well (Blaine, 2014). Over 3,072 MW was saved from the inception of implementation to 2013 which is equivalent to an offset of 5 generators (De la Rue du can, 2013:30).

Eskom does not have an agreement with small businesses.

2.5.4 The Electricity Regulation Act of 2006

This Act introduces a regulatory framework with what is known as Energy Efficiency Demand Side obligations to electricity producer licences and it empowers the National Energy Regulator of South Africa to implement Department of Energy policies (De la Rue du Can *et al*, 2013:22). NERSA is a body that is mandated in terms of the National Energy Regulator Act, 2004 (Act No. 40 of 2004) to regulate electricity, piped-gas and petroleum pipeline industries in terms of the Electricity Regulation Act, 2006 (Act No. 4 of 2006), the Gas Act, 2001 (Act No. 48 of 2001) ('the Gas Act') and the Petroleum Pipelines Act, 2003 (Act No. 60 of 2003) (NERSA, 2013:1). The focus of this study is

only on the electrical side. NERSA determines the costs that Eskom can set as tariffs (De la Rue du Can *et al*, 2013:23).

In basic terms, the Act seeks to ensure that there are rules to which all stakeholders involved in the generation of electricity have to adhere. This includes independent power producers (De la Rue du Can *et al*, 2013:22). This is good because it ensures that all power producers adhere to the same principles and procedures in order to create equal standards throughout the power producing infrastructure. The Act sets out roles for each of the stakeholders to play in ensuring equitable electricity supply.

2.5.5 The white paper on renewable energy

The white paper on renewable energy sets out the target that the government is committed to achieve as far as introducing renewable energy into the power grid is concerned (Department of Environmental Affairs and Tourism, 2005:10). Chapter four of the policy identifies different forms of renewable energy and they are:

- Solar- this form of energy which makes up only 10% of the power produced in South Africa but has great potential if tapped into because of great amounts of solar radiation experienced in the country.
- Hydropower- this is the least used renewable form of energy although it has great potential as well if exploited properly;
- Biogas and landfill gas- this form of renewable energy is good for addressing thermal needs of the country; and
- Wind energy- thus far a number of experimental wind farms have been built (Glazewski, 2005:1).

The target as set by the White paper was that 10 000 GWh were to be generated through renewable energy sources in 2013 (Department of Environmental Affairs and Tourism: 10). By 2009 4 GWh was being obtained from these sources of energy (Eskom, 2009). This is helpful in the effort to reduce the adversity of load shedding; however, little has been done to achieve the 10 000 GWh thus far (Eberhart, 2014:6).

Eskom also intends to build 100 MW wind farm, in Sere and 100 MW concentrated solar plant to add to the 4800 MW and 1300 MW that will be generated by Medupe and Kusile power stations respectively (Eberhart,2014:6).

It all comes down to the fact that the policy had not been followed well enough to reach its targets within the stipulated time frame. Little has been achieved as it has been shown above and perhaps if this policy had met its targets load shedding would have been avoidable.

The challenges that still face South Africa with regard to legal and policy framework on renewable energy include:

- The regulatory institutional framework for the various forms of renewable energy are still not being accommodated a under single structure;
- Lack of clarity with regard to measures that are to be taken in case the targets are not met or what incentives were given to potential independent renewable power producers;
- Legislation in this regard needs to be investor friendly; and
- The power production industry is dominated by the bigger utilities and still needs to liberalise sufficiently to accommodate smaller power producers (Glazewski, 2005:14).

2.5.6 The National Energy Act 34 of 2008

The National Energy Act was introduced to ensure that diverse energy resources are available, as much as it is needed and at affordable prices to all South Africans (RSA, 2008). Section 17(1) gives impetus to the Minister of Energy to ensure that there is energy security and supply in the country by directing the state-owned entities to acquire, maintain and manage national strategic feedstock and carriers. It means that the Minister of Energy has to ensure that measures are taken at all times to make sure that enough electricity is available for consumers.

The Minister is further given the role of ensuring that funding is in place to ensure that state-owned entities responsible for the provision of electricity to invest adequate in

energy infrastructure as is stated in section 18. The National Energy Act thereby gives the Minister of Energy the role of playing a supervisory role in the electricity production field. The Minister is responsible for policy making that makes electricity available to both residential and industrial consumers. The Act makes it clear as to what the role of the government is in energy security and supply as well as the role of other stake holders.

The Minister represents the Department and when it was stated that the department came up with Energy Efficiency Strategy of South Africa it means that the Minister oversaw the formulation of that policy. This is mentioned to avoid confusion on the two terms.

2.6 The influence of policy on power provision

It has been made evident that there is a workable policy and legislative framework and also in the previous chapter mention was made that the problem of load shedding can be as a result of political idleness showed by the government of South Africa. It is therefore important to look deeply into the role played by politics in the beginning and the current role played in the political sphere with regard to load shedding.

Load shedding may erode investor confidence in South Africa and that may mean fewer jobs (Montalto, 2015). Load shedding has been referred to as “a positive crisis” by members of the ruling party (Eybers, 2014:8). This is in spite of the fact that the ruling party was responsible for it in the first place. On the other hand the opposition parties use the problem of load shedding as a political tool to launch attacks on the ruling party and Eskom (Montalto, 2015). It means there is no common political ground on how the problem can be solved.

One of the major contributors to the delay when it comes to the building of the power stations has been strikes by workers (Thakali, 2008:2). Many of the strikes were led by Confederation of South African Trade Unions which happens to be in alliance with the ruling party (Nada, 2014). This is why it had been hard for the government to take hard measures against the workers. COSATU rallies its members to support the ruling party during elections (Kalenga, 2014). This means that if the ruling party would offend

COSATU in any way it may suffer some election losses. The workers working in the power stations are specifically represented by a COSATU affiliate, the National Union of Mineworkers (Nada, 2014). Until 2012 NUM had been one of the biggest unions within COSATU (Thamm, 2012:27). The government was not going to offend one of the biggest unions that can call on so many of its workers when the elections come.

As highlighted above, there has been good policy formulation and some of it brought some results although it had been impossible to do away with load shedding completely. Thus far, when politicians discuss load shedding, they never say how each of them will get their constituency involved in the effort to bring their usage of electricity under control so as to reduce the blow of load shedding. When the soccer World Cup was said to come to South Africa, political parties were united in getting people enthusiastic about that (Montalto, 2015). The same enthusiasm is needed when it comes to the reduction of energy use.

The government on the other hand seems to be most content with inquiries, task teams and internal discussions (Montalto, 2015). This indicates a lack of a sense of urgency on their part. Basically what it comes down to is that there is no positive demonstration of political will to solve the problem. Everybody has become used to load shedding so it cannot be used as a political tool to win votes and therefore politicians move to other issues (Montalto, 2015). If load shedding was such a tool perhaps mass mobilisation would have been undertaken without much attention being paid to political lines.

How all the above relate to the study is that it makes it clear as to how the problem of load shedding could have been solved if there would have been cohesion among the stakeholders. Because of the lack of such cohesion it impacted negatively on the nature of Eskom's power supply management and provision to the whole country and specifically to small enterprises based on ICT.

2.7 Current measures to combat load shedding

It is important to examine the work that has been done so far to make sense of the experiences of government, Eskom, the public and other affected parties with relation to load shedding. While load shedding cannot be combated in any way unless the power generation is increased through increase in the power stations, Eskom has in the past come up with plans to reduce electricity usage so that load shedding can be reduced. They are the following:

- Residential Mass Roll Out- this plan was intended to replace energy gobbling appliances with energy efficient ones and energy efficient methods such as:
 - Energy efficient CFL replacing incandescent lighting;
 - Energy efficient down lighters replacing halogen down lighters;
 - Geyser timers;
 - Geyser blankets;
 - Pool timers; and
 - Low flow shower heads.
- Solar water heating- the plan here was to give a financial incentive to consumers who opt for solar water geysers but this plan did not achieve much reduction; and
- Heat pump system- in this plan rebates were offered on heat pump system or replacement of geysers for both residential and industrial purposes. (De la Rue du Can *et al*, 2013:30).

These measures were responsible for the saving of 3072 MW in 2013 (De la Rue du Can *et al*, 2013:30). While a lot has been done to achieve savings in lighting, industrial process optimisation compressed air system, little attention has been given to technologies in the residential sector and Eskom has to increase its roll out of geyser blankets and low flow shower heads (De la Rue du Can *et al*, 2013:30).

Not a lot has been done to curb the energy usage in appliances such as refrigerators and televisions which take up a large amount of power in the residential sphere (De la Rue du Can *et al*, 2013:30). However, it shows thus far that there is an effort to manage

Eskom power supply and therefore ICT based enterprises can draw some hope from that fact.

2.8 Envisaged measures to ensure energy supply

As stated in the previous chapter, the only lasting solution to load shedding will come with completion of the two power stations currently under construction. It means power generation from these power stations can be regarded as part of the envisaged plans. There are others as well that include the usage of renewable energy, the inclusion of independent power suppliers and other plans (De la Rue du Can *et al*, 2013:4).

Eskom is busy building power stations that will provide power from renewable energy in the form of solar, wind and hydro power (Eskom, 2015). It has already been mentioned herein that Eskom intends building a 100 MW wind farm in Sere and a 100 MW concentrated solar plant (Eberhart,2014: 6).Since the advent of load shedding, every Mega Watt is important. This shows how measures are being taken to ensure that the solution is brought about on the issue of load shedding thereby benefitting the enterprises based on ICT in the long run.

2.9 General electricity needs of enterprises in South Africa

Eskom is a major driver of the South African economy (Eskom, 2011). Electricity is a one of the major commodities in many sectors of industry (Scott *et al*,2014:1).Through its sales of electricity, Eskom's economic value added at group level reached R42.1bn in the financial year 2011(Eskom, 2011). The key users of electricity in the business sector are mines and smelters (Scott *et al*, 2014:1). These industries need a lot of electricity to do perform their day-to-day activities.

An independent study conducted by a company called Quantec Research (Pty)Ltd found that Eskom's direct impact on the South African GDP as a result of its operational and capital expenditure is about 3%, taking into account only initial impacts and first-round effects in the economy (Eskom,2011). This shows that Eskom is a notable player in the economy of South Africa. In spite of that, financing the construction of new electricity supply facilities as it is currently happening has had a negative impact on the

economy since requiring cost-reflective pricing will see large price increases scheduled for the next few years (Eskom, 2011). This has not been good. This is because it will increase production costs for the energy-intensive industrial sector and could reduce competitiveness in export markets (Eskom, 2011). Businesses may also be negatively impacted on the ICT based enterprise side.

2.10 Lessons from other countries

In the effort to curb the problem of load shedding and its impact on small entrepreneurs it is important for all stakeholders to learn from experiences of other countries and the solutions that came as a result of such experiences. Some countries have been able to work out plans on how to manage power supply in such a way that it is kept constant even when times are hard (Leach, 2007). Lessons can be learned from these countries on a political or business level.

2.10.1 India

India has had the problem of load shedding. In fact for them it was worse because they once reached a point when the whole electricity supply infrastructure collapsed and sent the whole country into darkness (Ahn & Graczyk, 2012:7). Perhaps Eskom has to be commended for making sure that this does not happen in South Africa. However, what is most important are the lessons that can be learned from the experience that India has had thus far on the part of the electricity supplier there and the general public.

In July of 2012, Northern India experienced huge black outs (Ahn & Graczyk, 2012:7). This event was preceded by good intentioned policies. The government made it its goal to make energy accessible to all Indians but the sector, which is 50% private, did not improve capacity to meet the increasing demand (Ahn & Graczyk, 2012:7). This is almost the same scenario as in South Africa when Eskom was forced to implement load shedding. The policies of subsidising poor consumers of electricity made it difficult for power producers to run a well functioning and financially sound energy sector and as a result there was not enough investment into modernisation of the infrastructure (Ahn & Graczyk, 2012:7). This is very similar to the electrification of many new houses from

1994 which made it difficult for Eskom to invest in proper measures to ensure energy security while at the same time making sure that the policy of Reconstruction and Development Programme is followed through as far as electricity is concerned (Thakali, 2008:2).

In essence, the similarities between the South African and Indian situation as shown in the previous paragraphs, is that the demand on the grid was increased without escalating the capacity to supply enough energy to support all the new consumers which led to dire consequences as far as electricity supply is concerned. The two governments were implementing policies that were well intentioned, to provide electricity to poor societies. Although this was noble it over stretched the grids of the two countries.

There has been intervention in both countries. Eskom put measures in place to proactively deal with the adversities of load shedding; however, lessons that can be implemented in South Africa from the Indian experience can be discussed in the following manner.

After complete blackouts that the north of India suffered they devolved the administration of electricity supply, including decision making to the various states instead of the federal government (Raj, 2014:5). The lesson in this regard can be that Eskom may devolve decision-making to its regional structures as well. Currently what is happening is that Eskom puts a national implementation of policy plan in place and all regions have to put it into practice (Eskom, 2015). The problem with this method is that it may reduce the ability to react effectively in region based crises.

Again, instead of building renewable energy sources using state funds the Indian government got private companies to build a hydro powered station in one of the states (Raj, 2014:10). Private companies in South Africa can be given incentives to be the ones who build the power stations and make money out of those ventures. Currently the private companies do not benefit much from producing power because Eskom dominates the market (Green & Flagan, 2008:21). Funds that were to be used for further electrification programmes by the affected states were diverted to increasing

capacity (Raj, 2014:11). It would be important to ensure that further electrification is done with great care in South Africa to ensure that the strain that is added to the grid is done at manageable levels to avoid overwhelming the infrastructure.

2.10.2 United Kingdom

The United Kingdom countries were able to manage their power supply efficiently (Hemingway & Michels, 2012:50). For this to happen, policies had to be set in place to ensure that private companies play a leading role in the provision of electricity in the UK (Parliamentary Office of Science and Technology, 2003:1). Unlike South Africa, the UK has been able to involve private companies successfully and now they dominate the electricity supply and this has been helpful in making sure that the electricity supply is guaranteed at all times (Hemingway & Michels, 2012:50). Private companies compete against each other and they do not want to put themselves in a position that will favour their opposition as is the case with any company operating in a free market system (Parliamentary Office of Science and Technology, 2003:1).

The major lessons that can be taken out of the UK experience are that electricity can be shared among countries (Hemingway & Michels, 2012:50). At the moment there is a great backlog in infrastructure that enables African countries to share electricity and as a result each country has to produce its own electricity, failing which the citizens of the country have to suffer the consequences of power rationing (Ngwawi, 2014:2). This is in contrast to countries that make up the United Kingdom because, as happens now, Scotland and Wales are net exporters of electricity and they have helped England from having to implement power rationing (Hemingway & Michels, 2012:50).

Electricity imported from other parts of the United Kingdom helped England to pull itself out of a national grid disaster in 2003 in which 410 000 people were affected by the collapse of parts of the grid (Parliamentary Office of Science and Technology, 2003:2). This shows that if the infrastructure is available for countries to trade electricity among themselves possibilities were opened to countries to source power from their counterparts if they face a crisis or an emergency. If it had been possible for South

Africa to source enough power from other SADC countries it would have had the ability to avoid load shedding (Thakali, 2008:2).

The situation as it stands now is that current networks and configurations have to undergo serious improvement if the SADC member countries can have the capacity to share electricity among themselves as it is the case with the countries that make up the United Kingdom (Ngwawi, 2014:2). The Democratic Republic of Congo can play a major role in this capacity building because it has massive mineral and hydro raw materials to produce power for the whole of Southern Africa (Kapembwa, 2014:2). This may go a long way to lessen the impact of power insecurity on the society and business in the SADC region.

From what has been said thus far, it is clear that one of the lessons that can be learned from the UK is that the politicians from different SADC countries should engage each other and work hard to come up with plans to mitigate electricity shortage collaboratively. This capacity building has been a subject of many strategies in SADC meetings but the implementation thereof has been slow (Kapembwa, 2014:2).

What South African politicians specifically can learn from the United Kingdom is that countries that make up the UK implement an efficient incentive program wherein big users of electricity are paid if they reduce the demand and this has been able to create a balance in the demand and supply, thus creating surplus electricity (Parliamentary Office of Science and Technology, 2003:2). In South Africa, there is an agreement such as this one but it does not offer financial benefits for the big users (Raj, 2014:11).

The policy in the UK forces private power producers who dominate the power production landscape in the country, to give a minimum of six months notice to government before they switch off any part of the grid to ensure that the government can always forecast the availability of electricity at all times (Parliamentary Office of Science and Technology, 2003:3). Perhaps, if this measure had been there before 1997 it would have gone a long way in predicting the capacity of Eskom in 2007 and thus helped in avoiding load shedding completely.

The fact of the matter is that despite lessons that can be learned from the UK, when it comes to cushioning small business against the effects of power cuts there is not much protection from policy as is the case in South Africa. Enterprises are simply urged to provide their own back up (Parliamentary Office of Science and Technology, 2003:2). It means there is no lesson to be learned in this regard from the UK.

2.10.3 Kenya

Kenya suffers from a problem of power rationing also but instead of building the necessary power production capacity from state coffers they decided to embark on a public private partnership (Steward, 2015:3). Public Private Partnerships occurs when the government cooperates with private enterprises to build infrastructure or other social amenities (Kapembwa, 2014:2). In South Africa, Eskom, as a public utility, has the sole responsibility to build the power stations which are funded by the tax payer's money (Eskom, 2015).

Public Private Partnerships ensure that business foots the bill for the projects while government provides necessary supportive infrastructure such as sewage and roads (Kapembwa, 2014:2). This could have been used to build Kusile and Medupe power stations instead of using public money alone (Thakali, 2008:2).

In the Kenyan side, the private partners had to raise part of the US\$ 2billion needed for the project while the government gave land and entered into an agreement with the South African government for coal that would be used by the power station initially (Steward, 2015:3). In this way of doing things government does not have to carry all the costs of the projects and can save a lot of money in the process.

The lesson to be learned from the Kenyans is that government can work together with private sector to ensure power security in the country. This is beneficial to the society in general and business whether big or small. This is because power would be ensured and at the same time money would be available for other public causes. Again money would be retained in the country instead of having to take the money out of the country through loan repayment (Steward, 2015:3).

2.11 The impact of load shedding on ICT based enterprises in general

The business community has been adversely affected by load shedding (Du Preez, 2015). In big cities such as Johannesburg and Cape Town, many ICT based enterprises were forced to close down because they could not afford to stay open as they lost customers to bigger and more established companies (Lorrete, 2015). This does not mean that big companies that offer ICT services were spared of the economic outcomes of load shedding because they also had to spend money to ensure that they kept afloat (Montalto, 2015). Many enterprises, not just those that are ICT based had to buy generators for their enterprises (Eberhard, 2014:5). This shows that load shedding affected many parts of the economy.

The economy of South Africa was hit hard when the Growth Domestic Product (GDP) dropped by 1,3%, the growth thereof fell to less than 2% and investor confidence was lost (Du Preez, 2015). More specifically to ICT enterprises, the cost of providing the internet rises when there is no electricity as there is need for more technical work and these costs have to be carried by the end user (Zee, 2008). It means internet cafés were charged more by internet providers on top of having more costs to cover.

ICT based enterprises rely on the usage of computers and other electronic devices in most cases. These devices have a tendency to get broken when there are power supply interruptions. A computer has a component called the power supply which regulates the power entering the computer from the socket and this is the component that gets destroyed during power supply instability. It would be a good thing if the load shedding schedule was predictable so that computers and other sensitive devices can be switched off in time before the power goes off and avoid the possibility of destruction of such devices (Slabbert, 2014).

Ways of lessening the blow of load shedding on computers and related devices can be introduced. These may include the usage of a costly device known as the Uninterruptable Power Supply (UPS) which is plugged on the socket and the computer would then be plugged in the device and as power goes out the UPS will keep the

computers going for enough time so that they can be shut down in a proper manner. This is good because it lessens the impact of sudden power outage.

2.12 Organisational structure of Small Business

Many small enterprises in South Africa are owner managed (Lorrete, 2015). Small ICT based companies are also owner-managed. Many small enterprises operate in a functional manner in which employees work together to perform functions within the company even though there may not be clear roles for each person (Lorrete, 2015). It means that employees work together to achieve particular goals. They are not put into divisions in which they operate but operate any task that comes along.

2.13 The Electricity supply system of South Africa

In South Africa there is a state owned electricity supplying utility known as Eskom (Thakali, 2008:2). This utility supplies the majority of electricity in South Africa (Green & Flanagan, 2008:21). The South African power system is made up of large power stations that are concentrated in the interior of the country near the mines and industries of Gauteng province, and long transmission lines down to coastal areas which carries the power from coal generators that make up 70% of the country's primary energy and more than 90 percent of its electricity (Eberhard, 2014:5). Residential and small business consumers form a large portion of users of the power generated from Eskom generators (Department of Environmental Affairs and Tourism, 2005:6).

Eskom makes 40% of its revenue from distributing power to mines and other heavy industries and 60% to other customers inclusive of residential consumers (Eberhard, 2014:5). Among other issues, this study investigates nature and characteristics of Eskom power supply management on ICT based enterprises in Matlosana. It shows that much of the power goes to residential areas and small enterprises.

2.14 What can be done in the local sphere

The Wesvaal Chamber of Business under which the Matlosana Chamber of Business falls has had meetings and seminars relating to general challenges relating to businesses in Matlosana (Anon, 2013:10). These seminars may have to be structured in such a way that they should focus on the challenges of load shedding specifically and they should be more regular. These seminars should explore ways in which they can support each other to limit loss to enterprises within the city.

It is also up to the entrepreneurs to ensure that they protect their devices from possible destruction caused by load shedding. What happens is that when electricity comes back, sometimes it comes more potent than it should be and this may destroy the power supply of the computer or the devices (Meyers, 2007:258). It is for that reason that entrepreneurs should unplug their devices when not in use.

2.15 Summary

In this chapter, books, and other written form of information were used to give an understanding about the problem of load shedding and its impact on the ICT based enterprises. There are less scholarly documents on the issue of load shedding and this study was conducted to fill the gap of the impact of load shedding specifically on the ICT sector which is electricity intensive. The electricity supply system of South Africa was outlined as well as other accompanying matters such as policy and Eskom's plans. The next chapter state the methodology of research.

CHAPTER 3

Research Design and Methodology

3.1 Introduction

Following the literature review which was meant to bring the study into its context, it is essential that a description of how the study was conducted should be given and also procedures which were used to ensure that the study comes to a proper conclusion. A point of departure was to provide a description of how the study was designed, followed by how data was collected and analysed together with measures taken to ensure the ethical treatment of participants. These elements were informed by the purpose of the study. Literature focusing on research was used extensively in this chapter to get some familiarity with research methods and their application.

3.2 Research design

Research design refers to matters such as the set up of the research, the selection and handling of the participants, data collection and analysis methods used for a study (McMillan & Schumacher, 2006:22). A qualitative case study design is pertinent because it is an ideographic research method which implies that it is used to study individuals as individuals instead of as members of a population (Terre Blanche et al. 2006:460). Enterprises that are operated by participants of the study are varied based on each one's own enterprise, and for that reason, their perceptions cannot be taken to be representative of all the enterprises in the city. The qualitative case study design was most relevant for this study.

3.3 Research approach

The study is of a qualitative nature as made clear in chapter 1. To answer the research question of this study one couldn't skim over the surface, it was necessary to get a complete understanding of the situation, interpret it and make sense of what is presented by the data and the qualitative research methods therefore best suited for this task (Leedy & Ormrod, 2010:135). The gist of the last statement is that qualitative research methods are more relevant when the purpose of the research has to do with

exploring or describing real life situations (Coleman & Brigs, 2005:20). The aim of this study being to determine the nature and characteristics of Eskom power supply management on ICT based enterprises and to ascertain the influence of load shedding on ICT based enterprises from participants in Matlosana, means qualitative research was relevant.

The goal of qualitative researchers is often to reveal the nature of multiple perspectives held by individuals on a similar phenomenon (Leedy & Ormrod, 2010:135). In addition, qualitative researchers seek to probe deeply into the site of research to get a deeper understanding of the way things are, why they are like that and how participants in the context perceive them (Gay, Mills and Alrasian, 2009:13). This is done by collecting numerous forms of data and using various angles to examine them so that a rich and meaningful picture of a complex, multifaceted situation is constructed (Leedy & Ormrod, 2010:135). Additionally, making notes about the environment that participants find themselves in, qualitative researchers go on to provide insight into what the participants believe and feel so far as the phenomenon affects them (Gay et al, 2009:13).

Qualitative research in brief is relevant when there is little information on a particular topic, when variables are not known or when a relevant theory base is not enough or missing (Leedy & Ormrod, 2010:135). This depicts the difference between qualitative and quantitative research. Quantitative research is more relevant when the research is about measuring the extent of phenomena, thereby describing the nature of existing conditions and identifying standards (Cohen, Manion & Morison, 2000), whilst qualitative research is more about getting facts from participants (Gay et al, 2009:13). The difference between qualitative and quantitative research was also instrumental in making the decision to use qualitative research.

There are various ways to carry out qualitative research. The case study design is most relevant in carrying out this particular study. A case study, in short, is a qualitative design in which a particular individual or group of people are studied in depth for a period of time (Leedy & Ormrod, 2010:137). This design was particularly pertinent for this study because the participants that were earmarked for this study from the

beginning were a group of business people who are all affected by load shedding in the City of Matlosana.

3.4 Research methodology

3.4.1 Introduction

The study was conducted at the business premises of participants for their convenience and also to make sure that the study does not take too much of their time which could result in them not able to perform their-day-to-day operations. It should also be noted that the participant's place of business is their natural environment for the mere fact that they work there daily and are used to the same environment. This made it possible to take down more notes of the situation.

Load shedding is a relatively a new topic and not many studies have been conducted about it especially in the Matlosana area. This study must therefore offer as much detail as possible; hence it was ensured that the interviews are recorded so that all which is said by participants is not lost, thereby ensuring rich and descriptive data.

3.4.2 Population and Sampling

A population is a complete set of individuals in which the researcher is interested for the purpose of studying (Howell, 1989:3). In this study, the population was all ICT based enterprise owners around the City of Matlosana. Not all owners of enterprises would be interviewed for the purpose of this study and in that case a selected few were interviewed to give a picture of the sort of problems experienced in the sector.

3.4.3 Sample

People chosen from the population for the purpose of conducting a research are known as a sample (Verma & Mallick, 1999:160). To choose a sample from the population, the researcher must use sampling techniques (McMillan & Schumacher, 1997:397). Sampling is a process of selecting a particular sample for a study (Leedy & Ormrod, 2010:143).

3.4.4 Sampling technique

The technique selected for this study is the purposive sampling. Purposive sampling is the selection of the sample based on the researcher's own knowledge of the population, its elements and the judgement of the researcher (Babbie, 1998:195). The participants are known to me as well as the sort of enterprises they operate.

Selecting a purposive sample means that the researcher must select information-rich individuals for in-depth study without generalising the findings to the entire population (McMillan, 1997:397). Due to the fact that participants are known to the researcher, our previous discussions proved them to be information-rich, and as a result fit well for the purpose of this study. As mentioned, the aim is to study individuals as individuals.

The sample is made up owners of enterprises of:

- Internet cafés;
- Printing companies; and
- Computer repair service companies

There were seven participants envisaged for this study but in the end five were available for the interviews to take place. All enterprises are located within the City of Matlosana and have been functional for more than 3 years; this implies that they have experienced the impact of load shedding for a number of years thus making them more knowledgeable on the issue.

3.5 Data collection Process

3.5.1 Introduction

Data collection is a process in which participants are asked questions to gather facts for analysis in order to reach the findings (Leedy & Ormrod, 2010:145). In this study data that could meet the purpose of the study is fact based data. This data was able to shed some light into how the impact of load shedding is viewed by the enterprise owners.

3.5.2 Data collection

Data was collected using interviews, which is good for collecting qualitative data (Leedy & Ormrod, 2010:145). The benefit in using interviews is that it gives the participants a chance to express their perspectives on the matter of load shedding (Leedy & Ormrod, 2010:149). The benefit for the study is that the interview allows participants to reveal some facts that were overlooked by a researcher in the stage of compiling questions and that is the case during this study.

Interviews were semi-structured, therefore such interviews allow the researcher to probe and clarify the answers given by the participants (Maree, 2010:87). This is an important matter because in semi-structured interviews the participants are not confined to a rigid line of questioning and therefore can give their answers in their entirety. The researcher is also not confined and can ask further questions.

3.5.3 Data collection procedure

Data was collected through interviews that were recorded and then listened to over and over again to familiarise with the answers. Open-ended questions were asked. Open-ended questions allow participants to give their own answers instead of selecting from a list of answers on a questionnaire like the way it happens during surveys (Babbie et al, 1998:233). The participants were allowed to point out their opinions, however, at the same time not sway from the topic. From this process a body of data was generated for analysis and conclusion. Interviewing participants was far more beneficial for this study.

Interviews were conducted in the shops of the participants. This was a difficult task because the interviews were taking place while the shops were going ahead with day to-day operations. Participants had to attend to other matters sometimes but at the end of it all their perceptions were recorded and the analysis thereof concluded. The participants were asked to keep to answering the exact questions. This helped because there was little need for follow up questions as the participants did not stray from the questions.

When a question was posed to participants, the purpose for asking such a question would also be stated so that the participant can have a full understanding of why the question is asked and then answer accordingly. This minimised questions that could have been asked by participants to get clarity from the interviewer.

3.6 Data analysis

Analysis qualitative data often involves:

- Giving codes to the first set of field notes drawn from observations
- Noting comments
- Sorting and sifting through the material to identify similar phrases and relationships between variables, patterns, themes and process as well as distinctive differences between sub-groups and common sequences; and
- Identifying these patterns and process, commonalities and differences (Miles & Huberman, 1994:351).

Notes were collected before the study and they played a pivotal role in the compilation of questions which ended up in the interview schedule. Data was produced from these questions. Thereafter, interviews were held and recorded using a tape recorder. To get a sense of the data, these records were listened to and notes made. To get the data to a small and manageable size, the process of coding was used wherein codes were applied to chunks of data.

Codes are labels assigned to descriptive information to assign symbolic meaning to such information (Miles, Huberman & Saladana, and 2014:71). Codes are used to give meaning to chunks of data after identifying relationships between the responses of the participants in order to reduce the volume of the raw data (De Vos et al, 2005:333). It implies that chunks of data are summarised in one word or a short phrase to provide an inventory of topics for indexing and categorising (Miles et al, 2014:74). This implies that codes are used to compile similar data under one word or phrase in order to organise data according to what participants answered.

Using codes to analyse data was pertinent seeing that the raw data collected in this study was a lot and could not have been analysed without grouping it together under codes. Coding also helps with the display of data because they are attached to data chunks of varying sizes and are formed by attaching descriptive labels to particular segments of data (Miles et al, 2014:72). This was showed in the data analysis of the study in which chunks of data were placed under codes or labels of words that clarifies the relationship between the responses of the participants. The last point makes it clear that coding is suitable for a study such as this one.

Data as seen in chapter four was presented in paragraphs. The codes or categories that emerged from the data were stated and data was aligned with the codes.

3.7 Validity and reliability

When a measuring instrument is said to be valid, it measures what it is intended to measure (Leedy & Ormrod, 2010:28). Reliability is therefore said to be a degree of consistency or an agreement between two independently derived sets of findings and how similar the findings of independently conducted studies are under comparable conditions (Hudson, 1981:113-120). In literal terms, validity has to do with repeatability of findings obtained from a particular study if the measuring instrument from that study is used in another context with similar conditions prevailing (Leedy & Ormrod, 2010:28). Arising from the last mentioned citations, an impression is given that validity is when the interview schedule for this study is used in another town to research the impact of load shedding on ICT companies and the same conditions apply in that town; irrespective of that, the research findings should be similar.

While validity has to do with accuracy of scientific findings, reliability is concerned mainly with how research findings can be replicated (Le Compte & Goetz, 1982:32).

The following activities enhance validity:

- Lengthy data collection period – This enhances the understanding of the researcher regarding the context;

- Language used in the study- in as far as language is concerned it has to be the one which is understood by the participants. Both Setswana and English were used to interview the participants.
- Field research – having regard to the fact that qualitative research has to be carried out in natural settings, it was pertinent in this study to collect as much factual information about the settings of the study especially about the nature of the business and the usage of electricity in those enterprises.
- Disciplined subjectivity – participants were subjected to rigorous questioning to ensure that a large body of facts is extracted from them (McMillan & Schumacher, 2001:408-411).

Reliability is ensured through observance of factors such as consistency of the researcher's interactive style, data recording, data analysis and interpretation of participant's meaning from the data (McMillan & Schumacher, 2001:408). These activities were performed as part of conducting the study.

Furthermore, activities performed to ensure reliability, in line with what (McMillan & Schumacher 2001:408-409) outline, were:

- Prolonged and persistent field work- before the study was conducted interaction with participants was undertaken to observe their day-to-day activities in so far as the running of their business is concerned;
- Low inference description- detailed description of the participants and other matters relating to their business;
- Mechanical recorded data- the interviews with participants were recorded using a voice recorder;
- Member checking-the participants were given a chance to check if the findings represent their points of view accurately;

The processes, as highlighted above, made the data reliable because they ensured that consistent data was drawn from all participants.

3.8 Access and Ethical Considerations

In dealing with ethics of research in order to protect the rights of participants (Huysamen 1994:178-186) recommends that researchers should do the following:

- Informed consent was agreed on with the participants in writing when they sign a consent form detailing the purpose of the study and the role they are expected to play;
- Their participation was voluntary as no one was forced to participate;
- Participants were not exposed to any psychological or physical pain and discomfort given that the questions did not seek answers to deeply personal information;
- The participants' privacy was respected because they did not have to answer deeply personal questions and the raw data was not handled by third parties.
- No part of the data was falsely represented on the findings and the participants received a copy of the analysis and the findings to see if they correspond with what they have said
- No information about the study was withheld from the participants and they were given a chance to ask questions about anything they wished to know more about the study.

In carrying out the activities as mentioned above, the rights of participants were protected. What is important is that participants had to feel uncompromised in any way such as having their answers being given to third parties or being misinterpreted by the findings in such a way that it may hurt their dignity or perhaps, their business.

3.9 Summary

Thus far it has been explained as to what research processes were undertaken to come to the findings of this study. The activities in this chapter are trusted ways of conducting research as the literature has shown. Without such methods, the study would not be convincing. This fact has also been highlighted by literature on research. It was therefore necessary to follow these methods in order to gain the advantage of convincing findings that other researchers may use in trying to understand matters related to load shedding and ICT based enterprises.

The next chapter will be explain in detail as to what the data collected using methods in this chapter yielded.

Chapter 4

Data analysis and interpretation

4.1 Introduction

In the previous chapter the research design and methodology were discussed. In this chapter particular attention is paid to detailed analysis and interpretation of the data. The chapter focuses on findings based on the three main research question in order to address the key research question on the Impact of load shedding on ICT based enterprises in Matlosana. The study has been guided by the following questions:

What is the impact of load shedding on ICT based enterprises in Matlosana?

What is the nature and characteristics of Eskom power supply management on ICT based enterprises in Matlosana?

What influence does load shedding have on ICT based enterprises in Matlosana?

What strategies can ICT based enterprises use to manage the impact of load shedding on their enterprises?

In light of the above questions, the following analysis is made:

4.2 Data presentation

Data from interviews was transcribed and after the transcription, data was made easier for analysis to ensure that a deeper meaning is produced from the perceptions of the participants. The transcript contains the raw responses from the participants. The transcribed data was categorised into themes as reflected in the research questions stated in chapter one. There were 5 participants representing each of the 5 organisations involved in the study and each participant was provided with a name using letters A to E. The interviews were conducted with a high ranking member of the company in the position of either a director or manager at his/her company. All the

information provided was sanctioned by the enterprise and is has later cross checked with another senior member. The transcripts from the interviews are provided in Annexure C of this report. The following provide a detailed analysis of the interviews conducted with ten participants

4.2.1 Analysis of data from semi structured interviews

The analysis is presented using the interview questions which are linked to the research questions.

4.2.1.1 Research questions

- What is the nature and characteristics of Eskom power supply management on ICT-based enterprises in Matlosana?
- What influence does load shedding have on ICT-based enterprises in Matlosana?
- What strategies can ICT-based enterprises use to manage the impact of load shedding on their enterprises?

In line with the research questions above, the following data was obtained from the participants:

4.2.2. How would you describe your business?

This question was directed at learning the nature of the businesses that the participants are running. In other words, learning what the business does generally and what services they offer. This gives a picture of what was impacted by lack of electricity. The categories that emerged from the data in this regard were:

- Internet provision;
- Repair services;
- Printing

Participants A, D and E are involved in the internet services. However, participant one and four provide internet services as main services in their enterprises because they run internet cafés while participant D provides additional, repair and printing services. In fact this is their actual description of their enterprises, participant “A” answered, *“It is an internet café which gives members of the public a chance to access the internet at a certain rate for a specific time. It has a lot of machines which helps its operation”*; participant D answered, *“My business is an internet café in the middle of town”*. What flows from these answers is that the internet is a key service on offer for customers.

Participant E gave this answer to the question, *“I run an internet café and a PC repair shop in the same premises. The internet café occupies the front part of the shop and the repairs are done at the back of the shop. We refurbish old computers, repair hardware and software related problems, we build websites for companies we also do logos, business”*. It is clear that participant E transcends almost all service categories making the participant very relevant for this study.

The printing category is also a bit diverse. It can be argued that internet cafés offer the printing as a service because people may choose to print what they have found on the net. However, this is not the main service provided by the internet cafés but participant C specialises in the printing service. Participant C offered the description of their business by saying *“We run a print shop. The shop caters for people who want to print anything from CV’s to school magazines or newsletters. We also print adverts. Actually, we serve a lot of printing needs. We have different printing machines from the normal printer in the office to an industrial printer for more quantity driven prints.”* The enterprise owing to this description offers printing as the main service.

All in all, these enterprises fall within the parameters of ICT based enterprises because they depend on Information and Communication Technology to conduct their day to day business.

4.2.3. What is your view about load shedding?

With this question the participants had to give their opinions about load shedding. Only one code emerged from the data and that is the fact that load shedding has a negative

influence on business. In the case of participant A and C, business stops altogether when there is load shedding because there are no contingency plans. Participant A gave this answer to the question; *“load shedding has a bad impact on business because we depend on power supplied by Eskom. Every time load shedding strikes we have to close the cafe because we do not have a plan B that can be implemented to resume business activities”*. This is almost similar situation on the side of participant C, who paints a picture of such experiences by saying *“...load shedding is a pest. You won't believe how much we lose because of it. People come in here and they find that there is no electricity they go. Sometimes when there is load shedding here in Meiringspark, La Hoff, on the other side of Klerksdorp (Matlosana), will be on and the people will go there for the same things we could have done for them here.”*

Participant C's articulation brings another dimension that was overlooked during the literature review. The fact of the matter, as the participant highlighted, is that the whole city of Matlosana does not follow the same schedule when it comes to load shedding. Some areas may be having electricity while others do not. This means that even if an enterprise is suffering from a load shedding episode it is detrimental to just wait it out and not apply any contingency plan because other enterprises within the same industry as you in the city can benefit from the customers who go there only because they could not get services at the enterprise that is suffering load shedding.

Participant D was just short in answering the question *“I don't like it. It's bad for business”*. The short answer however gives a picture that the enterprise owned by participant D is affected negatively by load shedding. Participant D decided to be philosophical in responding to the question, *“...Well, I must say I hold the same view as everyone else in the country: load shedding is destructive. It is strenuous on every one, be it private individuals in their homes or to us owning businesses. Even government offices themselves have to wind down their order of business for the day when load shedding persists. I think it affects everyone who uses electricity to better themselves”*

Taking all the responses into consideration, the respondents hold a similar view that says that load shedding is detrimental to business. The prevailing sentiment is that load

shedding hinders the activities of the enterprises and therefore it is discouraging for the entrepreneurs.

4.2.4. What do you use electricity for in your business?

The question was aimed at finding out which valuable items are not in use during load shedding. This is important because it has to be clear as to whether these items were indeed ICT based items. The categories that emerged from the participants' perceptions were as follows:

- Computers;
- Printers;
- Associated machines

In Participant A's enterprise electricity runs *"...14 PC's, an internet router. Fax, photo laminating machines and a cash register"*. In participant B's enterprise electricity is used for *"...many computers that we need to test when we fix them. The computers always need electricity to go on so we don't have any choice we have to go the generator route or else we can't do anything"*. In participant C's case it is for *"Almost everything, 3 computers, and all these printers, about five of them, the fax photo copy machines..."* While participant D uses electricity for *"...computers...printers, the photo copy machine, laminating machine, T-shirt printer ... and so on"*. Participant E's usage pertains to *"... all my technology on electricity, even the cell phone needs electricity to be charged. Basically we have 12 computers, 10 of which are in the internet café and two are used for other projects. We also have many other devices like printers, scanners, you know what I mean?"*

All the enterprises make use of the computer as a tool in their day to day activities. Printers are not too far behind; they are relevant in most of the enterprises. There are other associated devices such as photo copy machines, laminating machines and others. It means there is a lot of machines on which the enterprises depend in order operate effectively and many of these of machines use electricity. Should it happen that

there is no electricity at a given time, all the devices cannot be used and this is a negative impact on the enterprises.

4.2.5. How much would you say you spend on electricity roughly?

Majority of the participants in answering this question spoke of amounts in excess of R1 500 per month. Participant A replied that electricity for the enterprise can be approximated to “... R 2 835.00 per month excluding rates depending on the usage of systems”. Participant B’s answer to the question is that electricity for this particular enterprise costs “over R2000 a month”. Participant C pays “...R2 000 in a given month”. Participant D cannot put a clear figure on how much they spend on electricity and only states that the amount is “...between R1 500 and R2000”. Participant E on the other hand spends “...R600 a week”

The amounts stated above are usually spent when there is an uninterrupted supply of electricity. Should it happen that load shedding hit the participants, like other businesses, they may have to incur more costs to get contingency sources of electricity such as generators for instance (Bisseker, 2008:8).

4.2.6. How do you keep your business running when there is load shedding?

Even though there is the challenge of load shedding the enterprises have to get the money in somehow. Some of the participants such as A and C do not have contingency plans in place to mitigate the impact of load shedding on their enterprises as mentioned above. Participant B and D use generators while participant E uses a clever method, he prefers to “keep spare batteries for our laptops fully charged at all times. We have a few Uninterruptable Power Supplies. These tactics do not last very long after the load shedding but at least we get some extra time to go on working without electricity. It’s better than doing nothing.”

Keeping the business running during load shedding requires creative ways sometimes if one cannot afford the generators. Load shedding does not last for the whole day and in some cases it would be a loss to the business to buy the generator.

4.2.7. Describe the nature of your energy supplies.

In describing the nature of their energy supplies one code emerged from the data. All the participants get their electricity from the municipality. This is not surprising because participants fall under the Matlosana municipality which buys bulk electricity from Eskom and the sells it to the citizens of the city. Answers for this question include *“our power is supplied by the municipality”* and *“our energy is supplied by the municipality we pay our amount monthly”*.

What happens is that Eskom sells bulk electricity to some municipalities who in turn sell to their residents. This is the case when it comes to Matlosana which also get the electricity from Eskom and distributes it to the residents and business around the city after putting a mark-up price (Kotze, 2013:5). Hence all the participants stated that they receive their electricity from the municipality.

4.2.8. What is your approximate average consumption rate?

The period of maximum consumption is when power is used the most. For those who own internet cafés, it is clear that their approximate average consumption rate is the same. This question looks at dynamics of energy consumption. For instance is it is used during the day, night, public holidays or weekends, and also look into finding out reasons for all that. This is often overlooked by many people and the participants of this study were no exception.

It was evident from the replies of the participants that the enterprises use electricity at different points in time. It means that there is no optimum time to affect load shedding that will be good for any of the enterprises. The cafés use electricity in the afternoon daily as one participant replied: *“The café gets busy from eleven but it reaches its peak around three in the afternoon when learners come from school. This happens daily “*. The other enterprises do not have a daily peak but a monthly peak. In the case of participant B *“the month ends are the busiest time of the month and that is when we need a lot of electricity to service all the clients’ because we also have to go to clients’ offices and homes to build networks and install routers so if there is load shedding we can waste petrol and go there only to find ourselves doing nothing, just wasting time”* it

is not surprising that the end of the month is the busiest time for the enterprise in the last statement, because this is a time that most people have the money.

Participant C also has a monthly peak but it is reliant on the work, *“We use the most electricity when we have to print big orders which is usually in the end of the months.”*

4.2.9. Have you ever had any of your machines break as a result of load shedding?

Question 6 sought to give a measure of material loss as a result of load shedding. It is evident from the answers that computers, printers and other related machines have been broken as a result of load shedding, however such damage has not extended to all participants. Participants A and C have suffered loss. Participant A has broken devices that include *“...photo printer, laminating machine and 3 computers. We normally don’t unplug the machines when we close and suspect that they might have been damaged during the night when power was restored.”*

Participant C has had a minor damage: *“Once, one printer packed up because when power was cut it was busy printing and when the electricity came back it wanted to continue printing and one of the wheels that pushes the paper through was lifted off its rail. It was irreparable.”* The damage is seemingly very small looking at the fact that this is just one printer but looking at the fact that participant C runs a printing company, any damage to a printer slows down the enterprise in some way. It seems again that the one way of saving one’s enterprise is to unplug when there is load shedding; participant one does not do it much and it is shows in the number of machines that broke.

Participant D on the other hand unplugs devices when load shedding starts and it yields results for them: *“...As soon as the electricity cuts off. I unplug everything and I plug them back again when the electricity is back. This takes time but it saves me the money and trouble that comes with having to replace broken computers and other appliances”.*

All things considered, load shedding is destructive to ICT devices but at the same time, it is the responsibility of the entrepreneur to ensure that load shedding does not damage their property. Only one participant has suffered major damage in terms of the number

of machines lost owing to load shedding. Those who are proactive to take precautions during load shedding have been able to avert damage of their equipment.

4.2.10. Do you get reduced profits when there is load shedding compared to when there is not?

Question 7 sought to find out the influence of load shedding on the turnover of the business. All participants agree that there is financial loss when there is load shedding answers include: *“Profits decrease drastically when there is load shedding because we have to close down the business. We can’t afford these big generators as the business is small”*

Participant C points to the fact that not all parts of Matlosana have lights off during load shedding therefore customers go to other places where there is electricity to get similar services there. However, participant B loses money in the sense that they have to spend extra on diesel for the generator: *“Yes because when load shedding hits we have to spend again and get the diesel for the generator and this is really an unnecessary expense. The generator is not always useful because it can break down and that will be another expense.”*

It means that the loss comes in two ways. First the enterprises lose money if they do not have contingency mechanisms to rely on in times of load shedding. Customers are lost and thus do not get to spend the money as they had intended, as participant C points out *“...a lot of money goes through that door when there is load shedding.”* Secondly extra money is used to fuel the generators which act as contingency mechanisms. It can be deduced from the replies of the participants that whether one has contingency plans or not there is a dent of some extent to the profit.

In an internet café having computers off means money loss because the computer is the primary source of internet, the main service there. Participant E stated they *“can’t run full steam without electricity”*. What was clear in the answers of the participants is that load shedding affects the finances of their enterprises negatively whether they have precautions to alleviate the impact of load shedding or not.

4.2.11. How else does load shedding affect your enterprise?

Question 8 looks at allowing participants to clarify other ways in which load shedding may have negative effects in their enterprises. Three codes emerged from the data with regard to this question, namely: brand image, overtime payments and security vulnerability. Participant A and E express worry at the loss of trust from the customers when their enterprises cannot furnish their needs. In this regard participant one states that load shedding *“...brings a negative impact on the image of the business as customers will be expecting better service”* and participant E supports this notion by saying *“...People stop trusting you in the long run”*

In business it is always good to have the trust of their customers and to lose that trust may mean the loss of profit to some extent. With regard to overtime payments participant B states *“...I sometimes have to pay my technicians overtime because if they go to someone’s office and electricity goes they have to stay until it comes back...”* this is an unavoidable expense seeing that the agreement between the employer and employee is that employees must work from a specified time in the morning and knock off at another specified time in the evening therefore if they have to work more hours it implies that they have the right to expect some compensation. This can eat into the profitability of the business.

The issue of having to pay overtime links to Question 6 which sought to ascertain the size of the loss in profits for the enterprises. Money is going out of the business as a direct result of load shedding to pay overtime imbursement to the employees. If electricity was available at the time the employees do not have to wait around for the electricity to come; the work can be done within the specified amount of time.

Also there may be security risks if load shedding is carried out especially at night. This is highlighted by participant C who answered by saying: *“The thing is, our gate is one of those electric gates and when there is no power, it makes me worried so much because burglars may come in easily and take things from us very easy”*

4.2.12. How do you plan for load shedding?

In this particular question, participants had to mention the contingency plans they have. The categories that emerged from the data with regard to this question were:

- No plan;
- Generators; and
- Keeping up with load shedding schedule.

Participant A and C follow the load shedding schedule on the website of Eskom. This is helpful because *“even though the times on the schedule do not correspond with reality at least you know that today some time there’ll be load shedding so be ready”*. This may be good because the business can plan for the day and just be ready for the eventuality of load shedding whether it happens or not.

Another way of planning means that to the enterprise has to *“... keep the generator ready”* and in order to do this *“all you need to do is to just put enough diesel in the generator. In this regard the enterprise can ensure that there is some sort of relief when load shedding is going on and the business can operate although it may be partial operations.*

Sometimes it does not take sophisticated methods to alleviate the impact of load shedding. It may be helpful to adjust times within which some of the work is done or keep extra batteries for laptops to be used when electricity is down. This has been in the case of participant D who chooses to *“wake up at four to do some typing work”*. In this way there is some reprieve for the participant to still be able to satisfy the customers even when load shedding is in progress.

4.2.13. How do you think the problem of load shedding can be solved?

Question 10 sought to find out what participants think what the solutions to load shedding are. The categories that emerged from the data are:

- Management of consumption;

➤ Government intervention.

How consumers manage their consumption can help. This is put in a nutshell by participant A in this way: *“Uninterruptable Power Supplies (UPSes). Make sure the UPSes are correctly sized for the job they have to do and that they cater for potential extended power...”* UPSes are devices that store electricity from the plug and when the power is cut the UPS will release the power that was stored in it before. In this way the enterprise can buy some time before they completely run out. This is a bit similar to using generators because generators can go on only to the point where the fuel can take them. Similarly UPSes can go on only as far as the power stored in them can go hence the participant stated that the enterprises should make sure that the size they are getting is right for their equipment to run on.

Participant A stated that business must use Uninterruptible Power Supply (UPS) devices to ensure that load shedding does not affect them that much. Participant B is of the view that businesses must use devices that do not consume too much electricity. This is supported by participant E but also participant E believes that the government has to do something in ensuring power security in the country. This perception is held by participants three and four also. Participant C wants to see the power stations that are currently under construction finished.

Furthermore the opinion of participant B highlights the responsibility of the end user of Eskom's power: *“As they say we have to cut our consumption and put other energy sources in use in our business and homes. But we also need to use tools that do not use electricity too much like those old meters we used to have for this line of work”* people in general must take up the accountability upon their shoulders in so far as keeping the demand for electricity low in the country so as to avoid load shedding.

Other participants believe that the government should intervene. In the words of participant C the *“power stations which they are building should be finished quickly”*. This is the only way of dealing with load shedding decisively and the building currently underway. While the power stations can be finished soon, the fact of the matter is that there has to be action taken in the interim.

4.3. Summary

Chapter four has recorded the reflections of the participants on the topic. Great efforts were made to ensure that the answers of the participants were taken as they were as much as possible. This is because doing this would ensure that the findings represent the real perceptions of the participants and not that of the researcher. This has now opened the way for findings to be made with regard to the topic.

Chapter 5

SUMMARY OF FINDINGS CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In the last chapter the data collected from the participants was analysed and presented. With that done, what is left is for the findings of the study and the conclusions thereof to be drawn from the data. Chapter 5 is aimed at bringing to light the results of the study. This is to say that the perceptions of the participants will now be aligned with the research questions to reach the conclusions as to what the impact of load shedding is on the ICT based enterprises.

5.2 Summary of Findings

5.2.1 Introduction

This section is a discussion of the main findings in relation to the objectives of the study. In other words this section deals with how the data collected for this study answers the research questions as they have been outlined in chapter one. Both the data and literature sources will be used to make sure that the findings of the study are reached. The findings will be made with regard to the following themes:

- The impact of load shedding on ICT based enterprises
- The influence of load shedding on ICT based enterprises
- Strategies that ICT based enterprises can use to manage the impact

5.2.2 Nature and characteristics of Eskom power supply management on ICT based enterprises

The findings revealed that that power to the enterprises, as with other residents of the city, is supplied by the Matlosana municipality. The amount paid by the enterprises ranges from R1 500 up to R2 800 for the electricity on a monthly basis. The power is provided through either prepaid or monthly account systems.

The above agrees with what literature states. Municipalities do not have the capacity to generate their own electricity and they only act as distributors of power received from Eskom (Department of Minerals and Energy, 2008:8). It means that power in municipalities still use power generated by Eskom and the municipalities only allocate it to different end users of electricity. Matlosana being the focal point of this study, follows this model as well (Anon, 2015:3). Usually electricity sold in this way is more expensive than the electricity supplied directly by Eskom (Le Cordeur, 2015). Hence the participants mention amounts well over R1 500 as amounts that they spend on electricity every month.

In distributing the electricity, the municipality gives the residents and businesses in the city a choice between a prepaid system and a monthly payment option (Anon, 2015:3). The study found that the ICT entrepreneurs sampled for this study use both options in their enterprises although the majority prefer the prepaid system. Eskom favours the prepaid model because it ensures that the electricity is paid for before being used therefore there would be no debt owed to Eskom if electricity is prepaid (Ndlangisa, 2011:4).

The above summarises the nature and characteristics of power provision in Matlosana.

5.2.3The influence of load shedding on ICT based enterprises

With regard to the influence of load shedding on ICT based enterprises the findings revealed that load shedding does influence the manner in which business is being carried out in ICT based enterprises. What flowed from the data is that the entrepreneurs have to take load shedding into account every time they need to make business related decisions. These are decisions that include how they take care of their equipment, how they prepare ahead for possible load shedding episodes as well as their input costs. Every time there is load shedding in operation entrepreneurs have to be quick and unplug the devices, which is never the case and they also have to put more of their profits back into the business to cater for costs that are associated mainly with load shedding such as buying generators and diesel.

This problem is not unique to Matlosana; as the literature shows, many entrepreneurs around South Africa condemn the state of affairs that is brought by the implementation of load shedding (Slabbert, 2014). They say that load shedding puts more strain on them as they have to prepare for matters that they did not have to prepare for in the past just to work around load shedding (Bisseker, 2008:8). The influence of load shedding evidently is negative.

5.2.4 Strategies which ICT based enterprises can use to manage the impact of load shedding

The findings revealed measures can be taken to manage the impact of load shedding include using Uninterruptible Power Supply devices, generators, having extra batteries for laptops and keeping abreast with load shedding schedules on the website of Eskom. However, government must intervene by speeding up the building of the power stations that are currently under construction to ensure equitable power supply.

Looking at all the measures suggested above, what is clear is that they all involve spending money somehow although in the case of having to keep abreast with load shedding schedules not a lot of money is spent but it is still a time consuming task.

Some of the entrepreneurs opined that Uninterruptible Power Supplies can help a great deal although they can only offer a short supply of electricity after load shedding takes effect, because at least they help to avoid a situation where the computers just shut down when the power goes. The use of UPSes is supported by literature. Literature shows that the use of UPSes is widespread across the world and enterprises favour them because unlike generators they do not allow the computers to go off first before they kick in which may result in losing of all unsaved work (Meyers, 2007:263).

Generators are also popular with the entrepreneurs. Those who do not have the generators wish they had them and those who do speak well of their usage. The overriding perception of the entrepreneurs is that generators are the only reliable means to ensure that the enterprises do not suffer total loss of income when there is load shedding. However, findings additionally revealed that there are some shortfalls associated with using generators. The shortfalls include the hefty price of diesel and the

fact that the use of generators is costly to the enterprise. Many entrepreneurs decry this fact across the country as they feel that they have to increase their input costs just for the enterprises to survive instead of using the money to grow the enterprises (Mgibisa, 2008:8, Prinsloo, 2015). Although generators keep the business running, they draw some money out of the coffers of the enterprises and this may hurt the business in the long run.

The government may need to send engineers to India to find out how they managed their electricity supply shortage problems. India had problems supplying electricity and had to build power stations quickly which they achieved within two years (Ahn & Graczyk, 2012:7). The fact that so many years have passed since the commencement of the construction of Kusile and Medupe power stations is a problem, however, the Indian experience has shown that it is possible.

On the whole, strategies that can be implemented, as the findings revealed, involve the clever usage of machinery or technology on the part of the entrepreneurs and new ways of thought on the part of the government as well as proper management of power supply systems in South Africa. As literature pointed out, the local chamber of business should be used as a platform to coordinate the efforts of the entrepreneurs in the city with regard to preventative measures taken to slow down the destructiveness of load shedding on entrepreneurs (Anon, 2013:10).

5.3 Conclusion

The study on the impact of load shedding on ICT based enterprises in Matlosana was conducted to shed some light on the kind of problems that ICT based entrepreneurs come across as a result of load shedding. As the topic makes clear, the study was conducted around the city of Matlosana in the Dr Kenneth Kaunda District. The interest in ICT based entrepreneurs was sparked by the realisation that their business relies almost entirely on electricity. The study therefore was intended to get more facts on the issue of load shedding with the anticipation that remedial measures may be provided for the enterprises which may help others as well. The ICT based enterprises, five in all, which formed the sample, are involved in offering different services such as Internet

provision; Repair services and Printing yet all of them experience negative results as a result of load shedding, despite their differences, indicating that load shedding has a negative impact on the enterprises

Semi-structured interviews were made use to collect data from the participants. The data was later analysed inductively as this is the best way of analysing qualitative data. Codes were induced on portions of the data to group it together. It means large portions of data that would have been difficult to analyse as they were, were put under one word that runs across the answers of the participants with regard to a similar question to create a group of similar answers.

In light of the findings made above, the negative impact became clear because the entrepreneurs have revealed that they suffer mostly financially but there are a few that has suffered material loss because some of their devices were rendered unusable because of load shedding. Basically one is led to conclude that the impact of load shedding on the ICT based enterprises in Matlosana is as much harmful as the enterprises spoken of in the literature review. The enterprises cannot fully function when load shedding is underway.

What can be concluded, again, from the study is that load shedding affects the general South African society in a harmful way. The facts collected from both empirical and literature sources highlighted the fact that enterprises lose in terms of profitability and in terms of equipment that gets damaged because of load shedding. The enterprises further spend more money on paying overtime as well as on diesel for the generators that some of them use in the absence of electricity. The profits of the enterprises are therefore reduced as a result. What can be deduced from this is that the enterprises are making a loss induced on them by load shedding meaning that such a loss would have not been there had there not been load shedding.

What has emerged from the data is that customers lose trust in enterprises especially those without generators because they cannot deliver during load shedding. It must be remembered that some of these enterprises offer a range of services such as typing and printing of T-shirts, for instance, which are ICT equipment intensive. This equipment

requires electricity. If there is no electricity the clients who bring such work cannot have their order finished in time. This is how, then, that brand image is damaged. This indicates further loss of finances as these workers would have to be paid for the extra time they spent trying to catch up. Security vulnerability also comes in, in the sense that some of the security features like security gates use electricity and during load shedding they can be opened easily. This is further indication of a detrimental state of affairs brought about by load shedding on the ICT-based enterprises.

It can be further concluded, based on the last fact that enterprises are exposed to the possibility of collapse owing to the intermittent power supply. The extent of the impact spreads across the country. On the whole the intermittent power supply reduces the capacity of the enterprises such as those based on ICT devices, to operate at full steam as they are power dependent and without power they cannot be operated.

Taking it all into consideration one is left without any doubt that load shedding is a burden for the ICT entrepreneurs. It causes nothing but harm to the enterprises. Money is lost and customers are left without satisfaction. Load shedding makes it difficult for the entrepreneurs to plan well in advance for the operations of their enterprises because they are not sure if power will be there on the specific day they may want to implement something.

Having seen how detrimental load shedding can be to ICT-based enterprises it means remedial actions must be taken to ensure that the impact is minimised seeing that it cannot be done away with. First, it can be deduced from answers given by some of the participants that there is a need for a change in attitude. A few participants believe that their enterprises are too small to afford generators while others believe that it is the government's responsibility to solve the problem of load shedding. There are those who do not take care of their devices as much as to ensure that they are unplugged during load shedding. It can be deduced from the above that some of the participants have to change the way in which they think about load shedding in order to mitigate the impact of load shedding on their enterprises. The attitudes as expressed above can lead a person to be too relaxed and not take necessary action to mitigate the impact of load shedding.

The attitude to the usage of Eskom's load shedding schedule also seems to be quite negative on the part of the participants. They view it as a waste of time. Even those who make use of the schedules to plan their days still look at it with some suspicion as they think it is not accurate as to show the exact hour at which the electricity will go off. This indicates that the participants mistrust the schedule. This needs to change because as one of the participants stated, the schedules may not be accurate on the exact hour but at least they are usually accurate on the issue of which day they will experience load shedding. It is when the attitudes have changed that the following recommendations may be fully implemented by all stake holders.

5.4 Recommendations

5.4.1 Green energy power

It was made clear during the literature review that using energy efficient lighting and adopting technologies such as solar energy and the like has the potential to lessen the demand on the national power grid. Doing this has the potential to make sure that the electricity being supplied by Eskom is enough for all consumers in the country. The enterprises sampled for this study should embark on this course of action as well. This is the responsibility of everyone in the country.

It will also help for enterprises operating within the sphere of ICT to make sure that when the power is cut they unplug their equipment to avoid destruction of equipment. This reduces loss of equipment as a result of load shedding.

The load shedding schedule should not be neglected as an important tool in mitigating the impact of load shedding because as one of the participants stated the schedule gives an idea of on which days will load shedding happen. Even if the schedule is not trustworthy as to the exact hour, it can help enterprise owners with the knowledge of the exact day load shedding may happen. Load shedding schedules can be printed and displayed so that customers should know when load shedding may be expected so that they should come before the hour or after.

The enterprises must explore the possibility of adopting the use of solar energy. This entails buying solar panels put on top of roofs so that they can store enough electricity to help when there is no electricity.

In reality, this is easier said than done. Some of the participants operate their enterprises in rented spaces and therefore need permission from landlords if they have to do things like putting up solar panels for instance. Permissions must be sought before embarking on any endeavour in this regard.

5.4.2 Access to alternative power sources

For those who cannot access the generators because of price, perhaps it is better to get second hand generators instead of searching for brand new one as this may be more costly. Keeping an extra battery for laptops can also prove essential during load shedding as one of the participants stated. Extra batteries can help when other computers can't be used because there is no electricity. Some functions of the business cannot wait for electricity to come back especially when clients are waiting for such material to be completed. If electricity is cut then typing, for instance, and other menial tasks can be carried out using the laptop until the electricity is restored.

5.4.3 Acquisition of Protective Power anti-surge units

What flows from the viewpoints of some of the participants when they answered the question: **Have you ever had any of your machines break because of load shedding?** Is that if the entrepreneurs should take the responsibility to unplug their computers when there is load shedding they would be ensuring that they do not get broken when electricity comes back. During the interviews it became clear that the entrepreneurs who unplug their devices have not had their devices broken because of load shedding. It is therefore recommendable that entrepreneurs invest in anti-surge units to protect their devices.

The usage of UPSes can prove an essential precautionary measure because they are able to adjust the power that comes from the socket if it is too high to be the required amount which is 250 volts in South Africa.

5.4.5 Independent Power Suppliers

The local chamber of business can also draw up a list of businesses that sell the alternative power sources in the city and publish it in the local newspaper or at least encourage such businesses to advertise their products on the local newspaper. This will help both business owners and residents in general because they will know where to go for the alternative power sources.

5.5 Summary

Chapter five is the last chapter of the study. This chapter was aimed at making findings based on the data that has been analysed in chapter four, and having done that, make recommendations as to how the impact can be reduced. The findings revealed that there is a negative impact that is imparted by load shedding on the ICT based enterprises. Enterprises lose monetarily and some lose materials because of load shedding. Recommendations were made to alleviate the impact of load shedding on the enterprise.

Reference list

- Ahn, S & Graczk, D. 2015. Understanding Energy challenges in India https://www.iea.org/publications/.../India_study_FINAL_WEB.pdf Accessed 01/03/2015
- Anon. 2013. *Challenging year ahead*. Klerksdorp Record, 8 March pg10
- Anon. 2015. Going “back to basics” very vital- Khauoe. Dikgangtsa Matlosana: Municipality news. May pg 3
- Babbie, E, 1998. *The practice of social research (8th edition)*. Wadsworth Publishing
- Babbie, F. 2005. *The basics of social research*. California: Thomas Learning Inc.
- Blaine, S. 2014. Eskom says South Africa should brace for more power cuts. Available from <http://www.bdlive.co.za/business/energy/2014/03/06/eskom-say-sa-must-brace-itself-for-more-power-cuts> .Accessed: 22/04/2015.
- Calldo, F. 2008. Eskom power crisis: Reasons, impact and possible solution. Solidarity.
- Carvaliho, B. 2015. New head ache for Eskom after Koeberg unit fault. Eyewitness news 02/02.
- CDE Round Table. 2008. South Africa’s electricity crisis. Johannesburg: Acumen Publishing Solutions
- City Press a. 2015. Eskom must get its house in order: Nene. City Press, 12 January.
- Cohen, L & Manion, L. 1997. *Research methods in education*. London: Routledge.
- Cohen, L, Manion, L & Morrison. 2007. *Research methodology in education*. Routledge.
- Cohen, L, Manion, L, & Morrison, K. 2000. *Research methods in education*. London: Routledge.
- Coutsoukis, P. 2004. South African electric power. Available from http://www.photius.com/countris/south_africa/economy/south_africa-economy-electric-power.html Accessed February 2015

Cressewell, J.W.2003. Research design: Qualitative, quantitative and mixed methods approaches (2nd edition). Thousand Oakes: Sage.

De Vos, A.S, Strydom, H, Fouche, C.B, Delport, C.S.L. 2005. Research at grass roots: For the social sciences and human services professions (3rd Edition). Van Schaick Publishers.

Dela Rue du Can, S, Letskert, V, Leventis, G, Covary, T, Xia, P. 2013. Energy efficiency country study: Republic of South Africa. USA :Berkelly Lab.

Department of Environmental Affairs and Tourism. 2005. South Africa country report: Fourteenth session of the United Nations Commission on sustainable development. Pretoria: Government Printers.

Du Preez, E. 2015. Economic effects of load shedding hits home. <http://mg.co.za/articles/2015-08-26-economic-effects-of-load-shedding-hit-home>

Eberhard,A, Kolker,J, Leigland,J. 2014. South Africa's renewable Energy IPP procurement program. World Bank Group.

Enslin-Payne, S. 2008.*Eskom lifts exports 12, 8% despite the crisis*. The star 10/03 p. 16

Eskom, 2013. Transmission, ten year plan development plan 2013-2022: Eskom supplies electricity at high voltage to customers and distributors. Eskom

Eskom. 2009. Load shedding practices, system, restoration practices and critical and essential loads. Standardisation Section: Eskom

Eskom. 2010. Eskom Holdings Limited: Integrated Report 2010 first station-Witbank, Colenso and Salt River Power stations.

Eskom. 2015. Load shedding: Frequently asked questions. Available from <http://www.eskom.co.za/.../LoadShedding.FAQ.pdf>

Eskom.2015. organisational structure. Available from http://www.eskom.co.za/OurCompany/company/information/pages/Organisation_structures.aspx.

Eybers, J. 2014. *Look who doesn't get load shed*. City Press 14/12 p 8

Froese, U.W. 2014. Capitalist democracy haunts SA. The Southern Times, 07 December pg 23

Gay, L.R & Airasian, P.W. 2008. Educational research: Competencies for analysis and application. New York: Merill Prentice Hall.

Glazewski, J. 2005. The legal framework for renewable energy in South Africa. University of Cape Town.

Green, J & Flanagan, L. 2008. *Power warning was sounded 10 years ago*. The star 25/01 p. 21

Hemmingway, J & Michel, C. 2012. Electricity generation and supply for Scotland, Wales, Northern Ireland and England, 2008 to 2011. Digest of UK Energy Statistics (DUKES)

Howell, D.C. 1989. fundamental statistics for behavioural sciences. Boston: PWS-Kent Publishing Company

Hudson, B. 1981. The primary of communication education. San Jose.

Huysamen, G.K 1994. Methodology for the social and behavioural science. Southern Book Publishers.

Kalenga, A.2014. *Nuclear power plans 'not a solution' to energy crisis*. Available at <http://m.ewn.co.za/2014/12/18/Govts-9600-megawatt-plan-not-transparent>. accessed-18/12/2014.

Kapembwa, J. 2014. AFDB prioritises Kariba and Kazangula. The Southern Times, 03 August

Kenny, A. 2006. *Koppemoetrol: Eskom spaarhom in 'n krisis*. Finweek 23/03 p. 12-13

Kornuta, H.M & Germaine, R.W. 2006. A student and faculty guide to writing a research study. Indiana: Author house.

Kotze, S. 2013. *City must pay up*. Klersdorp Record, 8 March pg 5

Le Compte, M.D & Goetz, J.D. 1982. Problems of reliability and validity in ethnographic research. *Research of education* 52(1):31-60

Le Cordear, M. 2015. *Municipal debt continues to pull Eskom down*. <http://www.fin24.com/Economy/Eskom/municipal-debt-continues-to-pull-eskom-down-20151124> Accessed 25/11/2015

Leach, M, Bilton, M, Ramsay, C, Wright, D.H, Johnstone, C, Kirsten. 2007. Demand side management. In Grubb, James, B, and Pollit (eds.) *Delivering a low carbon electricity system* Cambridge University Press.

Leedy, P.D & Ormrod J.E. 2010. *practical research methods (9th edition): Planning and design*. Pearson.

Lorrete, K. 2015. Typical organisation structure for small business. Demand Media.

MacMillan, H & Schumacher, S. 1997. *Research in education*. New York: Longman.

Mare, K. 2010. *First steps in research*. Pretoria: Van Schaick.

McMillan, J & Schumacher, S. 2001. *Research in Education: A conceptual introduction (5th edition)*. New York: Longman.

Mertens, D.M. 1998, *research methods in education and psychology*. London: Sage Publications.

Meyers, M. 2007. *CompTia A+ certification: Exam guide*. New York: McGraw Hill.

Mgibisa, M. 2008. *Eish! Its eskomplications*. City Press 10/02 p. 8

Miles, M.B & Huberman, A.M. 1994. *Qualitative data analysis : An expanded sourcebook (2nd ed)*. Thousand Oaks: Sage.

Miles, M.B, Huberman, A.M & Saldana, J. 2014. Qualitative data analysis: A methods source book (3rd edition). London: Sage.

Montalto, P.A. 2015. government knows Eskom solution but lacks resolve. Available from <http://www.bdlive.co.za/opinion/2015/04/14/government-knows-eskom-solutions-but-lacks-resolve>. Accessed: 22/04/2015.

Mooki, O & Nhlabathi, H. 2009. Eskom CEO quits. Available at: <http://m.mg.co.za/articles/2009-11-05-eskom-ceo-maroga-quits>

Nada, D. 2014. *Blame apartheid for blaming apartheid*. <http://m.news24.com/news24/Mynews24/Blame-Apartheid-for-blaming-Apartheid-20141215> accessed 18/ 12/ 2014

Ndlangisa, S. 2011. *ANC talks tough on councillor selection*. City Press 29 May pg 4

NERSA. 2013. Discussion document: Guidelines to approve distinguishing features in terms of 22(1) of Gas Act.

Ngwawi, J. 2014. SADC hits the ground. The Southern Times 21 September pg 2-3

Nieuwens. 2010. qualitative research design and data gathering techniques. In Maree, k. Van Schaick

Parliamentary Office of Science and Technology. 2003. Security of electricity supply. Post note

Patton, M.Q. 2002. Qualitative research and evaluation methods (3rd ed). New York: Sage Publications

Peron, B.E, Taylor, H.O, Glass, J, Margrum-leys. 2010. Information and Communication Technology in social work. *Advances in social work* 11 (1), 67-81.

Prinsloo, JD. 2015. Don't blame Eskom for load shedding. <http://www.bdlive.co.za/opinion/2015/03/19/dont-blame-eskom-for-load-shedding> Accessed 02/12/2015

RSA, 2008. National Energy Act. Pretoria: Government Printers.

Scott,A, Darko,E, Lemma, A & Rud, J. 2014. How does electricity insecurity affect business in low and middle income countries? ODI

Steward, C. 2015. Kenya takes the coal option. AfrElec 22 April.

Terre Blanche, M, Durheim, K, Painter,D. 2006. Research in practice:Applied methods for social sciences (2nd ed). UCT Press.

Thakali, T. 2008. *Load shedding blew it for Eskom*. The star, 03/05 p. 2

Tshingilane, S, 2014. *Hallo darkness our old friend*. City Press 14/12 p6.

Van Resburg, D. 2015. Maintenance is a religion and Eskom's a sinner. City Press, 15 January

Van Wyk, E. 2011. Load shedding only as a last resort. City Press May 29 p10.

Verma, V &Mallick, k. 1999. Researching education. London: Falmer Press

Welman,J.C. & Kruger, S.J. 1999. Research methodology for the business and administrative science. Oxford University Press.

Yende, S. 2011. Inquiry into Kusile

Zee. 2008. Internet access without electricity.

<http://thenextweb.com/2008/11/27/internet-without-electricity>. accessed 27-Jan 2016

ANNEXURES

Annexure A

Interview schedule

| Question | Description | Theme |
|---|---|--|
| 1. How would you describe your business? | Question 1 will give a clear picture of what the business does. This is important to ascertain the impact of load shedding as one would be familiar with operations are affected by load shedding thereby able to work out the results of load shedding on the operations | <i>The impact of load shedding on ICT based enterprises</i> |
| 2. What is your view about load shedding? | The view of the participant on load shedding is crucial because it is possibly influenced by the nature in which load shedding impacts on the participant and their enterprise. Therefore this view point will help in ascertaining the impact of load shedding. | |
| 3. What do you use electricity for in your business? | Question 3 will gives information on how electricity is used. In this way it will be possible to determine the size of the problem in the different enterprises. | |

Annexure B

Consent letter

Researcher: K Masibi

Participants' consent

By signing below, I agree to take part in a research study that will cover my views on **THE IMPACT OF LOAD SHEDDING ON ICT BASED ENTERPRISES**. I understand that the research will take a short time, and I will choose the most convenient time and location for my participation. I also understand that my identification will be strictly withheld from third parties. I understand that my participation is voluntary and I can choose to skip any question I would prefer not to answer. Having understood all the above mentioned facts I hereby give my consent to the researcher to ask me questions related to the above mentioned topic.

Signature: _____ Date: _____

Annexure C

Interview transcript

This transcript is a compilation of data collected from participants on the impact of load shedding on ICT based enterprises in Matlosana.

Interview with participant 1

1. How would you describe your business?"

Participant one: "It is an internet café which gives members of the public a chance to access the internet at a certain rate for a specific time. It has a lot of machines which helps its operation."

2. What is your view about load shedding?

Participant one: "Load shedding had a bad impact on business because we depend on power supplied by Eskom. Every time load shedding strikes we have to close the cafe because we do not have a plan B that can be implemented to resume business activities. It does not only impact badly on us, also the customer who will be barred from accessing the internet. Members of the public needing to apply for jobs on the net are disadvantaged; students practicing for their exams are also affected negatively. This also brings danger to this kind of business when there is no electricity, it becomes targeted by thieves."

3. What do you use electricity for in your business?

Participant one: "Electricity runs 14 PC's, an internet router. Fax, photo laminating, machines, printers and a cash register."

4. How much would you say you spend on electricity roughly?

Participant one: "Roughly I'd say R 2 835.00 per month excluding rate depending on the usage of the systems."

5. How do you keep your business running when there is load shedding?

Participant one: "I don't. I close for a while."

5.1. Describe the nature of your energy supplies?

Participant one: "Our power is supplied by the municipality."

5.2. Approximate average consumption rate?

Participant one: "I cannot quantify that at the moment."

5.3. What is the period of maximum consumption

Participant one "The café gets busy from eleven but it reaches its peak around three in the afternoon when learners come from school. This happens daily."

6. Have you ever had any of your machines breaking as a result of load shedding?

Participant one: Load shedding has a negative influence on ICT. Some machines here are damaged; photo printer, laminating machine and 3 computers are no longer functioning. We normally don't unplug the machines when we close and suspect that they might have been damaged during the night when power was restored."

7. Do you get reduced profits when there is load shedding compared to when there is not?

" Profits decrease drastically when there is load shedding because we have to close down the business. We can't afford these big generators as the business is small."

8. How else does load shedding affect your business?

Participant one: "It also brings a negative impact on the image of the business as customer will be expecting better service."

9. How do you plan for load shedding?

Participant one; "there is no plan as such."

10. How do you think the problem of load shedding can be solved?

Participant one: “Uninterruptable Power Supplies (UPSes). Make sure the UPSes are correctly sized for the job they have to do and that they cater for potential extended power outages...Most companies will rely to a great extent on generators.”

Interview with participant 2

1. How would you describe your business?

Participant two: “Here we operate a computer service centre and we fix computer for the clients, we build computer networks for businesses and offices we sell computer parts and things like that.”

2. What is your view about load shedding?

“It’s really bad, when there’s load shedding we can’t do some things we can’t test the computers and things like that. We really battle, diesel is not cheap”

- Researcher: *Follow up question*- “do you have a generator?”
- Participant 2: “Yes, we have one; we had to get a small one just to get things going when there is no electricity.”

3. What do you use electricity for in your business?

Participant 2: “We have many computers that we need to test when we fix them. The computers always need electricity to go on so we don’t have any choice we have to go the generator route or else we can’t do anything.”

4. How much would you say you spend on electricity

Participant 2: “I think about R2 500.00 or there about.”

5. How do you keep your business running when there is load shedding?

Participant 2: “We use the generator and this helps because at least we can still meet targets and fix clients’ PC’s in time.”

5.1. Describe the nature of your energy supplies.

Participant 2: “We get the normal municipal electricity voucher and when there is load shedding we use the generator like I said.”

5.2. What is your approximate average consumption rate?

Participant 2: “We don’t have a meter for that in this place but I would say around 40 kilowatts a day or there about.”

5.3. What is the period of maximum consumption?

Participant 2: “the month ends are the busiest time of the month and that is when we need a lot of electricity to service all the clients’ because we also have to go to clients’ offices and homes to build networks and install routers so if there is load shedding we can waste petrol and go there only to find ourselves doing nothing, just wasting time. We can’t use the generator there because it has to stay here at the shop so when there is load shedding during month ends its really bad for us.”

6. Have you ever had any of you machines breaking because of load shedding?

Participant 2: “No, not yet. We are a computer repairers we know the risks so we are ever so vigilant. We don’t leave anything to chance.”

7. Do you get reduced profits when there is load shedding compared to there is not?

Participant 2: “Yes because when load shedding hits we have to spend again and get the diesel for the generator and this is really an unnecessary expense. The generator is not always useful because it can break down and that will be another expense.”

8. How else does load shedding affect your business?

Participant 2: “I sometimes have to pay my technicians overtime because if they go to someone’s office and electricity goes they have to stay until it comes back.

We have to stick to the time frame that we have agreed on with the client, no excuses.”

9. How do you plan for load shedding?

Participant 2: “I don’t have a basic plan, how can you plan? The time table they put in the paper is not always right so you can’t tell when in the day it will go off. All you need to do is to just put enough diesel in the generator. But I plan to have some solar panels installed if the land lord agrees.”

10. How do you think the problem of load shedding can be solved?

Participant 2: “As they say we have to cut our consumption and put other energy sources in use in our business and homes. But we also need to use tools that do not use electricity too much like those old meters we used to have for this line of work.”

Interview with participant 3

1. How would you describe your business?

Participant 3: “We run a print shop. The shop caters for people who want to print anything from CV’s to school magazines or newsletters. We also print adverts. Actually, we serve a lot of printing needs. We have different printing machines from the normal printer in the office to an industrial printer for more quantity driven prints.”

2. What is your view about load shedding?

Participant 3: “You know, load shedding is a pest. You won’t believe how much we lose because of it. People come in here and they find that there is no electricity they go. Sometimes when there is load shedding here in Meiringspark, La Hoff, on the other side of Klerksdorp, will be on and the people will go there for the same things we could have done for them here.”

3. What do you use electricity for in your business?

Participant 3: “Almost everything, 3 computers, and all these printers, about five of them, the fax photo copy machines. Almost everything to be honest uses electricity.”

4. How much would you say you spend on electricity roughly?

Participant: 3: “over R2000 a month.”

5. How do you keep your business running when there is load shedding?

Participant 3: “I’m planning to buy a generator because we lose so much money because of load shedding.”

5.1. Describe the nature of your energy supplies?

Participant 3: “Our energy is supplied by the municipality we pay our amount monthly.”

5.2. What is your average consumption rate?

Participant 3: “All I know is that we pay R2 000 in a given month. I can’t convert that into kilowatts”

5.3. What is your period of maximum consumption?

Participant 3: “We use most electricity when we have to print big orders which are usually in month end.”

6. Have you ever had any of your machines breaking as a result of load shedding?

Participant 3: “Once, one printer packed up because when power was cut off, it was busy printing and as soon as the electricity came back it wanted to continue printing and one of the wheels that pushes the paper through was lifted off its rail. It was irreparable.”

7. Do you get reduced profits when there is load shedding compared to when there is not?

Participant 3: “Yes, a lot of money goes through that door when there is load shedding.”

8. How else does load shedding affect your business?

Participant 3: “The thing is, our gate is one of those electric gates and when there is no power, it makes me worried so much because burglars may come in easily and take things from us very easy.”

9. How do you plan for load shedding?

Participant 3: “I always check the Eskom websites. It is not updated quickly enough so you can’t trust it too much but it’s better than trying to avoid it. Doing that means every time there is load shedding it comes as a surprise. Even though the times on the schedule do not correspond with reality at least you know that today some time there’ll be load shedding so be ready.”

10. How do you think the problem of load shedding can be solved?

Participant 3: “those power stations they have been building should be finished quickly and Eskom must give us proper updates on their websites.”

Interview with participant 4

1. How would you describe your business?

Participant 4: "My business is an internet cafe in the middle of town."

2. What is your view about load shedding

Participant 4: "I don't like it. It's bad for business."

3. What do you use electricity for in your business?

Participant 4: "Electricity in my business is used for my computers, my printer the photo copy machine, laminating machine, T-shirt printer, the lights as well as a kettle and so on."

4. How much would you say you spend on electricity roughly?

Participant 4: "Between R1 500 and R2000."

5. How do you keep your business running when there is load shedding?

Participant 4: "I use a generator."

5.1. Describe the nature of your energy supplies?

Participant 4: "I buy electricity from the municipality offices. We don't have direct supply from Eskom in Matlosana."

5.2. What is your approximate average consumption rate?

Participant 4: "I don't read it like that. I just look at it in terms of Rands and Cents. If I spend a lot then I know I used a lot for that month or vice versa."

6. Have you ever had any of your machines breaking as a result of load shedding?

Participants 4: "not really. As soon as the electricity cut off. I unplug everything and plug them back again when the electricity is back. This takes time but it

saves me the money and trouble that comes with having to replace broken computers and other appliances.”

7. Do you get reduced profits when there is load shedding compared to when there is not?

Participant 4: “Yes, we do have a generator but it is not big enough to accommodate everything. It’s a small house hold generator and some computers have to stay off during load shedding. In an internet cafe like this one, computers must all work or you lose customers.”

8. How else does load shedding affect your business?

Participant 4: “Besides the loss of money there is also the inconvenience of having to work late in the night because we also do typing of assignment, T-shirt printing and many other things. We have to get people at short notice to help sometimes. We have to pay these people. It’s just not good for business this load shedding.”

9. How do you plan for load shedding?

Participant 4: “I keep the generator ready and sometimes I wake up at four to do some typing work to make sure that I put it aside and when load shedding starts, I have made the work load less. Because people bring their assignment to us to type and they need them on time for them to submit them. We need to maintain their trust so that they can tell others about us out there.”

10. How do you think the problem of load shedding can be solved?

Participant 4: “The government must get its hose in order. They made promises and we voted for them. They must fix whatever it is that is wrong with Eskom. We are tired of this. The workers building the new power stations must stop striking now and then. The government makes it look like load shedding is our problem, it is not. They must just put Eskom in working order.”

Interview with participant 5

1. How would you describe your business?

Participant 5: "I run an internet cafe and a PC repair shop in the same premises. The internet café occupies the front part of the shop and repairs are done at the back of the shop. We refurbish old computers, repair hardware and software related problems, we build websites for companies we also do logos, business."

2. What is your view about load shedding?

Participant 5: "It's a hot topic nowadays. Well, I must say I hold the same view as everyone else in the country: load shedding is destructive. It is strenuous on every one, be it private individuals in their homes or to us owning businesses. Even government offices themselves have to wind down their order of business for the day when load shedding persists. I think it affects everyone who uses electricity to better themselves."

3. What do you use electricity for in your business?

Participant 5: "I run all my technology on electricity, even the cell phone needs electricity to be charged. Basically we have 12 computers, 10 of which are in the internet café and two are used for other projects. We also have many other devices like printers, scanners, you know what I mean?"

4. How much would you say you spend on electricity, roughly?

Participant 5: "Roughly R600 a week"

5. How do you keep your business running when there is load shedding?

Participant 5: "We keep spare batteries for our laptops fully charged at all times. We have a few Uninterruptable Power Supplies. These tactics do not last very long after the load shedding but at least we get some extra time to go on working without electricity. It's better than doing nothing."

5.1. Describe the nature of your energy supply.

Participant 5: “We acquire our electric supply from the municipality. This is done through buying of electricity vouchers that the municipality sells.”

5.2. What is your approximate average consumption rate?

Participant 5: “A lot of electricity. Like I said what is spent on electricity is approximately R6 00 a week.”

5.3. What is your period of maximum consumption?

Participant 5: “The internet café is used by school children mostly and it is busy when they come from school.”

6. Have you ever had any of your machines break as a result of load shedding?

Participant 5: “Load shedding increases the wear and tear of computer. It is always good to have computers on the whole day than to switch them off every now and then.”

7. Do you get reduced profits when there is load shedding compared to when there is not?

Participant 5: “Yes, we can’t run full steam without electricity.”

8. How else does load shedding affect your business?

Participant 5: “In many ways. People stop trusting you in the long run.”

9. How do you plan for load shedding?

Participant 5: “I don’t plan. When it comes it comes but extra batteries for laptops are always kept handy.”

10. How do you think the problem of load shedding can be solved?

Participant 5: “People must use fewer devices in the home. The government must work hard to solve the problem, really.”