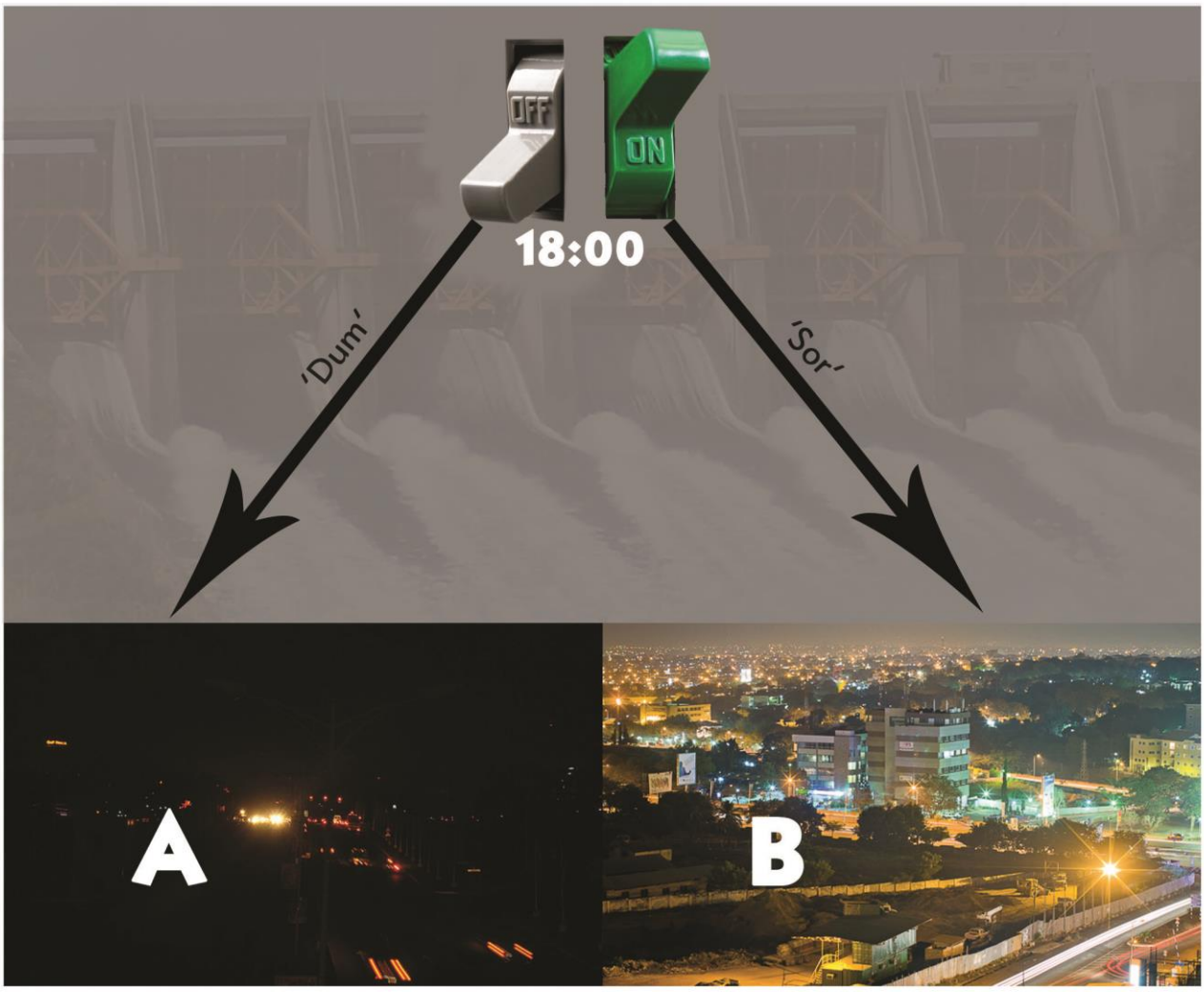
MICHAEL OGBE

Living under the electricity load shedding in Ghana; a case study of businesses in Accra Newtown and residences in North Legon suburbs of Accra, Ghana.



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Declaration

With the exception of references used, which have been duly cited, I Michael Ogbe do hereby declare that this thesis is the result of my own work under the supervisions of Ragnhild Lund (Professor) and Thomas Sætre Jakobsen (PhD Candidate) at the Department of Geography, Norwegian University of Science and Technology (NTNU), Trondheim, during the 2014/2015 academic year. This work has neither been submitted in whole nor in part for any degree in this University or elsewhere.

Dedication

I posthumously dedicate this research to my late mother Mrs. Elizabeth Esenam Ama Ampim Ogbe (Da Betty).

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NTNU, Trondheim
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Michael Ogbe

Abstract

In this twenty-first century, electricity has become the pivot of global activities. Electricity has become the engine for social development and economic growth (Pachauri et al., 2011). The world lives and operates on electricity - electricity is so vital to our everyday lives. However, access to adequate and reliable electricity is a big issue in most developing countries (Brew-Hammond, 2010, Kanagawa and Nakata, 2008, Reddy et al., 2000) and Ghana is of no exception. This provides the starting point to this seven-chapter qualitative research on 'living under the electricity load shedding in Ghana; a case study of businesses in Accra Newtown and residences in North Legon suburbs of Accra, Ghana.

The data for this research were collected in the summer of 2014 in Ghana The informants were categorised under three groups; institutions involved in the electricity load shedding, offset printing presses in Accra Newtown and households in North Legon suburbs of Accra. In all, four institutions (MoP, VRA, GRIDCo and ECG), ten business owners and ten households were interviewed with the help of semi-structured interview guides. One focus group discussion was also conducted. All the interviews and discussion were conducted in both English and Twi language, recorded and later transcribed into English and analysed thematically by the researcher.

Theoretically, I positioned myself within the Capability Approach by Amartya Sen coupled with the Right Based Approaches to Development by Britha Mikkelsen; and Structuration Theory by Anthony Giddens to develop a conceptual framework for the research.

From the data, it was found out that, the electricity load shedding is as a result of two major challenges. The first major challenge boils down to the policies and decisions of the government. The other challenge had to do with the non-performance of responsibilities by the duty bearers.

The research therefore argues that though the duty bearers could contribute to the wellbeing of the right holders in the electricity sector in Ghana, with the findings, the load shedding in Ghana has led to an adverse impact on the wellbeing of the right holders (businesses and households) in the research area.

List of Abbreviations

AC	-	Air Conditioner
AGI	-	Association of Ghana Industries
ATM	-	Automated Teller Machine
AYE	-	Alliance for Young Entrepreneurs
BBC	-	British Broadcasting Corporation
BPA	-	Bui Power Authority
CENIT	-	CENIT Energy Limited
CEO	-	Chief Executive Officer
EC	-	Energy Commission
ECG	-	Electricity Company of Ghana
GRIDCo	-	Ghana Grid Company
GSS	-	Ghana Statistical Service
GWCL	-	Ghana Water Company Limited
HP	-	Hewlett-Packard
IPPs	-	Independent Power Producers
MoEP	-	Ministry of Energy and Petroleum
MoP	-	Ministry of Power
MRP	-	Mines Reserve Plant
MW	-	Megawatts
NEDCo	-	Northern Electricity Distribution Company
NTNU	-	Norwegian University of Science and Technology
PNDC	-	Provisional National Defence Council
PURC	-	Public Utilities Regulatory Commission
T2	-	Takoradi T2 Power Plant
T3	-	Takoradi T3 Power Plant
TICO	-	Takoradi International Company
TT1PP	-	Tema Thermal 1 Power Plant
TT2PP	-	Tema Thermal 2 Power Plant
TUC	-	Trades Union Congress
UNDP-GEF	-	United Nations Development Programme-Global Environment Facility
VLC	-	VideoLAN Client
VRA	-	Volta River Authority
WHO	-	World Health Organization
WPR	-	World Population Review

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CHAPTER 1

* Background to the Study
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1.1 Introduction

This research examines the wellbeing of businesses and households under the electricity load shedding in Ghana with a case study on Accra Newtown and North Legon suburbs of Accra. With theoretical insights from Capability Approach by Sen (1993), coupled with the Right Based Approaches to Development by Mikkelsen (2005) and Structuration Theory by Giddens (1984) the study adopts a conceptual framework that investigates the electricity load shedding policy in Ghana by examining the duty bearers and their roles in the policy and also identifying the right holders and their lives under the load shedding.

The purpose of this chapter is to introduce the reader to the background of this research. It further presents the problem statement, the research objective, the specific research questions and a justification for the research. The chapter will conclude by giving an organization of the chapters in the entire thesis. The information presented in this chapter is from the various relevant literatures to the research.

1.2 Background to the Study

Intellectual discourses on electricity emerged in the 1600s with the works of the English scientist William Gilbert (1544-1603) on electricity and magnetism (Stewart, 2001). Gilbert had been credited to be the one who introduced the Latin word ‘electricus’ to denote the property of attracting small objects after being rubbed (Baigrie, 2007). It was from this that subsequent researches about "electricity" emanated. Other scientific scholars who have worked on electricity from the writings of Srodes (2002) include the German Scientist Otto von Guericke (1602-1686), the Anglo-Irish Physicist Robert Boyle (1627-1691) and the American Scientist Benjamin Franklin (1705-1790).

In this twenty-first century, electricity has become the pivot of global activities. Electricity has become the engine for social development and economic growth (Pachauri et al., 2011). The world lives and operates on electricity - electricity is so vital to our everyday lives. Contemporary usage of electricity is highly evident in our communication system, our households setting, transport and security systems, businesses and workplaces, distribution of social amenities like internet, water and gas, and above all, our entertainment industries.

Let us for a moment pause, and think of the possible consequences of not having electricity for hours or even days. What would the world look like? Liscouski and Elliot (2004) reported that on August 14, 2003, parts of the Midwest and Northeast United States and Ontario, Canada, suffered from an electric power outage. Despite the fact that it was just for a short time, both print and digital media reported it as a 'catastrophe' (Yahya, 2007). In 2014, some of the countries that were experiencing inadequate supply of electricity included Nepal, Bangladesh, Pakistan, Belgium, India, Zimbabwe, South Africa and Ghana (Vermeulen, 2014). From this global perspective, the next section of this chapter will narrow down to the Ghanaian context of electricity load shedding.

1.3 Problem Statement

Access to adequate and reliable electricity is a big issue in most developing countries (Brew-Hammond, 2010, Kanagawa and Nakata, 2008, Reddy et al., 2000) and Ghana is of no exception. Historically, Ghana had suffered shortage of power supply in the eras of 1983-84, 1997-98, 2003, and 2006-2007 (Adom and Bekoe, 2013). The 2006-2007 era was the hardest among these electricity load shedding periods. Out of 48 hours, electricity was provided for only 24hrs; out of the about 1180 megawatts generated by the two hydropower dams (Akosombo and Kpong) only about 400MW was produced (ibid).

Nevertheless, in the year 2012, the fifth and most probably, the severest electricity load shedding in Ghana started. Majority of the electricity generated in Ghana comes from the Volta River Authority (VRA) which was established under the Volta River Development Act 1961 (Act 46) with the objective of developing the hydroelectric potential of the Volta River to supply of electricity to Ghana and some neighbouring countries (Bekoe and Logah, 2013). Aside the VRA, there is now the Bui Power Authority (BPA) are some Independent Power Producers (IPPs) that also contribute to the total national electricity generational capacity. In the past 10 to 15 years, Ghana only managed to supplement its total electricity generation capacity with about 1,000 megawatts (Mathrani et al., 2013). Nonetheless, the national demand for electricity is estimated at rate of about 200 megawatts per annum (Boateng, 2014). It is argued that the inadequate supply against rising demand of electricity has led the authorities of Ghana resorted to the electricity load shedding. The Electricity Company of Ghana is the institution that comes out with a timetable to officiate the load shedding (see chapter four). For Ghana to be able to adequately meet the rising demand for electricity there

must be an annual addition of about 200MW of electricity added to the national grid. This calls for the importance of an enormous investment in the electricity sector by the government of Ghana. The generation, transmission and distribution sectors of electricity all need to be revamped in order for Ghana to be able to meet the rising electricity demand. An estimated figure of about US$4 billion is required to be able to achieve (Mathrani et al., 2013).

Until the solution is arrived at, Ghanaians will only have to cope with the reality – the existence of the electricity load shedding. As a middle income country (Granado, 2013), Ghana depends heavily on electricity. Businesses, industries and residences all rely on adequate and reliable electricity supply to function well. The current electricity crisis has therefore brought untold hardship and discomfort to businesses and homes - a situation some have described as the worst in the country's history (Acquah, 2015).

The problems facing the Ghanaian populace due to the load shedding is abounding. Electricity supply had drastically decreased and the timetable for the load shedding that intends to alert people on when or not they will have light had been reported to be unreliable. These situations had been very frustrating to the consumers and had led to most businesses that can afford, to procure personal electricity generators or plants to provide alternative electricity in order to maintain production. Consequently, this had led to an increase in production cost which has translated to an increase in commodity prices in Ghana and the masses are suffering. On the other hand, the increased production cost from the purchase of generators and fuel (diesel) on the parts of businesses had gradually led to loss of jobs and unemployment to most employees. More so, the electricity cuts had destroyed some valuable properties of people such as refrigerators, televisions, air-conditioners and other related equipment. Another challenge of the load shedding is felt in the health sector where some hospitals also experience the load shedding. Human lives have been reported by most of the radio stations especially in Accra to be in danger due to the lack of electricity - patients need to undergo surgeries and there is no electricity to make that possible. Furthermore, whenever the electricity goes off, there is darkness all over, and this creates a fertile ground for criminals. With all these problems from the load shedding, it is doubtful if the first of the eight United Nation’s Millennium Development Goals which is to eradicate extreme poverty and hunger by 2015 (Pogge, 2004) could be attained as we are already in the year 2015.

Duku et al. (2011) and Ofori-Boateng et al. (2013) in their works on electricity in Ghana, mainly focused on the potentials of alternative sources to the hydroelectric power generation.

Also, Adom and Bekoe (2013) together with Essah (2011) researched into the generation and consumption of electricity in Ghana. Abavana (2004) investigated electricity and poverty reduction in Ghana. Majority of the rest of literature on electricity in Ghana paid attention to mostly the scientific issues of electricity such as Bekoe and Logah (2013) who looked at climate change and its impacts on electricity generation, and Nunoo and Ofei (2010) examining the 'supervisory control and data acquisition with advanced metering infrastructure' in the electricity sector. From these literatures and others that were consulted prior to the commencement of this research, it was observed that none of them focused on how electricity load shedding affects businesses and households in Ghana. This is the identified gap within the literatures that this research purports to fill. The main research objective and questions, justifications and organization of this research are presented in the successive sections of this chapter.

1.4 Research Objective

The electricity load shedding in Ghana has become an intricate occurrence in Ghana. This research aims at disentangling the concomitant intricacies of this developmental blight. That is to say, the main aim of this research is to explain the electricity load shedding policy in the Ghanaian environment, assess lives of businesses and households under the electricity load shedding, indicate the prevailing adaptive strategies to the policy and finally, provide expedient recommendations to ebb the canker. This is to explore the extent to which capabilities of both the duty bearers and right holders exist and to further unpack how the functionings of the duty bearers impact on the wellbeing of the right holders.

1.5 Research Questions

The objective of this research would be answered by the following research questions:

1. What is electricity load shedding in Ghana?
2. Who are involved in this strategy (institutions and roles)?
3. How is electricity load shedding affecting business lives?
4. How is electricity load shedding affecting residential lives?
5. What are the various mitigation measures towards electricity load shedding?

6. What are the possible solutions to the electricity load shedding?

1.6 Justification of the Research

Truth be told, this research was not just conducted to merely meet the awards of an Mphil in Development Studies, specialising in Geography at the Norwegian University of Science and Technology, Trondheim, Norway; but, it is also culminated with my passion of unearthing the developmental challenges of humanity, and finding solutions to such impediments. After a carefully analysing my observation of the challenges besetting Ghana in the era under review, and also looking at my academic background and research focus; the title, objective and questions, methodology and research area together with the concepts and theory of this research were chosen. Through this research, it is my aim of one, contributing my quota to the academic milieu and two, finding a solution to a national crisis.

At the outset, it is believed that, with the help of the capability approach (chapter two) by Amartya Sen – one of the very useful micro-theories and human placed approaches to development, and co-production of knowledge with informants, the gap identified in the literature will be filled. A whole new dimension to knowledge in the developmentally focused academia is expected to be added with the assessment of the duty-bearers and right-holders of the electricity sector of Ghana, and analyses of the structural procedures at play in the electricity load shedding policy and examination of lived experiences of businesses and households in the selected suburbs of Accra. The interrelationship between structures and agents studied under the goal of the attainment or not of wellbeing is the point of departure of this research from the other available literature. This uniqueness makes the research a new and interesting academic focus that has great potentials for future academic enquiries.

Still, the research looks at how the unreliability of electricity is affecting businesses and households despite their self-mitigating measures. This is intended to help provide findings that will be geared towards an improvement of the electricity sector so as all the consumers in the sector would be able to attain their desired wellbeing (quality of life). In other words, when the proposals based on this research is applied, businesses and households would be able to get adequate and stable electricity for all their expected usage and this would be very helpful in propelling the human and economic development of Ghana as a whole.

1.7 Organization of the Thesis

This thesis is structured into seven chapters. Chapter which introduces the reader to the background to this research provides the introduction to the whole thesis, background of the study, statement of research problem, objective and questions of the study. It further explores the need for conducting this research - justification and finally ends with giving an indication as to how the entire thesis is organised into chapters. Chapter two hosts the theoretical and conceptual underpinning of the study by focusing on the theoretical and conceptual framework of the study. Chapter three presents the methodological framework of the study of the research. Chapter four begins the empirical chapters of the research with an overview of the institutions in the electricity sector of Ghana within a national research context. Chapter five presents the perceptions and the challenges to the cause of the electricity load shedding in Ghana. Chapter six concludes the empirical chapters with an in-depth look at the everyday lives of businesses and households under the electricity load shedding in the study area. Finally, the thesis ends with a summary, conclusions and recommendations all contained in chapter seven.

CHAPTER 2

* Concepts
* Research Theory
* Conceptual Framework

2.1 Introduction

This chapter presents the theoretical and conceptual underpinning of the study. It is the prime intension of this study to explain the electricity load shedding concept, assess its impacts on businesses and residences and to further identify the adaptive strategies towards it. Underneath this task is the responsibility of clearly unearthing and explaining the embedded concepts. This chapter therefore, examines the various concepts and shows how they interrelate. It further identifies the duty-bearers and the right-holders in the electricity sector of Ghana in a conceptual framework that links together the concepts. The information presented here is mainly based on the theoretical works of Amartya Sen and Anthony Giddens, though the works of some other related scholars have been included.

2.2 Concepts

To be able to effectively understand and portray the ideas of this study, there is the need to explain some words/concepts that are very crucial and recurrent in the study. Concepts such as agents, structure, capabilities, functionings and wellbeing run throughout this study and thus, must be explained. The way they interrelate is also illustrated, which introduces the conceptual framework of the study.

2.2.1 Agents

Agents here in this study refer to the printing presses and the households. Amartya Sen (2001) in his book Development as freedom explains that an agent is someone who acts and brings about change, whose achievement can be evaluated in terms of his or her own values and objectives. Going according to this explanation, it means that an agent is the one who has the ability to do whatever he or she desires to do or to become whoever he or she dreams of becoming. This also means that as an agent, one needs to be guided by some amount of personal attainments/achievements or better still goals or objectives (Sen, 1992). For instance, as a household in North Legon, Accra, the goal is to be able to enjoy the benefits of getting connected to the national electricity grid and as such enjoy a constant, reliable and adequate electricity supply from the electricity company of Ghana (ECG). This ability to act and take a decision for one's own betterment makes one an agent. More so, it is very relevant to point out the fact that an agent here in this study does not refer to someone acting in the stead of

another as it is in most economics (Rees, 1985) and game theory (Semsar-Kazerooni and Khorasani, 2009) literature.

The idea of agents is not new in intellectual discourses. It has run through a lot of discussions mainly in philosophy and sociology. The 17th century French philosopher René Descartes argues that man is rational because man thinks in his famous quote, "I think, therefore I am - cogito ergo sum" (Ali and Descartes, 1970). Expanding this argument by Descartes further, Immanuel Kant posits that an individual's interaction with the outside world is the beginning of one's self-awareness (Kant et al., 1998). Furthermore, Friedrich Nietzsche reasoned that man has the opportunity of choice however, he makes such choices constructed around his own egoistic desires - "will to power" (Nietzsche, 2011). Karl Marx also sees people as agents even though to him in his famous book The Communist Manifesto, in the modern society, the principles of the bourgeoisie control these agents (Marx and Engels, 1967).

2.2.2 Structures

Having identified the agents, the next issue is to know what elements therein their environment affect or direct their daily lives. This brings in the next concept of structures. Structures here in this study refer to the policy (electricity load shedding) and the various organisations that are the primary institutions (ECG, VRA, GRIDCo and MoP) involved in the electricity management scheme. The concept of structure goes hand in hand with that of agent in most social science researches. Thus, a lot of scholars who have written on one will most probably write on the other.

According to Barker (2005), the recurrent patterned provisions in a society which impact or limit the choices and opportunities available to people is known as structures. These can be policies, laws, institutions, ideologies, norms and so on in any given society. The structural functionalist Emile Durkheim sees structure as very crucial in stabilizing the existence of human society (Durkheim, 1963).

Just like the way the concept of agent has some other meanings, so it is with the concept of structure. Just a mere mention of the word structure sounds ambiguous; are we talking about for instance a physical structure or we are talking about a laid out plan to achieve something? Merton (1976) argues that the conception of social structure is not only polyphyletic due to the fact that it has more than one familial lineage of sociological thought but it is also polymorphous since lineages vary somewhat in substance and partly in method. In this study

therefore, structure refers to the network of social relations (Radcliffe-Brown, 1940), a set of hierarchical societal authority (Lin et al., 2001) and rules and resources (Giddens, 1984) that are at the disposal of agents to help them arrive at the desired goals (Sen, 2001).

2.2.3 How Agents and Structures interact

Other notable recent scholars who have worked on the concepts of agents and structures include Barker (2005), Giddens (1984) and Hewson (2010). Barker considers the state of being an agent as the ability of individuals to perform whatever they wish independently whilst they make their own free choices.

Anthony Giddens (1979), the father of the *structuration theory*, introduces the term reflexivity in agents' discourse when he sees an agent as having the ability to consciously change his or her place/environment in the social structure. Nevertheless, Hewson (2010) goes further to illustrate three types of being an agent; these are the individual, the proxy, and the collective agents. When a person acts on his or her own behalf, it is referred to as an individual agent. When an individual acts in the name of someone else, it is referred to as proxy agency. The collective agent is where people act together; a collaborative action. According to Hewson (ibid.) intentionality, power, and rationality are the properties that give rise to being an agent. Human beings work with intentions which are most often leaned towards a goal. Humans also do possess different capacities and means; this explains why some people have more ability than others. Lastly, humans have the ability to reason and this rationality guides their actions or inactions and also foretells the respective consequences thereof.

In 'The Constitution of Society', Giddens (2013) argues that structure is the medium and product of social action which is presented as a system of norms within which agents interact. What he terms the duality of structure. Structure according to Bernardi et al. (2007) generally refers to a set of relations between societal elements that has some measure of coherence and stability. This general perception of the structure concept is in line with the ideas ordered or organised arrangement of elements by (Haferkamp and Smelser, 1992).

2.3 Capability Approach

From the above discussion, it is possibly palpable that I am being influenced by Amartya Sen's ideologies. Thus, the overarching theory that this study rests on is the capability approach (Sen, 1993b). I am using this theory because it helps in assessing the wellbeing (quality of life) of agents, design of social policies and social arrangements in any society; and this is the embodiment of my objective for this study.

Born at Bangladesh in 1933, Amartya Sen is an Indian economist and philosopher. He is a Harvard University professor and also won the Nobel Memorial Prize in Economic Sciences in 1998 and Bharat Ratna in 1999 for his work in welfare economics (Morgan, 1988). His scholarly works have contributed immensely to welfare economics, social choice theory, economic and social justice, economic theories of famines, and indexes of the measure of wellbeing of citizens of developing countries.

2.3.1 Sen's Capability Approach Model

The theoretic framework by Amartya Sen revolves around two main normative arguments. The first is that there must be freedom for everyone to attain wellbeing, that is to say, freedom is crucial to moral prominence. The second is that this freedom needs to be understood in terms of people's capabilities. The existing opportunities of people to do and or to be what they have reason to aspire, so to say. It is also worth noting that this approach has been explored and developed further into other discourses, such as rights and social justice (Alexander, 2008, Crocker, 2008) or development ethics (Alkire, 2005, Clark, 2009, Robeyns, 2005). It has also led to the idea of focusing on human development – introducing the human development reports mostly published by the United Nations Development Programme (Fukuda-Parr, 2003).

Sen contends that because mostly human rights are undermined by top-down development policies the associated terms are well defined and demystified. This thus leads to the suggestion that governments should be dignified against the actual "*capabilities"* of their citizens. For instance, Ghanaians connected to the electricity grid technically have the right to enjoy hydroelectric power. But in reality, for this right to be enjoyed, Ghanaians need to have an adequate, available and reliable electricity supply – this is what he terms "*functionings*". In other words, the absence of such functionings, make the existence of citizens' capabilities a mere assumption.

These are the major concepts in the capability approach that are prominent in and pertinent to my study. These two concepts help very helpful in evaluating social policies such as the electricity load shedding in Ghana. They are elucidated below in order to understand their interlinkages and how they contribute or prevent the wellbeing of Ghanaians.

2.3.1.1 Functionings

These are the states of 'beings and doings' (Sen, 1993b). Basically put, the various situations of human beings and activities that they undergo collectively refer to their beings and doings. In my study the beings include being in a house where there is constant supply of electricity or being in a printing press where machines are constantly working due to the availability of stable and adequate electricity. The doings however refers to the acts of putting on electrical fans or air conditioners for instance in order to get some cold air in a hot room for comfort whiles one wants to sleep in North Legon. Within the printing press business, the act of using the polar machine – the paper cutting machine, in order to trim larger papers to requisite sizes for effective printing is a an example of doings.

This concept of functionings can be univocally good or univocally bad; the goodness or badness depends on the context under consideration and/or the perception we have (LaFollette, 1999). If a household in North Legon has all their light bulbs on in the night to put-off potential criminals and thieves from attacking their house; will that be considered a good functioning or a bad one? Someone who is an advocate for energy conservation like Van Raaij and Verhallen (1983) will most probably see this as a negative functioning, whiles another who is more concerned with maximum security (Amin, 2002) will see that as a very positive functioning.

So this concept of functionings will help in exploring the various ways by which the electricity load shedding is affecting the respondents in this study. Are they functioning well or otherwise, what functionings do they even possess? These are some of the various details that will be brought out in subsequent chapters; particularly the data analysis or discussion chapters of this study.

2.3.1.2 Capabilities

According to Amartya Sen, capabilities are a person's real freedoms or opportunities to achieve functionings. Sen (1993a) argues that capabilities are the effective opportunities of individuals to undertake actions and activities that he or she has reason to value and to be the

person that he or she has reason or aspiration to be. People must therefore have the freedom to pursue wellbeing (Sen, 2001). There is therefore the need for an effective freedom of an individual to make a choice between different available functioning combinations (Alkire et al., 2009) in order to achieve various kinds of desired life. In evaluating or assessing one's capabilities, Sen (2001) lists five main determinants that need to be considered. These include: the importance of real freedoms in the assessment of a person's advantage, the individual differences in the ability to transform resources into valuable activities, the multivariate nature of activities leading to wellbeing, a balance of materialistic and non-materialistic factors in evaluating human welfare and finally, the concern for the distribution of opportunities within society.

Does a household in North Legon decide to battle with mosquitoes in their sleep in darkness as their electric fan is off or they just have to bear with that unfavourable situation because ECG has put the lights off in their vicinity due to the electricity load shedding? Will people be able to charge their mobile phones anytime there is the need to?

In this study, capabilities denote the ability of agents to perform or achieve certain actions or goals as Amartya Sen will put it, through a set of controllable and measurable processes or services – structures (Alkire et al., 2009). Sen (1993b) reasons that the alternative combination of things a person is able to do or to be refers to the person's capabilities. Thus, the various 'functionings' he or she can achieve. Bringing it down to this study, the capabilities of the printing press, owners for instance, refers to the various capacities they can employ to be able to meet their production goals in order to maximum profit and maintain the running of their businesses with regards to the electricity provision and other related resources they have. This is what Rigg (2007) will describe as "what people can do with their entitlements." Will people be capable of achieving their goals if they do not have the freedom to operate and function? It is therefore very important to state that the essential freedom (Alkire et al., 2009) to pursue different functioning (Sen, 1993a) is an essential element in people's capabilities?

2.3.1.3 Relevance of the Capability Approach

Just like every theory has its followers and critiques, so it is with Amartya Sen's Capability Approach. Some scholars like the American Philosopher Martha Nussbaum wonders about the possibility of operationalizing the capability approach (Sugden, 1993). Nussbaum would have preferred Sen to list the important capabilities he is referring to in his arguments. So

Nussbaum (2003) came out with a comprehensive list of ten capabilities. In my mind, the flexibility that Sen's approach embodies is more appealing than any definite list as Nussbaum would argue for. This is because, I see the flexibility as a vital asset and sustaining it only opens up more room for the consideration of other social contexts such as the one this research falls within.

Nevertheless, some researchers have also argued that people differ in their approval of a good life so it is not necessarily the case for Sen to insist that certain capabilities are just valuable (Sugden, 1993).

Last but not least, some academics also are of the view that the information required to be able to use Sen's approach is just too high. Alkire (2005) for instance is of the view that, for one to use the capability approach to evaluate social states, it is necessary to acquire data of multiple functionings. Some, if not all of these are not even available.

The above are just three out of the many other criticisms against the approach. So the question is why is the capability approach still being employed in this study irrespective of the criticisms bedevilling it? The following strengths of the approach are the convincing factors why it is seemed suitable for this research. The approach is very flexible and considerable (Alkire, 2005) and this makes way for researchers to use it in different ways. There is no list of definite capabilities for instance that Amartya Sen makes unlike the way Nussbaum does. This helps a researcher to be able to adequately fit his or her researched capabilities into the approach. Sen does not endorse a unique list of capabilities as objectively correct for practical and strategic reasons (Clark, 2009). Furthermore, the capability approach can be used in assessing an individual's benefit in issues such as social justice, living standards among others (Sen, 1993b). This makes it very much applicable to this study since it focuses on the wellbeing of the households and printing presses herein referred to as the agents.

2.4 Wellbeing

Inasmuch as the agents in this study expects the available structures to help them maximise their potentials, so do the structures also want to strive to meet the expected duty. Hitherto, the concept of wellbeing has been the primary concern of philosophers. The Macedonian philosopher Aristotle sees wellbeing as synonymous with happiness or human flourishing (Robinson, 1989). To him, this is the very essence of human life. Lately, wellbeing has not

been allowed to rest in the jurisdiction of philosophy alone. Other fields of study, especially the social sciences, have also delved into what wellbeing means or represents. In geography for instance, the human geographer D. M. Smith would rather refer to it as 'welfare geography' (Smith, 1973).

Wellbeing in this study reflects the quality of life. It is mostly assumed to be the dynamic progression of people's lives: how they manage their conditions, actions and resources. It can also be seen as the state in which basic human needs are met and the way in which people are able to live peacefully in communities with opportunities for advancement. This is characterised by equal access to and delivery of basic needs services such as reliable and stable electricity, good and quality water, shelter and health services just to mention a few.

The factors or constituents that add to the quality of people's capabilities of their lives represent their wellbeing. In this research, wellbeing connotes the individual vivacity to embark on actions which are meaningful to their lives within a store of internal resources - aiding them to muddle-through (Lindblom, 1959) when they experience shocks (Ellis, 1999) or vulnerability (Scoones, 1998). In other words, the state of feeling good and to be resilient to unforeseen undesirable changes beyond one's direct control is fundamental to achieving a state of one's wellbeing. With respect to electricity, one should be able to at least, charge his or her phone, securely preserve all her food stuffs in the refrigerator, get some cool air from the electric fan or air conditioner for her comfort among such basic needs as a matter of having her house connected to electricity.

2.5 Conceptual Framework

Shields and Rangarajan (2013) postulate that the way ideas are organised to achieve a research project's purpose is a conceptual framework. This is an important aspect of this research too as it helps in the organization of the various ideas about the topic. It also directs how the data was collected and aids in the analysis of the data.

Having explained all the relevant concepts and also the overall theory, it is prudent to illustrate how they come together to capture and organize the ideas and issues within this study. Below is the illustration of the conceptual framework.

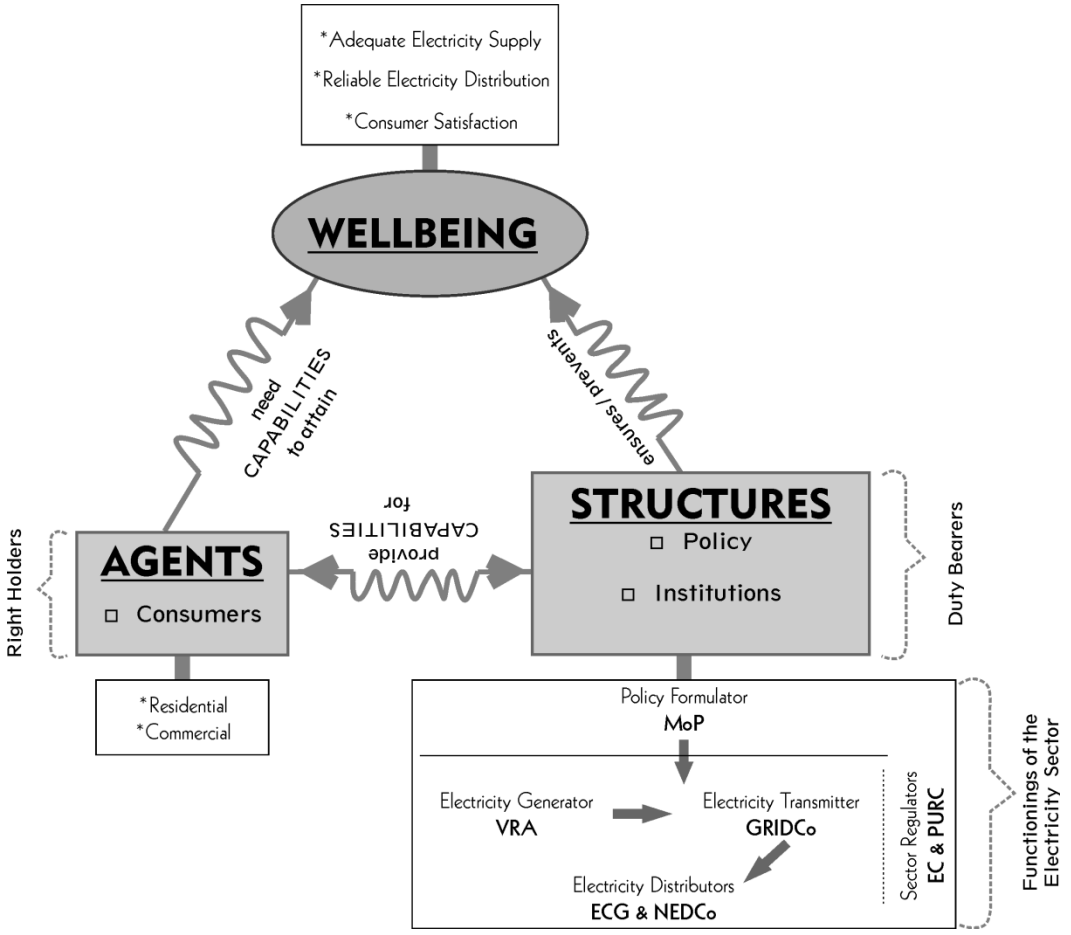


Figure 1: Conceptual Framework by (Author, 2014)

From this framework the major components are agents, structures and wellbeing. Wellbeing is in a spherical shape just to indicate its vast nature and also the fact that it must be provided. Both agents and structures are in a rectangle indicating the physical elements in them. The

connection between these three major shapes is a coil instead of just a simple straight line because the study is about electricity. So the coil signifies the electric cables that also are also used as a connector of electricity. Between the agents and the wellbeing are capabilities; agents need capabilities in order to achieve wellbeing. So also are capabilities between structures and agents; in this case the assumption is that structures must provide agents with capabilities for them to achieve wellbeing. However structures are in society generally in order to ensure the wellbeing of the entire society; and that is also captured in the framework as such. However, in this study, cases it is found out that in some cases, these structures also avert the agents from attaining their quality of life – wellbeing. This is why between structures and wellbeing, the connector carries the caption ensures/prevents. In totality, the elements in this framework are all depicted in a triangular shape in order to show that they work concurrently.

From the various literatures that had been explored for this study, it is notable that the duality of structure (Giddens, 1984) and agents (Kant et al., 1998) are the robust foundation that wellbeing (Sen, 1993b) requires in order to be achieved. When the United Nations came out with the Universal Declaration of Human Rights (Cloke et al., 2000) in 1948, it was recognised that all humans are intrinsically entitled to rights. However, Sen (1993) affirms that not until people are provided with freedoms and functionings, the enjoyment of these rights remains a mirage. In this study, it is conceptualised that the enjoyment of rights is wellbeing. From Sen's argument, and in connection with this study, it is revealed that there are two main stakeholders of wellbeing – those who are entitled to the wellbeing and those who are expected to protect the wellbeing. These two stakeholders have been unravelled succinctly in rights-based approach to development (Mikkelsen, 2005) as the *rights holders* and the *duty bearers*. Adopting that in the framework for this research, the right holders are consumers in the electricity sector of Ghana. They hold the entitlement to the enjoyment of adequate and reliable electricity provision in Ghana. On the other hand, duty bearers in this study refer to the institutions that are obliged to provide adequate and reliable electricity for the consumers in Ghana. These institutions are the Ministry of Power (MoP), the Volta River Authority (VRA), the Independent Power Producers (IPPs), the Ghana Grid Company (GRIDCo), the Electricity Company of Ghana (ECG), the Northern Electricity Distribution Company (NEDCo), the Energy Commission (EC) and finally the Public Utilities Regulatory Commission (PURC).

Narrowing it down to the agents and structure discourse by Giddens (1979), the agents are perceived in this study as the right holders whereas the structures are the duty bearers and the load shedding policy in the Ghanaian electricity sector. This is why agents and structures are at the bottom of the triangle with wellbeing at the very top. It also shows that wellbeing is what both the structures and agents aspire for. Just like it has been indicated in the previous paragraphs, the right holders denote the households and businesses whilst the duty bearers denote the institutions that manage the electricity load shedding policy. Below the institutions' box is another rectangle, depicting the general interconnection between the institutions and their functionings in the electricity load shedding policy. This latter box is vividly explained in the chapter four.

2.6 Chapter Summary

Largely, this chapter presented the theoretical and conceptual foundation of this research. It examined the concepts of agents, structures, capabilities, functionings and wellbeing; it further showed the interaction between agents and structures. These concepts provided the basis for an insight into Amartya Sen's capability approach, which was the next section under this chapter. The capability approach was indicated as the overarching theory under which this research revolves, so the elements of functionings and capabilities were explained. The last part of this section gave a justification of the choice of the capability approach. The chapter ended by a depiction and interpretation of the conceptual framework that links together all the aspects of the research.

Having found a theoretical standpoint with a conceptual plan, the way is opened now to figure out which method the research depended on. And this is what chapter three delves into – the research methodology.

CHAPTER 3

Choice of Research Method

Data Sampling

Data Collection and Analysis

Positionality and Reflexivity

Ethical Consideration

Research Trustworthiness

Research Limitations

3.1 Introduction

This chapter provides an overview of the methods employed in conducting this study. It tells the procedures of collecting the data for this research; relevant information about the participants, the types of data collected and how they were processed and analysed. The chapter further highlights the positioning and reflexivity of the researcher, the ethical considerations that were adhered to during the fieldwork, the research trustworthiness and finally, the research limitations. Most of the information presented here are personal narrations with literatures backing them.

3.2 Choice of Research Method

Over the past 50 years, there has been heated debate between social researchers in terms of the overall approaches to gathering data from different ontological and epistemological perspectives on the social world (Matthews and Ross, 2010). This is what has been referred to as the qualitative/quantitative debate. However, in order to produce a sound academic material in any research, the onus lies on the researcher to carefully select relevant theories, data, informants and the analytical process in connection with the objectives of the study.

With the above information, the type of data that is required for this study and with the aim of making meanings out of it with respective to the research questions, the most suitable technique was considered to be a qualitative methodology.

To Schmid (1981), qualitative research is an inquiry into the empirical world from the perspective of the investigator. According to her, qualitative research is underscored by two major principles. One, the physical, sociocultural, and psychological environment influences our behaviour as humans; this is what forms the basis of what Lincoln and Guba (1985) refer to as naturalistic inquiry. Two, human behaviour is assumed to go further than what is perceived under an inquiry. To wit, it is critical for a qualitative researcher to access the subjective meanings and perceptions of the subject matter he or she is studying. In line with these ideologies, Miller and Kirk (1986) defined qualitative research as "a particular tradition in social science that fundamentally depends on watching people in their own territory and interacting with them in their own language, on their own terms" (p. 9). Also, Matthews and Ross (2010) argued that a qualitative research method is one that is “primarily concerned with stories and accounts including subjective understandings, feelings, opinions and beliefs” (p.

478). With this method, it is easier to get a deeper understanding and explanation of the key issues from the data.

3.3 Data Sampling

After successfully identifying the method to employing in collecting the required data for the research, the next issue is, with the research questions in mind, who will be the best informants? The research questions of this study seek to identify mainly, how the electricity load shedding is conceptualised, the institutions in the electricity load shedding system and also to find out how the electricity load shedding is affecting businesses and households in parts of Accra. Thus, the sample informants for this research are categorised into three major groups: the primary institutions managing the electricity load shedding in Ghana, offset printing press owners in Accra Newtown and individual residential households in North Legon.

In all, there were four key informants and twenty primary informants (shown in the table 1 below) as the respondents for the data collection. This collection of informants provides the chance of obtaining a holistic picture and effective use of available time.

Table 1: Summaries of respondents and sampling techniques (Source: Author, 2015)

Category	Size	Type of informant	Sampling technique
Primary Institutions	4	*Key*	*Purposive*
Offset Printing Presses	10	*Primary*	*Theoretical*
Households	10		
Focus Group Discussion	5	*Primary*	*Purposive*

Purposive and theoretical sampling techniques were the main non-probability base sampling approaches used in collecting the data from the above specified informants. Purposive sampling according to (Patton, 2005, Ritchie et al., 2003, Teddlie and Yu, 2007) refers to the process with which samples are chosen based on their particular characteristics. This uniqueness helps researchers to be able to do detailed exploration of the main themes that they are working with. Basically, this technique is named as 'purposive' because the samples are indeed selected for a 'purpose' opines Ritchie et al. (2003). However, some other scholars like (Burgess, 2011, Perla and Provost, 2012) see it to be a biased form of sampling and hence would rather prefer it called 'judgment sampling'.

From the table 1, the primary institutions who were also the key informants for this research were chosen purposively. This was done in order to essentially answer the first research question – which seeks to figure out the perceptions of the electricity load shedding. Furthermore, the MoP, VRA, ECG and GRIDCo were chosen purposively because they are at the centre of the caboodle of the electricity load shedding. The have all the technical information needed for a successful and concise research into the electricity load shedding in Ghana. These entities possess the importance in maintaining and calling the shots in the electricity load shedding system which is vital for this research and hence, were selected purposively.

On the other hand, the primary informants were interviewed using the theoretical sampling technique. Matthews and Ross (2010) posit that in theoretical sampling, "data collection, analysis and the sampling of cases are going concurrently, and that sampling of new cases for data collection continues until there is no further data emerging from each additional case" (p. 168). This type of sampling is mostly based on the ideas of Grounded Theory as Charmaz (2011), Glaser and Strauss (1970) and Strauss and Corbin (1990) argue.

The primary informants are the right-holders in the electricity sector of Ghana. They pay for the electricity but they are at the receiving end of the electricity load shedding. So to know the consequential effects of the electricity load shedding and how they are managing their lives, it was vital to use the theoretical sampling technique for them. Through this method, the needed information was gathered from the 10 informants within the groups of businesses and households each. These informants were selected by a random walk from company to company and from house to house; depending on who was willing to respond to the questions. It is worth stating that, there was no occasion where two consecutive companies or houses –

in terms of location were interviewed. This was done in order to prevent the tendency of getting the same information from the respondents due to the similar locational characteristics. From one informant to the other, the embedded information was all unravelled until it reached a point where there was no further new information coming out. This is what Matthews and Ross (2010) refer to as the 'saturation' point.

As mentioned earlier, the informants within this category were grouped into two: businesses and households. The former were mostly the owners also known as the Chief Executive Officer (CEO) of the printing presses in the Accra Newtown suburb. In situations where the CEO was not around, he or she delegated the Operations Manager to respond to the interview questions. The printing presses that were interviewed ranged between large-scale to small-scale printing capacities. This was ensured to be able to get the feel of the impacts of the electricity load shedding across the printing presses. Even though, the operation of printing presses is mainly a male dominating business field in Accra, it was refreshing to find one lady as a CEO to be one of the informants.

The latter were mostly the heads of the households. For this research, a household denotes a group of people, usually family members; either nuclear or extended, who are connected to the same electricity meter. In other words, a household encompasses a group of people who get their monthly electricity bills from the Electricity Company of Ghana by their connected electricity meter. In some of the instances where the head was not present, any adult individual was relied on. Both males and females were interviewed depending on who was present at the stipulated time of the interview. In most of the households, the husband is the head and in the absence of the husband, the wife steps in. Moreover, with one particular household, both the husband and wife had travelled before the agreed upon date for the interview, so they delegated their eldest child – daughter, to respond to the questions. It is also worth stating that, the households chosen for the interviews ranged from high to low-income earners. Unlike most of the developed countries, especially in Norway where it is a bit difficult to easily identify which household is richer than the other, in Ghana, all one needs to do such categorization is to take a look at the building of the household. For instance, whiles most high-income earning households would most probably have their houses fenced with high walls with some security post at the entrance and at the era of the fieldwork, having a generator or an electric plant, the low-income earning households mostly lack all these.

Sampling for new households was concluded after it was realised that no further information was coming out. This was to avoid the information gathering to reach a point of diminishing marginal returns (Robson, 2002) because the saturation point had been reached (Matthews and Ross, 2010) and nothing new came out again.

3.4 Data Collection and Analysis

Having talked about the sampling of the informants, it is now requisite to expatiate on how the data was collected and analysed. This part of the chapter therefore throws more light on that agenda. In their impressively illustrative research methods book, Matthews and Ross (2010) define data as a "stand-in for the social reality we wish to study" (p. 181). This is to say, the values, opinions, experiences and to some extent, the representation of the facts of the people and issues that a researcher is interested in finding out refer to as data.

The various processes through which the primary data for this research was collected, processed and analysed are as follows.

3.4.1 Data Collection

Data collection is mostly a hands-on job which is carried out within a specific space and a given time. And to carry out any work or job successfully, there is the need for tools. A research tool thus refers to the means by which a researcher gathers his or her data (Matthews and Ross, 2010). It could be through the aid of questionnaires, interviews, photo shoots and other such possible means.

The primary data for this research was gathered mainly through a 2 month's fieldwork in some parts of Accra - the Ghanaian capital city (indicated in the profile of the study area under chapter four). This fieldwork lasted through the second week of June to the second week of August, 2015. Prior to going to the field, the key informants were identified through some of the available literature of the electricity sector of Ghana. After a successful identification of them, I had some preliminary communications with them. I contacted them through emails and some of them through phone calls again in order to inform them about my desire of needing their inputs in this study.

On the field, the primary data was collected by the use of semi-structured interview guides, one focus group discussion, personal observations and some photography. As the data were gathered, they were compared usually with the research objectives as well as the questions.

This was done with the mind of keeping on track and in tune with the aims of the research. A field notebook was very useful in achieving this goal. Personal observations, ideas, notes and reflections were jotted down in this field notebook so it was easy to do the comparison. During the field work, all the interviews and some discussions that were gathered as data for this research were documented with a tape recorder. In the places where photographs were allowed to be taken, I took them with my Samsung Galaxy Trend Plus phone and later on transferred onto my HP laptop.

3.4.1.1 Semi-Structured Interview

This research is interested in finding out people's experiences, feelings and understanding of and about the electricity load shedding situation in parts of Accra, Ghana. To be able to effectively meet this goal, the need for a semi-structured interview is paramount. Some social scholars like Yin (2011), Kitchin and Tate (2000) and Crang and Cook (2007) are of the opinion that semi-structured interviews are the most suitable method of acquiring qualitative data from informants; especially, when their life experiences and perceptions are concerned.

For the key informants – the MoP, the VRA, the GRIDCo and the ECG, I sent them copies of my introduction letter from the Department of Geography at the Norwegian University of Science and Technology (NTNU) as a student researcher and the interview questions (Appendix 1). This was during the process of getting an appointment booked for the interviews with them. For some of these entities it took me about a week to get my appointment whiles others took about three weeks. On the other hand, with my primary informants – the businesses and households, all I did was to visit them in their premises, introduce and identify myself properly and then get the interview done. At times, I was lucky enough to have met the needed informant who was also ready and willing to respond to the questions immediately. At other times, I had to go and come back some other day for the interview to be carried out.

When the appointment was booked and all was set for the interview, how was it conducted? It was ensured that the respondent is informed about the way the interview will be conducted: how long it could last, how it would be recorded and also the importance of feeling comfortable to express his or her feelings as much as possible. The assurance was given and made clear that, all information given were strictly for academic purposes and will uniquely be used in that regard. So about some two to five minutes were used to build that rapport (Matthews and Ross, 2010) which is very essential to a successful interview. It is worthy to

mention that since the fieldwork was conducted in the midst of the electricity load shedding, every participant was aware of the prevailing situations and was willing to respond to my questions. To make the interviews more comfortable, the interview guides were arranged in such a way that, they started with simple introductory questions and then graduated into the main thematic questions.

For me to get better information needed on the electricity load shedding from both the key and primary informants, it was plausible I let them describe and explain their own experiences and knowledge in their own words. However, on a lighter note, Ghanaians like to talk; and sometimes they over talk. So in order to avoid the propensity of getting the informants over talking, it was vital that I employed the participant interview (.ibid). This means I controlled the interview (see picture 1 below) with the set of questions I had in hand. I asked the questions and then, gave the respondent the chance to respond to them. Some times and actually, most of the times, I asked follow-up questions (Gill et al., 2008) which were not written down on the interview guide depending on the kind of information the respondent was giving. At the end of the interview, the opportunity was given to the informant to talk about any other relevant issue or issues he or she still wants to elaborate on.

On the average, these interviews lasted for about forty-five minutes. The shortest was forty minutes and the longest was about one and half hours. This was due to the intermittent phone calls the informant received. Generally, these interviews were very helpful in that: firstly, they gave the room for more discussions and ended up bringing out more relevant issues that were not thought of before the fieldwork and as such, not covered in the interview guide (Matthews and Ross, 2010). Secondly, through the interviews, the body movements of the participants together with their emotions and tone of their voices made it easier for me to appreciate their concerns and feel their lived-experiences. As shown in the Picture 1 on the next page; the gentleman (A) is an official of one of the institutions who was so engrossed in the interview, listening very attentively to one of the questions. He had a lot of documents to prove all that he was saying; some of the documents were even given to me to go through. The woman (B) is one of the printing press owners and showing her emotions. Her posture – sitting with the head resting on one hand in the Ghanaian context shows sadness – the sadness of the load shedding. The picture (C) shows reveals the preparations towards one of the dark nights; the lights were off so the family had brought their paraffin stove out waiting to light whiles they were preparing dinner.

Picture 1: Interviewing some of the participants (Source: Author, fieldwork 2015)

3.4.1.2 Focus Group Discussion (FGD)

Aside these one-to-one in-depth interviews, it was also important to fathom what a collection of households would say about the issues that are of prime importance in this research. There was therefore the need to organize at least one of such group dialogues dubbed in the research milieu as a focus group discussion. A focus group discussion according to (Matthews and Ross, 2010) is a way of collecting data that draws on group dynamics to acquire deep, rich, qualitative data. It is also a kind of interview alright just that it has more than one informant and the main code here is to discuss and in some cases, to argue for people's varied opinions.

A group of five household heads (3 women and 2 men) were put together with the researcher and the moderator in order to discuss the perceptions and life under the electricity load shedding. As the researcher, I introduced the moderator to the participants and also reiterated the purpose for the discussion. I had to make it clear to them and reassure them it was solely for academic use because some of them would rather not participate had the purpose been otherwise. I observed the discussions and took notes whiles the moderator was the leader and overseer of the discussion. The moderator was a friend who has completed his Masters in Psychology at the University of Ghana and he is well versed in focused group discussions. The major issues were discussed with him and the opportunity was created for him to ask for further clarification where necessary. Matthews and Ross (2010) reason that this is really

useful in making the moderator very conversant with the issues so he becomes well abreast with the issues in order to carry out a very fruitful discussion.

After the discussion we (the moderator and I) compared and also deliberated our impressions of what the informants discussed. This was very useful because, I had the chance to get the issues that he noted down whiles leading the discussion, and also picked his mind on what I have captured in my notebook. This is to ensure that I had gotten the issues as well as they were discussed.

The use of this focus group discussion was very necessary in that, after interviewing the individual households, it was observed that, although they were all coping with the electricity load shedding, their perceptions and experiences were diverse. So there was the need to have a platform where some of the households could interact to discuss or argue their differing opinions and capabilities. Kitzinger (1994) maintains that this interaction between participants helps to portray their views of the world, indicates the language they use, the values and beliefs about the issues confronting them. I am strongly of the opinion that, this interaction best allows participants to question each other and in the instances where they are of varying stands; they can rethink or reassess their own understandings of their familiarities. For example, before the discussion, I was of the view that, every participant was going to lament and lambast the electricity load shedding. But one informant was of the view that, although the situation is definitely not the best, he had observed that he organizes his activities of electricity better than previously when there was no electricity load shedding. Anytime there is light and he wants to iron, he irons all the dresses he uses in the week. Formerly, he would have just ironed only what he was going to wear and leave the rest. After his submission, the rest on the participants agreed with him because it had then dawned on them that they had also had the same change in attitude even though they were oblivious of it.

Furthermore, I argue with Morgan (1988) that through focus group discussions, researchers are well aided with the ability to stimulate information from respondents that show the importance of the issue or issues under investigation and also, what is significant about the issue or issues.

3.4.1.3 Observation

Aside these interviews, the other method I employed was to go around and conduct a visual inspection of the natural setting to see how people managed their lives whenever there was an

electricity black-out which is normally referred to ‘light-off’ in the Ghanaian parlance. This is referred to as observations in most of the research literature. The form of observation I did could best be described as a complete observation as Gold (1958) puts it. Matthews and Ross (2010) call it simple observation and see it as a data collection method in which the researcher is just an objective outsider. The import of this method was to get a feel of the alternative means by which people get light during the darkness and also, how the coped with the light offs. I visited some houses taking notes of these coping strategies in the North Legon suburb as well some companies in Accra Newtown.

Picture 2 below shows some of the items with which some people used to provide some amount of light whenever their electricity went off.

Picture 2: Alternative sources of light during the darkness (Source: Author, fieldwork 2015)

3.4.1.4 Photography

I had done audio recordings of all the interviews I conducted during the fieldwork and I had gone around doing personal observations to see how people usually cope whenever there was a light-off. But, there were some crucial questions I grappled with; would I be able to capture all these information and all the elements in the fieldwork environment within which I found myself? How many words would I use in doing that? Would the readers or audience, especially those who are not familiar with the study area of this research, be able to easily grasp all that I write? These questions made the taking of pictures very pertinent. The French photographer Bruno Barley quotes that "photography is the only language that can be understood anywhere in the world" cited in Palmer and Mullan (2013). The Chinese proverb; "one picture is worth ten thousand words" answers these questions succinctly.

All the pictures that had been shown in this research were taken with my Samsung Galaxy Trend Plus mobile phone with an image resolution of 5 mega pixels. I took the indulgence of the informants before taking their pictures. In situations where some properties were snapped, I sought their permission. With what I experienced, all those who agreed for them or their properties to be snapped, were very enthusiastic because I was going to use them for academic purposes. On the other hand, those who disallowed, were of the view that in recent times, people grant interviews for a particular purpose and have their pictures taken, only to find out that their pictures are in some of the printed media for something else they are not aware of. Some also said they later on find their pictures displayed all over some social media like Facebook, WhatsApp, Twitter and Viber to their displeasure. Still, others did not want to approve of their pictures taken so that later, some kind of political commentary would be given in respect to the information they gave with their pictures in association. I respected all their views and obliged by their wishes.

These photographs had been very important for the research in that, they captured all the lived moments I had during the fieldwork. Without these photographs, those moments would not have been possible to reproduce vividly.

3.4.1.5 Digital Mapping

This study is a geographical research and as such, the spatial contents of the issues under investigation need to be established. The locations of the study areas and the institutions interviewed had to be shown for an easy familiarization especially for the readers who are unacquainted with these terrains of the globe. With my background and acquired skills in the fields of Geographic Information System, I was able to gather all the necessary geospatial data needed for the maps that have been used for this research. Parker (1988: p. 1547) defines GIS as "an information technology which stores, analyses and displays both spatial and non-spatial data" (Maguire, 1991).

All the maps used in this study were composed and designed personally by me. I collected all the background shapefiles like roads, Accra suburbs, locations of the major towns in Ghana – especially wherein the institutions connected with the entire electricity sector of Ghana are, from Maphouse Ghana Limited during the fieldwork. Maphouse Ghana Limited is a leading geospatial company located in Kokomlemle in Accra. They are focused on providing and producing state of the art services in the digital mapping industry in Ghana. All these data were later on used to compose the maps by the ArcMAP version 10.2 software installed on my laptop computer. I got this software from the library (Orakeltjenesten) of the Norwegian University of Science and Technology. The maps were exported as image files in Joint Photographic Experts Group (jpeg) formats and inserted in the study area section of chapter four.

Although maps are usually considered to be a geographical tool, most researchers both in the physical and other social sciences use this tool in their works. Just like the photographs that were taken for this research, these maps give the visual recognition of the spatial location within which this study is concerned about.

3.4.2 Secondary Data

With the above clarified data collection methods, the resultant information are mostly regarded to be primary data. Matthews and Ross (2010) define primary data as "data that a researcher gathers specifically for their own research" (p. 51). Aside these primary data, there were some other information that were used which were not gathered explicitly for this research. These included literature from other scholars which have been duly referenced and acknowledged in this research. This kind of literature is known as secondary data. Secondary

data refer to the "data that a researcher uses which has already been produced by others" (ibid. p. 51).

Inasmuch as these were already existing data, they were not just used as they were produced by their various authors. They were read, understood and applied to the context of this research. Also, they were used only, as and when they were necessary.

3.4.3 Data Analysis

After gathering all the interviews and transcribing them, the outcome was just a normal MS Word text document - raw data. Raw data is considered to be the unadulterated words as spoken by a participant or participants in responding to questions in an interview. To make meanings out of them and to be able to use them for the research, it was necessary for them to go through some form of analysis.

Matthews and Ross (2010) define data analysis as the "process of working with the data to describe, discuss, interpret, evaluate and explain the data in terms of the research questions or hypothesis of the research project" (p. 317). It is worth stating that, the analysis essentially started during the fieldwork. After a successful fieldwork, all the recordings were transcribed by playing the audio files using VideoLAN Client (VLC) media software and I typed the words from the audios in the version 2010 of Microsoft Word I have on my computer. Luckily for me, most the interviews were conducted in the English Language, so the transcription was not difficult. Though some of the interviews were conducted in the 'Twi' language, I am very fluent and conversant with the language so it was not too difficult to transcribe those interviews into English. He only challenge with them was that, it took me a longer time transcribing them as compared to the duration for the English interviews' transcriptions. The transcriptions were done in order to preserve the data in its raw state so that it could be revisited.

The choice to do the transcriptions personally instead of giving it out to someone else was taken because of two reasons. Firstly, I did the interviews myself and as such, I had heard all that the respondents had said so listening to the audio again only refreshes my mind and thus making the typing easier than in the case where a completely new person would have been given that task. The advantage of being familiar with the way the respondents spoke during the interviews was something I had over any other person that would have been given the transcription job. Secondly, the research was done with a very limited financial resources, so

giving the transcription out to another person, would require a fee. Unfortunately, it was not possible at the time to get any money for that purposes.

How was the transcribed data processed? Each respondent's words were put alongside other respondents in order to explore the data for meanings, identify possible relationships within the data and explain the apparent similarities and or differences in the data. The data was organised by creating some codes, then some key themes were identified and finally, these themes were explored by using some charts. This "process of working with raw data to identify and interpret key ideas or themes" is known as thematic analysis by Matthews and Ross (2010).

Figures 2 and 3 below are illustrations about how these codes were generated and used. Codes such as Imp-Fp, Imp-Jb and Imp-He (shown in figure 2) represented impacts on food preservation, impacts on Jobs and impacts on health respectively. So while reading through the transcribed text on my laptop computer, wherever these issues pop-out, I highlighted them with an assigned unique colour (shown in figure 3). As indicative in figure 3, all issues related to impacts on health were highlighted with a magenta colour and impacts on food preservation were highlighted with a green colour. This made the identification of the central themes easier and made the thematic analysis more interesting and less tedious because the key elements had already been nicely distinguished.

CODE	DEFINITION
Imp-Fp	Impacts on Food Preservation
Imp-Jb	Impacts on Jobs
Imp-He	Impacts on Health
Imp-Lh	Impacts on Domestic Livelihoods
Imp-Mc	Impacts on Machinery
Imp-Se	Impacts on Security

Figure 2: A sample of the data processing codes and their meanings (Source: Author, 2015)

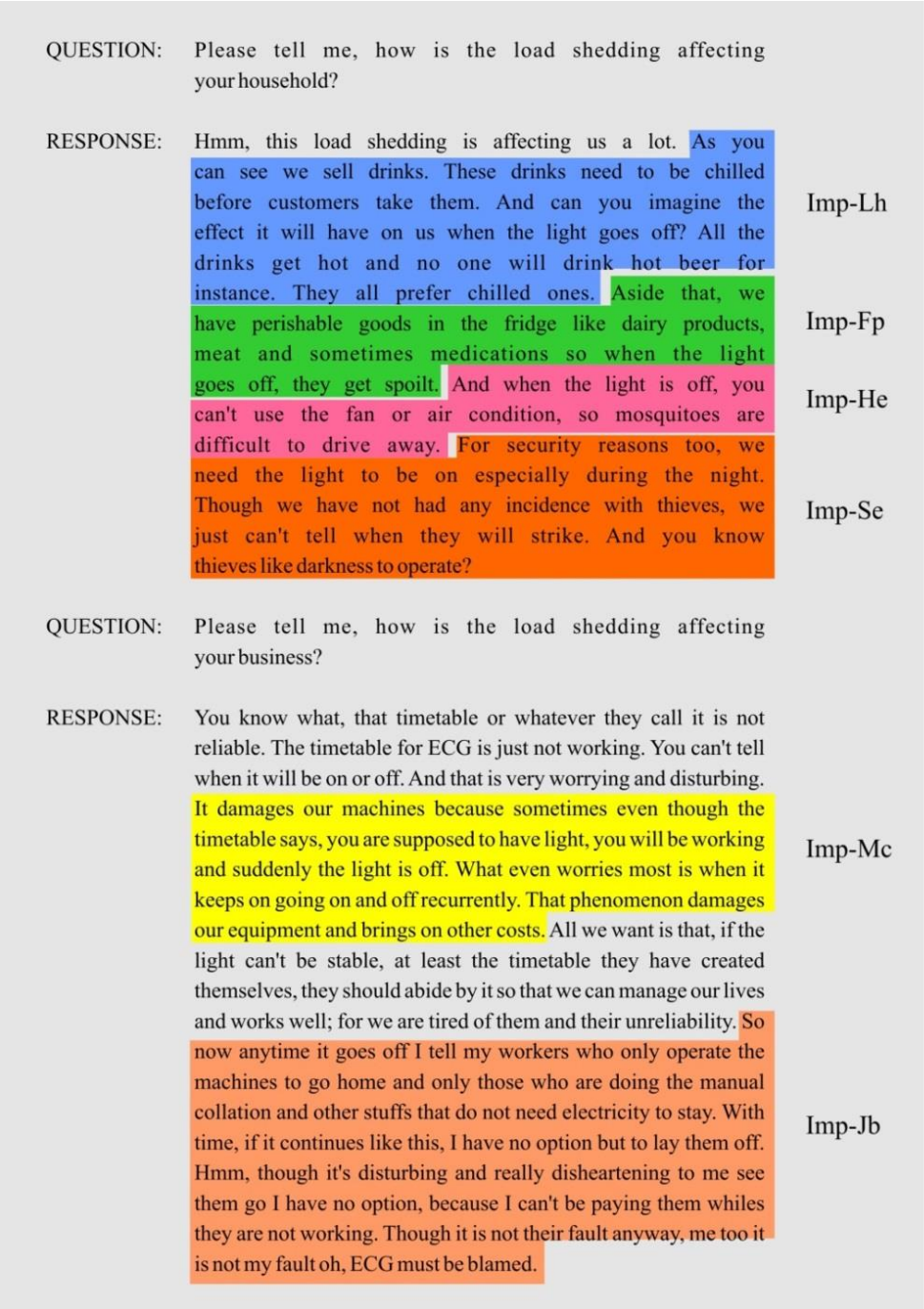


Figure 3: A sample of the application of the codes to the transcribed text (Source: Author, 2015)

Through the above thematic analysis, the following central themes were observed in the captured data: *the duty bearers and their roles in the electricity load shedding under a national research context, the perceptions of the duty bearers about the electricity load shedding and the challenges that has led to the cause of and last but not the electricity load shedding* and finally, *the impacts of the load shedding is impacting on the wellbeing of the*

right holders. The analyses of the data based on the above themes and the conceptual framework will be presented in chapters four, five and six of this research.

3.5 Positionality and Reflexivity

The electricity load shedding is phenomenon that is frustrating almost every Ghanaian. So going to ask people about their lives under this situation requires; one, respect for them from me and two, respect from them for me. As a Ghanaian studying in Trondheim, Norway, going back to Ghana for a two month's fieldwork requires some mental realignment. My stay in Norway has in a way influenced my perceptions of life; how I relate to people for instance had changed. It was normal to greet anyone you see or meet along your way in Ghana, and actually it was demanded - people expect you to. But over here in Norway, it is not. You only greet those that are well known to you; and even that just a 'hi-hi' will suffice. I had to readjust myself in a locus that will first of all, allow me to fit back into the Ghanaian culture and also give me the information I need. Cloke et al. (2000) termed this is a strategy positionality. The feminist geographer, Gillian Rose asserts that positionality remains a fundamental element to the process of knowledge production in any research endeavour (Rose, 1997).

Usually, Ghanaians have a stereotype for Ghanaians that have travelled abroad and back either for a research or business. The general assumption is that, most of these 'returnees' do not respect the 'local' folks due to their outside exposure. Therefore, when there is the need for any information from the locals, the information is mostly not given willingly, especially when they (the locals) attest to the fact that the returnee is trying to prove as if he knows it all. So to break this erroneous perception, I had to get the means of creating a very good rapport with all my informants. I ensured that before I made any requests, I used the word 'please' and after such requests had been given, I remembered to say 'thank you'. These helped me to bridge the power relationship gap between the informants and myself. They did not just see me as a returnee who needs assistance but, they saw me as one of them; who is feeling their pains and is researching on it. They were not intimidated in any way whatsoever due to whom I was in the communities at that time.

Nonetheless, aside all these considerations, I was also conscious of the theoretical and conceptual foundations of the research throughout the fieldwork. Cloke et al. (2000) argue

that it is indispensable to be self-critical of the research methods and techniques for good interactions in the field. I thus, got myself very familiar with the key concepts of and relevant literature on the research. This made me to be abreast with the issues of the electricity load shedding and helped me very much in my interviews especially the key informants' interview. I knew the prevailing issues surrounding the electricity load shedding so I was able to ask relevant and decisive follow-up questions.

Some of the narrations from the informants were very emotional, you could see from their body expressions, the pains they were going through; their frustrations about the electricity load shedding could not be hidden anymore. In some of the cases, the informants became partisan - making political comments and connotations on the situation. In such instances it was very tempting to forget my role as a researcher and to play along with their emotions and politics. But Moser (2008) is of the view that issues relating to personality like social skills, emotional response with general attitude and behaviour towards participants are very important in the field. So with this assertion, I tried to remain composed irrespective of the nature of the stories that were been told in order to still be in control of the interviews. I tried as much as possible only to solicit relevant information from the informants and not to influence them with my personal judgments and opinions.

Throughout the fieldwork, I was reflexive of all that I was told. I asked my informants questions with the mind that I do not know more than them. In cases where I did not understand or get the message an informant was putting across, I probed further to seek clarification. This was to help me avoid been prejudicial and to be influenced by my sentiments as much as possible concerning the information I was gathering. His avoidance of premeditation and standing outside of my subject matter is known is research fields as reflexivity. Reflexivity requires the researcher to be aware of his effect on the process and outcomes of research based. This is centred on the principle that knowledge cannot be separated from the knower (Steedman, 1991).

Even though, I had stayed in Accra for quite some time before coming to Norway, through this reflexivity, I was able to prevent my locus as an insider swaying my thoughts and verdicts during the interviews with my informants. I only poised for knowledge and I saw my interviewees as the source of that knowledge I seek. And this was very helpful to my data collection.

3.6 Ethical Consideration

As social beings, we are guided by rules and regulations in almost all of our deeds. Our lives are governed by some sort of principles. Matthews and Ross (2010) opine that social researches have some ethical implications. They define ethics as "a set of rules by which individuals and societies maintain moral standards in their lives" (ibid., p. 71). Caroline McAuley in (Brewer and Miller, 2003) asserts that "the ethics of social research is about creating a mutually respectful, win-win relationship in which participants are pleased to respond candidly, valid results are obtained, and the community considers the conclusions constructive" (ibid.: 95). Mindful of this, the following were the guiding principles that were adhered to throughout this research.

First and foremost, I had an introductory letter from my department (Appendix 1) which was signed by my supervisor and programme coordinator as a form the backing authority I possess in carrying out the research interviews. I presented this letter together with my student identity to all my informants for them to know who I was and the support I have in carrying out the research. I gave them my department's email address and official telephone numbers to call for confirmation in case they desired.

Secondly, after the official introduction of myself, I then provided them with clear and adequate information about what my research is about. Even though, the electricity load shedding was all over town and almost everyone wants to talk about it, I made them know that I had some specific questions that needed to be answered. However, they were absolutely free to speak their minds on any issues they want to if they have time for it.

Thirdly, I was honest with them with respects to the purpose for the interview. It was solely academic, and assured them that all information they would provide would be strictly used only in that regard. I guaranteed them that they would not wake up the following day or later to find the information they gave me in the newspapers or being discussed on radio stations for instance. The information given would only be in my thesis.

Fourthly, none of my informants were coerced into taking part of the interviews. Their free will to consent (Matthews and Ross, 2010) to participating in the research was held in high esteem. For all of them, I made them aware that, their participation is entirely voluntary; they can decide or not to participate. Besides, they were also made aware of the fact that, if for some reason or reasons, they feel like not responding to any particular question, they are

absolutely free to do so. Also, I made it clear to them that, they free to opt out of the interview if they so wished. In terms of taking of pictures during the interviews, I had their full consent in do so. Before I took any picture, I asked if they were okay with me taking their pictures and how they would want it done. Should they pose for the shot or it should just be taken without any planned posture? I did exactly what they agreed to. I also asked them if they would have any problems with me putting their images in my research. It is therefore worth noting that, all the pictures I have included in this research are those with which I have had their consent to do so.

Fifthly, the ethics of anonymity and confidentiality were never ignored. I assured the informants that all the information given would be treated accorded with the highest level of confidentiality. In terms of their identities, I made them aware that their personalities would be anonymous in order for them to be free from all kinds of socio-political harm.

Sixthly, before I began with any interview, I asked the informant to ask any questions he or she had. This gave me the chance to clarify any other issues that might be blurred to them. It was also a way of creating a good rapport before I started asking questions. At the end of all the interviews, if they had time, I allowed them to talk on any other issue that pertained to the electricity load shedding that they felt I had not asked them about. This helped me to know some of the other salient issues about the subject matter that I had not captured in the questions.

Finally, to compensate them for their immensurable time they spent giving me their valuable information; I thanked them and gave them a local Ghanaian highly appreciated medium size 'GoldenTree Chocolate' (Appendix 2). I did this after the interview because; I did not want them to be enticed by the chocolate for them to respond to my questions. I wanted them to willingly offer me the information they had. It was just supposed to show my appreciation for their help. And I must admit it was so heart-warming seeing them full of smiles after receiving these chocolates. I had too many 'thank you' afterwards; some of them even continued thanking me whenever they saw me in town. They would say "Mike, thank you for the chocolate! It was nice talking to you".

3.7 Research Trustworthiness

Qualitative research according to Sandelowski (1986) is indefinite and refers to many different research approaches. The goal in this thesis is to describe accurately, the experiences of the businesses and households lives under the electricity load shedding in parts of Accra, Ghana, and not to generalise theories or models just like Field and Morse (1985) argued. Therefore, to ascertain the honesty of the study, Guba (1981)'s model of trustworthiness also recognised in Lincoln and Guba (1985) would be employed.

There are four aspects by which a qualitative research could be assessed as trustworthy according to Guba (1981). These aspects are truth value, applicability, consistency and neutrality of the research.

In this qualitative study, the truth value also referred to as creditability (Lincoln and Guba, 1985) was attained by the accurate presentation of the findings of the lived experiences and perceptions by the informants interviewed and observed on the subject matter for this study. These findings were not defined a priori by me – the researcher as Sandelowski (1986) contended. But rather, through triangulation (Crang and Cook, 2007) and reflexivity (Steedman, 1991) the findings of this research are credible. In triangulation, I used both interviews and focus group discussion to solicit views and opinions from the informants. Also, the informants were asked the same research questions to converge the multiple perspectives shared on the subject matter in the study area. These converged responses have been presented accurately in this research as the findings. As such, people in the study area could immediately recognize the accounts or descriptions of the informants in this study because they also share related realities. I was also reflexive on the field (discussed in chapter 3.4), so these strategies helped in establishing truth value this research.

The second aspect of ascertaining the trustworthiness of this study under the chosen model is applicability also referred to as transferability by Lincoln and Guba (1985). The findings presented in this study fit very well into the spatio-temporal context of the study area with regards to research objective and questions. To that effect, given another spatial context (location) with similar situations, the findings from this study would fit or would be similar both contexts. However, just like Lincoln and Guba (1985) I argue that should someone want to transfer my findings to another context, it is more of his or her responsibility than mine (the researcher). I have presented adequate expressive data on this research which would allow for

contextual comparison, and to Guba (1981), this is sufficient in addressing the applicability of my research.

The consistency of the research was attained through the use of coding as explained under data analysis (chapter 3.3.3). There were variations in the data collected for this research; the informants presented their lived realities in diverse ways. Guba (1981) however opined that for a qualitative research to be consistent the variability should be traceable – their sources must be identified. These variations could be ascribed to the diverse ways in which the informants were living under the electricity load shedding; their coping strategies and capabilities were different consequently, their emotions and perceptions also differed. In order to capture all the variations in the data and present them as findings for this research, specific codes were adopted in a thematic analysis form as shown previously. Through the refining of the data with the codes in order to arrive at the central themes for the empirical chapters of this study, I paid critical attention to the data and also, I was tentative in how to conceptualize them just as Dey (2003) recommended.

Finally, Guba (1981) viewed neutrality of a qualitative research as how the data and interpretations are confirmable. Lincoln and Guba (1985) suggested that, the inclusion of samples from field notes, transcribed recordings, codes used for analysis and other such related materials in the research methods is important to confirm the neutrality of the research. In this research such documents had been provided and explained for instance the analysis codes. This is helpful for any other researcher to be able to independently verify the processes that led to the findings in this research – making this research neutrally trustworthy.

3.8 Research Limitations

I would have wished carrying out this research from start to finish without any challenges. But the truth is that, I had some challenges, I had some dilemmas and I had to take some quite tough decisions especially in the field. This last section of the methodology chapter throws some light on these limitations. In this section, the limitations would be mentioned and reflected upon.

The maiden limitation in conducting this research had to do with time. The duration for the fieldwork for this research was only two months. This duration was not fully adequate; arriving at Ghana, going to book appointments with both the key and primary informants, conducting the all interviews, doing observations and collecting all the relevant geospatial data all in two months, was not easy. In some cases, some of the informants had to postpone our appointments to see to their personal pressing needs. In other cases too, to complete one full interview, I had to visit the informant more than once. There were times that our meetings were interrupted by urgent calls on the informants and the normal thing was to make another appointment. All these delayed the progress of the data collection and made the two months shorter than I had envisaged.

Furthermore, despite the fact that the fieldwork was sponsored by the Norwegian Education Fund (Lånakassen); including both traveling in and out of the fieldwork, the financial demands of the fieldwork were not fully met by the sponsorship. At the time, the local currency (Ghanaian Cedi) was highly depreciating against the United States' dollar and since the money got from Lånakassen had to be converted into dollars before using in Ghana, it made it quite expensive to spend in Ghana. The prices of goods and services were on the ascendency, in some case, the inflation was observable on daily basis. This made the costs of transportation to the research areas and informants and the purchase of research materials, like stationery and batteries for the recorder and telephone call credits – used to call the informants to remind them of our appointments, quite pricy.

Additionally, using the theoretical sampling method for the primary informants was not easy. It required critical and tactical in order to arrive at the required data that I was looking for. Unlike any quantitative based sampling method that would have just required frequencies of the interested variables, this type of sampling rests on the quality and not just the quantity of the needed information. So to get the informants delve into the issues they were talking about,

explaining themselves and not just merely listing the issues, was quite challenging. Some of them were very frustrated with the electricity load shedding so it affected their moods – they easily get annoyed when you want them to explain issues further. They felt like they were been giving too much to do, because they assumed everyone was going through the same and therefore, there was no need to explain further.

Last but not least, I had to attend the funeral of my mother on the 4th of July, 2014 – in the middle of the data collection. My dream was to have gone home to hug my mother and tell her how school and Norway had been treating me; not to go bury her. But somehow, my dream was not fulfilled. That experience of seeing my mother lowered gently to her grave and getting to know that she was not going to be seen again – gone forever, has been one of the most difficult, if not the worst experience in my life. It was emotionally challenging.

Have these limitations with all their potency, affected the ability to effectively answer my research questions and/or the quality of my findings? In terms of the time duration, what I did that was very helpful was to start gathering my research tools here in Trondheim before I got to Accra. I printed all my interview guides, made contacts with my key informants and also the mapping company right here in Trondheim before I got to the field; this saved me a substantial time. I constantly called my informants whiles on the field to remind them of our appointments. This was done to avoid the incidences of them forgetting and leading to postponements. Aside these time saving strategies, what I did to manage the funds I had for the research too was to do most of the data processes personally. For instance, I transcribed all the interviews and composed all the maps myself. These could have been sublet to a research assistant but would have come with additional cost. With respect to the data sampling technique, the quality of the data was rated higher than the quantity. So I made sure I got the best information from the informants that answered all my research questions. I had to sacrifice the numbers for the worth of the information through further probing of the informants' accounts. And the focus group discussion was really helpful in this regards too. It threw more light into all that the other individual informants had already given. Finally, with the death of my mother, my psychology friend and focus group discussion's moderator had been very encouraging. He helped me a lot in psyching me up. He took time to talk to me and made me accept the fact that it has already happened, I could not lost all the two; my mother and my education. So I had to concentrate and win one of them – my education is the only conceivable one to fight for, so I had no other option than focusing on the research and finishing it well to honour my mother. So to answer the question I posed in the opening of this

paragraph, I would say emphatically that, although these limitations were faced, the data I gathered were able to answer all my research questions and my findings are true representations of the prevailing spatio-temporal conditions concerning the subject matter of this research.

To conclude this section of the chapter, I would say that, it is indispensable for future researchers to anticipate such limitations as reckoned in any study they might be carrying out, but the coping strategies adopted in this research could be worth considering for their successes.

3.9 Chapter Summary

In sum, this chapter offered an insight into the methodology adopted for this research. It started with the choice of qualitative research method as the best fitting for the research. Afterwards, it demonstrated how the informants for the research were sampled, the ways by which the data was collected, processed and analysed. The concluding sections of the chapter looked at the positioning and reflexivity of the researcher, the ethical considerations that were adhered to during the entire data collection, processing and analyses period, the trustworthiness of the research and also the limitations faced during the research period.

After successfully collecting the required data, processing and analysing them, it is time now to present the empirical findings. These findings as captured under central themes from the analysis are the duty bearers and their roles in the electricity load shedding under a national research context, the perceptions of the duty bearers about the electricity load shedding and the challenges that has led to the cause of and last but not the electricity load shedding and finally, the impacts of the load shedding is impacting on the wellbeing of the right holders. These are the contents of chapters four, five and six respectively.

CHAPTER 4

* The Research Context of Ghana
* Duty Bearers in the Electricity Load Shedding Policy
* Capabilities of the Duty Bearers in the Electricity Load Shedding Policy

4.1 Introduction

The first three chapters of this research provided accounts on the background, conceptual and theoretical underpinnings and the methodology of the study. This chapter is the first of the three empirical chapters of this research. It identifies the duty bearers and their shared responsibilities in the electricity load shedding in Ghana, thus, answering the second research question - who are involved in this strategy (institutions and roles)? The concept of structures as captured under the capability approach and also illustrated in the conceptual framework, serves as the foundation for this chapter. The conceptual framework guided the categorization of the institutions in the electricity sector of Ghana as revealed in this chapter. The data used for this chapter is from document analyses from the secondary data gathered from various digital and print publications by the identified institutions.

In order to understand the roles and issues involved with the institutions in the electricity load shedding in Ghana, it is important to first of all, provide the particular research context of Ghana within which they are situated. Hence, a brief geographical, demographical and some social contextualization are provided on a national scale.

4.2 The Research Context of Ghana

Historically, the present day geopolitical region called Ghana had been inhabited since the Bronze Age - ca. 2000BC (McLaughlin and Owusu-Ansah, 1994). It was the first country where Europeans arrived to trade in sub-Saharan Africa. It was very rich in gold and hence its name, the Gold Coast. The Portuguese were the first traders to arrive at the Gold Coast in 1470. In 1553, the English joined, followed by the Dutch in 1595 and in 1640, the Swedes came. The trade was initially in gold but advanced afterwards into slaves. From 1820 however, the British took political control over the Gold Coast and ruled it until 1956. On 6th March, 1957 the Gold Coast became the first black African country to gain independence from its British colonial masters (BBC, 2014). Its name 'Gold Coast' was changed to 'Ghana' after the great Wagadugu Empire of West Africa. The rulers of that medieval empire which lasted between the 4th to the 13th century were called 'Ghana'. According to Jackson (2001) the word 'Ghana' means "Warrior King". Osagyefo Dr. Kwame Nkrumah was the first president of the Republic of Ghana.

Geographically, Ghana is located on the coast of West Africa along the Atlantic Ocean and shares boundaries with Burkina Faso in the North, the Gulf of Guinea in the South, Togo in the East and Ivory Coast in the West. Ghana lies between latitudes 4° and 12°N, and longitudes 4°W and 2°E thus, only a few degrees north of the Equator and spans to a total land area of about 238,535 km^2 (GhanaWeb, 2014). The Prime Meridian also passes through the port city of Tema in Ghana. Because it is located within the tropics, Ghana has a tropical climate with two major seasons: the wet season and the dry season. The former normally occurs from April to mid-November with rainfall figures ranging from 78 to 216 centimetres. The latter also referred to as harmattan, occurs around December to March. It is characterised by a dry desert wind, low humidity with hotter days and colder nights. Average temperatures range from 21°C to 28°C (Oxford et al., 2008). Ghana is endowed with some plains and highlands, many rivers and some waterfalls, and most especially the world's largest artificial lake - Lake Volta. The Volta Lake houses two (Akosombo and Kpong Dams) out the three hydro-electric dams in the country. It has been observed by the Ghana Meteorological Agency that the water levels in these dams respond directly to the various seasons. With the coming of the rains, the water levels rise and when the harmattan sets in, the water levels drop. This seasonality changes goes on to affect the electricity production in the country. For instance in 2007, due to a severe harmattan, the water level dropped drastically and this affected electricity however, with the coming of heavy rains during the latter part of the same year, electricity production increased again (Boafo, 2007).

Politically, Ghana is a unitary presidential constitutional democracy with a parliamentary multi-party system. Ghana is divided into 10 administrative regions. These regions are further divided into 216 assemblies of 6 metropolis, 49 municipalities and 161 districts (GhanaDistrict.com, 2012) as shown in the map on the next page. Each region is governed by an overall regional minister while the various assemblies under each region have a separate chief executive. All of them are appointed by the president of the Republic. Even though, the Greater Accra Region is the smallest in terms of landmass (3,245 square kilometres), it is the second most populous region in the country due to the cosmopolitan cities of Accra and Tema – the Greater Accra Metropolitan Area (Songsore, 2008). This Metropolitan Area in 2010 had about 4 million people (Brinkhoff, 2010). Consequently, this leads to a high demand for electricity because of the population and the various commercial and industrial activities that are carried out in them (VRA, 2015).

Demographically, Ghana has a population of about 27 million as of June, 2014, according to the Ghana Statistical Service. The gender representation of this population is about 51% being females whiles 49% are males (GSS, 2014). The World Health Organization pegs the life expectancy of the Ghanaian population at 61 for men and 64 for women (WHO, 2012). In terms of religion, Christians are about 71.2%, Muslims are 17.6%, traditionalists are 5.2% and the rest 6% represents those with others religious opinions. Some of the major languages spoken in Ghana include Twi, Ewe, Fante, Dagomba, Dangme and Ga. The English language however is the official language. Ghana has a literacy rate of about 71.5% of the total population. More males - 78.3% are educated than their female counterparts - 65.3% (GSS, 2014).

Economically, the World Bank classified Ghana as a lower middle income country with an annual Gross Domestic Product growth of 8% in 2013 (WorldBank, 2015). Agriculture accounts for about 56% of the total labour force, followed by industries with 15%, and other services standing at 29% (IMF, 2014). Ghana is the second largest producer of cocoa in the world. Ghana exports oil, gold, cocoa, timber, tuna, bauxite, aluminium, manganese ore, diamonds and some other horticultural products. France, Italy, The Netherlands, China and Germany are the major export partners of Ghana. The Stock exchange of Ghana (Ghana Stock Exchange) is the 5th largest on continental Africa and 3rd largest in sub-Saharan Africa. Within the West African sub-region, Ghana sometimes imports electricity from Ivory Coast and natural gas for electricity thermal plants from Nigeria via the West African Pipeline Company and also exports to Benin (VRA, 2015).

Figure 4: Map showing the Research Context of Ghana (Source: Author, 2015)

4.3 Duty Bearers in the Electricity Load Shedding

It was found out through the various literatures on the electricity sector of Ghana that there are some institutions whose actions or inactions affect the effective running of the Ghanaian electricity sector. Based on the data collected in the field and some secondary data, this section identifies these institutions in the electricity load shedding in Ghana. With respect to

this study, buttressed by the *Capability Approach* and also depicted under *Structures* of the conceptual framework of this research, these institutions are conceived as the *duty bearers* in the electricity sector of Ghana. Finally, the differential roles and responsibilities by these duty bearers would be outlined.

Responding to the question "*who are the institutions involved in this electricity load shedding?*" the Acting Director of Research and Monitoring – who was my respondent at the then Ministry of Energy and Petroleum, had this to say:

> "It is a coordinated effort, you know once you have to generate, you need to transmit and then distribute. These are the key sectors of the power sector…
>
> The Ministry of Energy gives the policy direction and gives guidelines, so the ministry is involved. There's the generation aspect where both the private and public sectors collaborate. The Asogli and others from the private sector whiles the VRA (national generation company) from the public sector. When it comes to the transmission, we have a national transmitter - GRIDCo. The distribution sector has 2 national companies; ECG and NEDCo…. That's why I said it is a network with all these institutions involved."

From the very first sentence, it is revealed that the institutions are categorised according to their roles in the electricity sector of the country. These are *generators*, *transmitters* and *distributors*. But according to the Ministry of Energy and Petroleum, this group of three is incomplete. There is also the electricity *policy formulator and implementer*, the sector *regulators* and finally, the electricity *consumers*.

The government of Ghana through the Ministry of Power is responsible for all the electricity policy formulation as well as its implementation. Below this body, two uniquely distinct bodies are responsible for the economic and technical regulation of the sector. These are the Public Utilities Regulatory Commission (PURC) and the Energy Commission (EC). From these regulators come the electricity generators. The Volta River Authority (VRA) is the main government established entity that is responsible for the country's electricity power generation. Aside, there are some Independent Power Producers (IPPs) who also generate some amount of electricity. After getting the power generated, the national electricity transmitter - Ghana Grid Company (GRIDCo) transports the power to the national distributor - the Electricity Company of Ghana (ECG). Alongside the ECG is the Northern Electricity Distribution Company (NEDCo) who helps in distributing the electricity to the northern parts

of the country. At the end of this electricity sector are the consumers. These include the bulk customers, residential, commercial and industrial users of Ghana. Some amount of the electric power is also exported to Benin (VRA, 2014).

As indicated in the data sampling section of the methodology chapter, it was only the MoP, VRA, ECG and GRIDCo that were interviewed on the field. This means that, for the rest three institutions – EC, PURC and NEDCo, the presentation on them is fully based on secondary data. Below is a diagram showing the totality of these duty bearers in the electricity sector of Ghana as well as their different roles presented in the ensuing sub-sections.

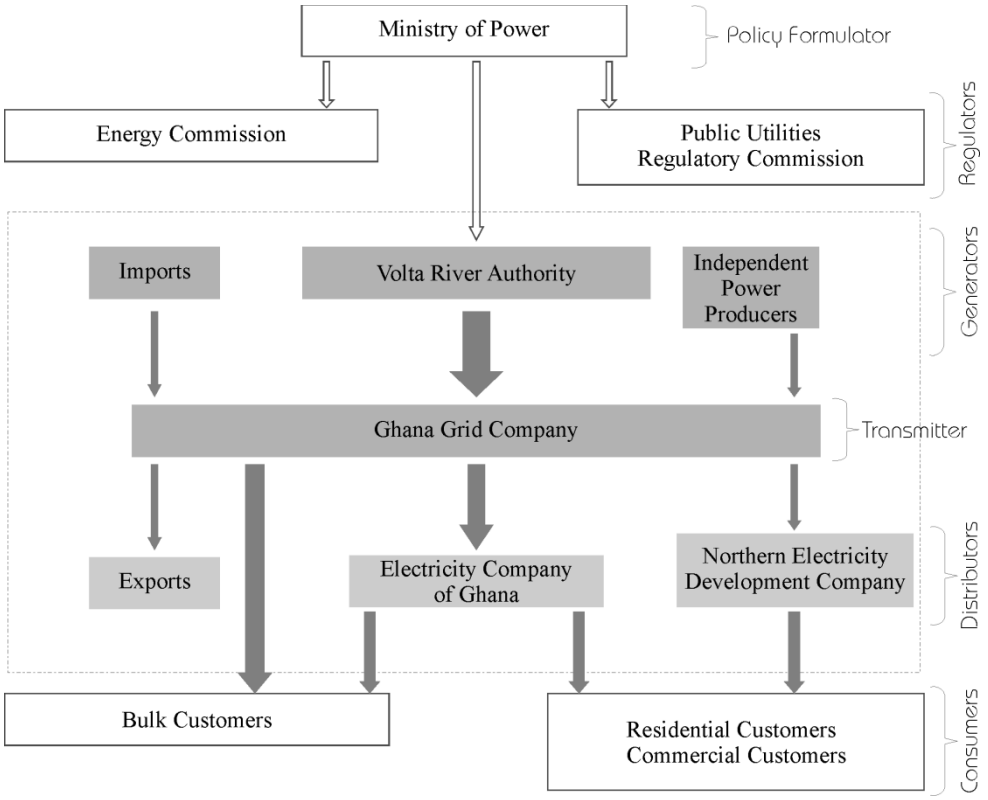


Figure 5: Institutions in the Electricity load shedding System (Source: Author, 2015)

4.3.1 Ministry of Power (MoP)

The Ministry of Power was created by the Government of Ghana in November, 2014. This ministry was carved out of the former Ministry of Energy and Petroleum in order to restructure the electricity sector to ensure more stability in the production and distribution of electricity in the country (Laary, 2014). According to the Chief of Staff Prosper Bani who signed the official government statement announcing the creation *"…the new Minister will be expected to mobilise all human and material resources available to resolve the current challenges facing the power sector"* (Bani, 2014).

This new development notwithstanding, the field data that I collected were from the defunct Ministry of Energy and Petroleum and I would still use them for the analyses in this research because due to its newness, the Power Ministry still depends on the same institutional structures and policies from the interviewed ministry.

As a duty bearer, the ministry is charged with the responsibility of extending and ensuring a continuous supply of energy services in the country. Also, it is the duty of the Power Ministry to formulate, implement, monitor and evaluate energy sector policies. The MoP through the Minister, Deputy Minister and the Technical Directors – who serve as the topmost executives in the ministry, gives the policy direction and gives guidelines to the rest of the institutions in the electricity sector. According to MoEP (2014) the prime vision of the ministry is to develop and ascertain "a reliable high quality energy service at the minimum cost to all sectors of the economy through the formulation, implementation, monitoring and evaluation of energy sector policies" (p: 4)

In illustrating on how the ministry relates with the other institutions in the sector, the Acting Director of Research and Monitoring at the ministry said:

> There are certain key institutions which shouldn't be affected by the electricity load shedding like hospitals, security services and others. So the ministry has to come out with guidelines to regulate the timetable and which places should be left (untouchable). So ECG has to seek the attention of the ministry before they draw their timetable and schedule for the electricity load shedding.

It is seen from the above quotation that the ministry serves as the overall 'headmaster' of the sector. That is, even though the ECG is solely responsible for the electricity load shedding

timetable, it does not necessarily have the freehand in that operation. It takes orders from the sector ministry.

4.3.2 Energy Commission (EC)

The Energy Commission of Ghana is the technical regulator of the electricity sector. It was instituted by the Energy Commission Act 541 by the Parliament of Ghana in 1997. Stated by EC (2015) the Commission expected to "regulate and manage the development and utilization of energy resources in Ghana" (p. 3). Aside this role, the commission is also tasked with the provision of legal, regulatory and supervisory framework for all the energy providers in the country. It is this body that grants licenses for the transmission, wholesale supply, distribution and sale of electricity and natural gas in Ghana.

The Energy Commission is made up of seven Commissioners. By their relevant knowledge, expertise and experience in the energy sector, they are appointed by the president of Ghana. Their head is the Executive Secretary who is to ensure the implementation of the decisions of the Commission and also provides strategic and organizational leadership to the commission.

In Ghana, it is quite common to observe adverts from both the screen and print media on how to use electricity effectively. The way to minimise cost associated with the various electrical gadgets and such related education are mostly carried out by the Energy Commission. Even during the fieldwork it was observed that, the commission was exchanging older refrigerators with newer energy-saving ones at a subsidised cost. This is the Refrigerator Energy Efficiency Project which is under the auspices of the UNDP-GEF and the Government of Ghana (EC, 2015: p. 4).

4.3.3 The Public Utilities Regulatory Commission (PURC)

Just like the Energy Commission, the PURC was also instituted by the Energy Commission Act by the Parliament of Ghana in 1997. Only that the PURC is under the Public Utilities Regulatory Act, 1997 (Act 538). However, unlike the Energy Commission, the PURC is the economic regulator in the electricity sector

The PURC is autonomous and regulates as well as oversees the provision of quality electricity and water services to all consumers in the country. That is, the VRA, ECG and NEDCo (mainstream electricity companies), and the Ghana Water Company Limited (GWCL) are all under the direct supervision of the PURC.

The commission is run by a nine-member panel. This is composed of a Chairman, an Executive Secretary, a representative each from the Trades Union Congress (TUC) – representing the labour union; Association of Ghana Industries (AGI) – representing the industries; and domestic consumers. The rest four are experts who are well versed in the commission's work. Just as it is with the previous regulator, these members are appointed by the president in consultation with the Council of State (PURC, 2015).

In Ghana, the PURC is the organization that all aggrieved consumers of electricity must approach for redress. The commission is more or less like the mouth-piece of the people. It is responsible for providing guidelines for utility charges and it receives and investigates complaints and settles disputes between consumers and the utility providers (PURC, 2015).

4.3.4 Volta River Authority (VRA)

"*All that we do is to generate power.*" That is was what the Research and Public Education Officer of VRA responded when he was asked "what is the role of VRA in the energy sector?" VRA is thus the chief source of electricity in Ghana. It is one of the biggest legacies of the first president of Ghana - Kwame Nkrumah. VRA was established in 1961; and at the time it was to generate, transmit and distribute electricity to all the parts of the country (VRA, 2013). But just as the respondent alluded to, their main task now is to generate the electrical power needed for the country.

To achieve this, VRA relies on hydro (the biggest), thermal and solar plants in producing electricity. The Akosombo Hydroelectric Power Plant, Akuse Hydroelectric Power Plant and Kpong Hydroelectric Power Plant are the two hydro plants of the VRA. Tema and Takoradi are the houses for their thermal plants. The solar plant is situated in Navrongo in the Upper East Region of the country. Below is an illustration of the main generation facilities of VRA. These facilities together contribute to 2,104.5MW, representing about 80% of the country's total electricity generation capacity (ibid.).

Table 2: Electricity generational facilities of VRA [Source: VRA (2013)]

Generation Facility	Installed Capacity (Mega Watt)
Akosombo Hydroelectric Power Plant	1,020
Kpong Hydroelectric Power Plant	160
Takoradi Thermal Power Station (T1)	330
Takoradi Thermal Power Station (T3)	132
Takoradi International Company (TICO/T2)	220
Tema Thermal 1 Power Plant	110
Tema Thermal 2 Power Plant	50
Mines Reserve Power Plant	80
Solar Power Plant	2.5
TOTAL	2,104.5

Table 2 above presents the electricity generating facilities that the VRA possess. Aside the hydroelectric dams of Akosombo and Kpong, it has the thermal power stations (T1 and T3) at Aboadze, located near the oil city of Takoradi, the Thermal 1 and 2 and the Mines Reserve power plants at Tema and also has a 10 percent stake in the TICO/T2 while the majority stake of 90 percent belongs to TAQA - a UAE investment firm (Ahlijah and Humphries, 2013).

Aside the mainstream hydroelectricity generation, VRA also provides some amount of socio-economic development services to the country. The Akosombo Hotels Limited, the Volta Lake Transport Company, the Kpong Farms Limited are examples. Other fields where the Authority has extended its business mind include the health sector with the VRA's Health Services; education sector with the VRA's Schools and also real estate sector with the VRA's Akuse and Aboadze Estates. It is also concentrating on the establishment and application of some Environmental Management Programmes in order to alleviate the adverse effects of its operations. These are the areas the Authority refers to as its 'non-power' sectors (VRA, 2013).

4.3.5 Bui Power Authority (BPA)

BPA (2015) recount that in July, 2007 the Ghanaian Parliament enacted the Bui Power Authority Act, 2007 (Act 740). This act was passed in order to institute the Bui Power Authority (BPA) which was to plan, execute and manage a new hydroelectric dam on the Black Volta the Bui Hydroelectric Project. The dam was successfully constructed by collaboration between the Government of Ghana and the China Exim Bank. The Ghana Government contributed US$60m and while the China Exim Bank provided a concessional loan of US$270 million with an interest of 2 percent as well as a commercial loan of US$292 million (Hensengerth, 2011). The Chinese construction firm known as Sinohydro constructed the dam and the dam generates a total of 400 megawatts of electricity but is currently producing 133 megawatts (BPA, 2015).

4.3.6 Independent Power Producers (IPPs)

Aside the VRA and the BPA discussed in the just ended preceding sections, there are some independent power producers who also generate some amount of electricity to augment the national electricity load. In 1997 there was a recommendation for the Ghanaian electricity sector to be restructured (Malgas, 2008) and based on the sector ministry's objective of increasing the electricity generation capacity to 5,000MW by 2016, the government has welcomed some IPPs to the electricity sector.

According to the Ministry of Power, although there are some IPPs that have been given provisional licenses to start operations, it is only two that have currently in operation. Together these generators contribute to 310 megawatts of electricity to the national capacity.

> As at January 2013, the Sunon Asogli Thermal Plant and the CENIT Thermal Plant have successfully being operating. The Asogli plant generates 200MW and the CENIT is at 110MW. Some other ones have been given provisional licenses but they are yet to start. These IPPs are very helpful, so we would want more to come on board. [Informant at the Ministry of Power]

4.3.7 Ghana Grid Company (GRIDCo)

The Ghana Grid Company (GRIDCo) commenced operation in August, 2008. The Volta River Development Act 692 is what forms the legal basis for its establishment in the year 2005. It was later on registered as a private limited liability company in 2006 (GRIDCo, 2009).

GRIDCo was instituted so as there will be the development and promotion of competition in the wholesale power market in Ghana. GRIDCo is to ensure that there is transparency and non-discrimination in the transmission processes the power generators and distributors. GRIDCo does not transmit power from the VRA to ECG and NEDCo only; it also does same to some bulk consumers (mines) directly without passing through these 'distributors' of ECG and NEDCo.

GRIDCo is expected to transmit electricity from wholesale suppliers (VRA and IPPs) to bulk distributors (ECG and NEDCo). Nonetheless, it also carries out transmission system planning and implements necessary investments policies in order to reliably transmit electric energy; and manage the wholesale power market.

4.3.8 Electricity Company of Ghana (ECG)

ECG started working with the name 'the Electricity Department' on 1st April, 1947 (ECG, 2014). In 1962, its name changed to the 'Electricity Division' and five years later, it became the current Electricity Corporation of Ghana by the NLC Decree 125. With a total work force of about 6000 employees, ECG is registered as a limited liability Company in Ghana. It operates under the Ministry of Power and exclusively owned by the Government. The ECG was incorporated under the Companies Code, 1963 in February 1997, and was tasked to purchase electricity from the Volta River Authority and distribute to all consumers in the country (ibid).

To affirm the responsibility of the company, the respondent from ECG said *"…we are the distributors in the power sector, so we buy from VRA and distribute to the southern part of the country."* However, since 1987, there has been some of reduction in their national electricity distribution roles. They now concentrate only on the southern sector of the country; comprising of the Ashanti, Central, Eastern, Greater Accra, Volta and Western Regions. The northern parts are the responsibility of the Northern Electricity Department Company (NEDCo). "*…Don't forget we don't get to the northern part of the country, in that part of the*

country, it's NEDCo that deals with them - Sunyani to Tamale." This was what she (the respondent) said to elaborate on the scope of focus.

According to her, inasmuch as they concentrate on these regions, they pay copious attention on Accra because the electricity demand in Accra is enormous. *"…the demand in Accra is more so we give special attention to Accra. Accra is always the biggest receiver from the supply we have."* It is not too difficult to understand why the demand in Accra is that huge. Most of the bulk consumers of electricity are located in Accra; the industrial companies, major hospitals and commercial entities.

4.3.9 Northern Electricity Distribution Company (NEDCo)

In 1987, the Volta River Development (Amendment) Law – PNDC Law 171 was passed which allowed the VRA to establish the Northern Electricity Distribution Company (NEDCo). This company was to help distribute electricity to the northern part of the country specifically after the city of Kumasi. ECG was by then mostly focused on areas from Kumasi southwards to Accra (NEDCo, 2013).

Since 1987, NEDCo has been distributing electricity power from the VRA to the Brong-Ahafo, Northern, Upper East and Upper West Regions of the country with just an initial electricity load of about 10 megawatts. NEDCo has five major area offices located in Sunyani, Techiman, Tamale, Wa and Bolgatanga. These offices manage the distribution and its associated issues like billing and grid connection in their respective area jurisdictions. The Tamale office also serves as the general head office of NEDCo (ibid.). The general mission of NEDCo is to procure and distribute electricity efficiently, safely and reliably in the northern sector of Ghana.

4.4 Capabilities of the Duty Bearers in the Electricity Sector of Ghana

The purpose of this sub-section is to briefly present the distinctive roles all the duty bearers play in electricity sector of Ghana. It further provides the interlinkages between them in relation to the electricity load shedding policy. The discussions here are based on both field and secondary data with the aim of answering the roles part of the second research question for this study. It is also theoretically based on the *load shedding sector* part of the conceptual framework for this research. This sub-section will end by providing a tabular illustration of the duty bearers and their roles.

4.4.1 Policy Formulation

The Ministry of Power is the official institution that represents the Government of Ghana in the electricity sector. According to MoEP (2014), it is the ministry's responsibility to formulate and enforce the implementation of all the policies of the electricity sector. In conformity to this, the informant at the Ministry said *"…the Ministry gives the policy direction and gives guidelines as to what happens in the electricity sector of the nation…"*

Also, in connection with the load shedding, it was revealed that the Ministry advocates for certain key institutions such as hospitals, security services and some vital governmental institutions like the Parliament House. Hence in drawing the timetable for the load shedding, the ECG liaises with the Ministry in order to identify the untouchable places. Nevertheless, the ministry reaches out to the private sector (IPPs) to come on board in beefing up the electricity generation capacity of the nation as quoted below:

> …the ministry will have to review existing policies then come out with new ones. If there's the need for may be a change in policy direction, if there's a need for a new venture into another direction, the ministry provides some kind of leadership for example attracting the private sector to come to the energy sector to help. That is the role the ministry plays. To facilitate that, the ministry has itself a target of raising generation capacity – thus from the current capacity to 5000MW by the year 2016. So if the ministry comes out with such a policy and a target then it also has to provide the needed leadership to be able to generate that... (Informant at the Ministry)

The Ministry is thus, the ultimate institution bequeathed with the responsibility of developing all electricity policies in Ghana. This makes the Ministry have an oversight responsibility for

all the policies that regulate the activities of the electricity generators, transmitter and distributors in the overall sector of Ghana.

4.4.2 Electricity Generation

The generation of electricity in Ghana is carried out by the state-owned Volta River Authority and the Bui Power Authority, and the Independent Power Producers. The VRA generates about 2,104.5MW - about 75 percent of the country's total electricity (see chapter 4.3.4) while the rest 25 percent is generated by BPA and IPPs. These power generators sell the generated power to the distributors (ECG and NEDCo) through the state's electricity transmitter – GRIDCo. The amount at which it costs them to generate and sell electricity is seen in the following quote by the informant at the VRA during the fieldwork *"…we generate at 20 US cents per megawatt and then we sell at 11 US cents per megawatt because it is a PURC policy…"*

4.4.3 Electricity Transmission

There is only one institution with the responsibility of transmitting high voltage electricity from the generators to the electricity distributors. This is the GRIDCo and it is mandated to transport electricity from the VRA, BPA and IPPs and to the bulk customers of ECG and NEDCo.

4.4.4 Electricity Distribution

The two institutions in Ghana that are responsible from distributing electricity to consumers are the ECG and the NEDCo, the former is responsible for the southern (Ashanti, Central, Greater Accra, Eastern and Volta Regions) part of the country while the latter's responsibility is the northern part (Northern, Upper East and Upper West Regions). These two institutions are responsible for making the timetable of the load shedding. What they do is to demarcate the areas under their jurisdiction into smaller parts so that it will be possible to provide them with electricity in turns. Based on their demarcation of the various areas, they allocate a timeframe for each when it will have light and when it will not in a timetable (see Picture 3 and Appendix 3) which is published in both the print, digital and audio-visual media in the country.

From the collected data, it was revealed that these distributors have electricity sub-stations that serve as electricity warehouses from where the consumers are connected to the national grid with electricity cables. Aside the connection of the consumers to the national grid, the

distributors are responsible for metering all the buildings and related facilities of the consumers from where their monthly bills are generated.

The electricity consumers are conceptualised under two categories in this study; these are the *commercial* and *residential* consumers. The printing presses interviewed at the Accra Newtown fall under commercial consumers and the households interviewed at North Legon are the residential consumers. From the discussions with the ECG, it was realised that commercial consumers need more voltage of electricity due to the industrial machines they use. On the other hand, the residential consumers use relatively lower voltage of electricity. This differential usage of electricity translates into the pricing of their electricity consumption. The ECG informant stated that commercial consumers were paying GH₵0.45 (0.45 Ghana Cedis) for every kilowatt of electricity consumed whereas residential consumers were billed GH₵0.16 for a kilowatt of electricity. The Bank of Ghana international money exchange rate at the time was $1 to GH₵3.51.

4.4.5 Electricity Sector Regulators

There are two main regulators in the electricity sector of Ghana - the Public Utilities Regulatory Commission (PURC) and the Energy Commission (EC). In the electricity sector of Ghana, the generators, transmitter and distributors are considered by the Ministry of Power as part of the public utility providers. The PURC and the EC are the two government institutions that are expected to serve as a referee in regulating the electricity utilities to serve the general Ghanaian public good rather than the individual utility institutions' private interests. The PURC is the economic regulator with a prime responsibility for adjusting the tariffs that ECG and NEDCo charge their consumers. The EC however is the technical regulator with the responsibility for licensing and overseeing the technical actions of the utilities. These two institutions through their roles bring about a fair competition in the electricity market and they administer standards of performance for the provision of electricity to consumers.

4.4.6 Summing Up

This sub-section will conclude by illustrating the various roles played by these duty bearers (institutions) in a table below.

Table 3: Duty Bearers and their roles in the Ghanaian Electricity Sector

NAME OF DUTY BEARER	ROLE
MoP	Policy Formulator
EC	Technical Regulator
PURC	Economical Regulator
VRA, BPA and IPPs	Electricity Generators
GRIDCo	Electricity Transmitter
ECG and NEDCo	Electricity Distributors

In connection with this study, it is argued that these duty bearers have the potential of satisfying the electricity needs of the right holders (consumers). If all their roles are played well and met, it will lead to an improvement of the electricity provision to consumers which they aspire for - quality of life – wellbeing (Sen, 1993).

4.5 Chapter Summary

The discussion in this chapter illuminates the responsible institutions and their specific functionings as duty bearers in the electricity sector; it additionally gave an account of the totality of the institutions involved in the electricity load shedding policy in Ghana. It provided an overview of how these institutions manage the policy and indicated their shared-responsibilities. It is argued in this chapter that, through the fulfilment of the stipulated functionings of the duty bearers, the wellbeing of the right holders could be provided. Prior to that, the particular research contexts of Ghana within which the duty bearers are situated were

provided. These contexts entailed a brief geographical, demographical and some social contextualization on a national scale.

The next chapter will delve into how these identified duty bearers perceive the electricity load shedding as well as their functionings or malfunctionings (challenges) in meeting their roles.

CHAPTER 5

The Perceptions and Functionings of the Duty Bearers in the Electricity Load Shedding Policy

5.1 Introduction

After identifying the duty bearers in the electricity load shedding it is forthcoming to find out how the electricity load shedding is perceived by them. It is difficult to read, listen or watch any news about Ghana in the media without hearing the phrase 'electricity load shedding'. The electricity 'electricity load shedding' has become a jargon that is used and spoken about in the daily lives of Ghanaians; at least for the past two years. Since this thesis focuses on electricity unreliability in Ghana, it is necessary to explore how the people of Ghana relate to this concept of their environment.

The intention of this research is not to confuse the academic world or the general public by using a concept that is blurred, but rather to contribute to the body of knowledge about the electricity load shedding by presenting it as it pertains to Ghanaians. The first section of this chapter outlines the perceptions of the various duty bearers interviewed on the electricity load shedding policy. Furthermore, on that basis, a concise and a working definition will be given about the electricity load shedding through the lenses of all the interviewed duty bearers. The chapter will conclude by reviewing the challenges the duty bearers face even as they strive to meet their expected roles.

The purpose of this chapter is mainly to further explore answers for the second research question for this research. Unlike the precious chapter, this chapter is mostly based on the field data collected; hence, most of the information provided here is based on assertions from the MoP, VRA, ECG and GRIDCo.

5.2 The Duty Bearers' Perceptions of Electricity Load Shedding

Concepts are at the foundation of social science theory and methodology. Their essentiality is based on the provision of substance to theories, the formation of the basis of measurement and their influence on the selection of cases (Goertz, 2006). Though the duty bearers are interconnected within the electricity sector, their differing roles played however make them perceive the load shedding concept differently. It is the intent of this section to bring to bear the various perceptions of the duty bearers based on their role in the general sector of electricity in the nation. This section is also based on the field data and unravels the *Policy* aspect of the *Structures* captured under the conceptual framework for this study.

First and foremost, the supervising ministry of the electricity sector notifies that the concept is captioned in various terms, depending on who is talking about it. The ministry would however prefer referring to is as load management rather than electricity load shedding. What is however unique about its (electricity load shedding) nomenclature is the fact that it is generally referred to as "*dumsor*" (interpreting it into English will be the combination of *dum* as *off* and *sor* as *on*; that is, *dumsor* translates as *off-on*) by almost everyone in the country. The Acting Director of Research and Monitoring said:

> …in Ghana some call it Electricity load shedding, others call it Load Management, and the popular one that we can hear in town these days is "dumsor". That's what the man in the street or the woman in the market calls it. But if we say Load Management, from where I am sitting – what happens is that any time we don't have enough generation in terms of power to meet the demand, then it means we schedule it in such a way that whiles some section of the public or community gets it, others go off so that we will be able to satisfy at least each and everyone's needs. So whiles some go off for 6 hours, others go off for 12 hours. But basically, you will never go off for 24 hours, never!

To summarise what the informant said, load management as he would rather want it called, is when the quantity of electricity generated is less than the quantity demanded; and to be able to be able to meet the general society's demands for electricity, the distribution is scheduled in a way that sections of the society takes turns in having electricity supply.

Technically, he further explained that currently, Ghana has a "…*total generation capacity of about 2546.5 megawatts (MW) whiles the total energy demand is about 2840MW*". This means there is a shortfall of 293.5MW. So in such situations, what is advisable is to 'manage' the resource at hand and according to him, that is what is going on. This is why "*we prefer to call it load management rather than shedding, it is ECG that calls it electricity load shedding because they are carrying it out and they know it better*" he stated.

The main generator of electricity – VRA gave a quite direct definition and they also refer to it as electricity load shedding.

> Electricity load shedding is when the whole country can't be supplied with electrical power so the power supply is divided according to segments; and it is simply put, when the power is rationed. [Informant at VRA]

Quite similar to the above definition from the VRA is that of the ECG. ECG defined it as follows:

> Electricity load shedding is when we proportion the various areas in the country and we make it possible for every household to have a source of light. [Informant at ECG]

The national transmitter - GRIDCo however defined it in a rather technical way as the

> Balancing of demand with available generation and keeping spinning reserve on the system to cater for any other contingency. [Informant at GRIDCo]

5.2.1 Summing Up of the Perceptions

In order to get holistic insights to the load shedding from the duty bearers views, this sub-section will sum up all their perceptions. This is necessary because it gives way for a further examination of the cause(s) of the electricity load shedding – which will be explored in the next section of this chapter. Therefore, the summarised opinion of the electricity load shedding from the duty bearers in this research refers to:

> the system wherein electricity power is distributed proportionally to sections of a society in turns with a well-stipulated schedule due to a mismatch between supply and demand of electricity.

5.3 Cause of the Electricity Load Shedding ('Dumsor')

Now that we have become aware of how the various duty bearers perceive the electricity load shedding, the next concern is what then has/have caused it? This section ends the discussion on the duty bearers as captured in the conceptual framework. In this section, the cause of the electricity load shedding will be outlined and the succeeding sub-sections will subsequently unveil the challenges that have led to the cause. The information here is based on field data and some secondary data.

From the holistic perception presented in the preceding section, it is observed that, the load shedding is caused by *inadequate electricity supply*. As the ministry accounted, the current capacity of electricity generated which is pegged at 2546.5MW falls short of the current demanded capacity of about 2840MW. This means that the inability (*malfunctionings*) of the duty bearers to provide the difference of 293.5MW means that not everyone/everywhere in

the country will be able to be served with electricity at the same time – demand simply supersedes supply. Hence, to be able to manage the situation, for 'fairness' sake, the only way to go for the duty bearers was to engage in proportioning the supply of electricity to all consumers, with the aim of at least getting all served so that nobody will be totally left out unserved.

5.4 Challenges of the Duty Bearers Leading to the 'Dumsor'

The load-shedding in Ghana has been attributed to a myriad of challenges facing the duty bearers in meeting their respective responsibilities. Their inability to generate and distribute adequate and reliable electricity to serve all the consumers stem out from challenges emanating right from governmental policies to performance hindrances (malfunctionings) on the part of the generators and distributors of the electricity in the country. This section brings to bear, such root challenges. Quotations from the field would be used appropriately to support the claims.

5.4.1 Policies and Decisions of the Government of Ghana

From chapter four, it was realised that the government through the Ministry of Power initiates and guides all the policies in the electricity sector. This solitary role played by the ministry leads to some damaging bottlenecks in the smooth running of the electricity sector. For example, if the government delays or fails in getting natural gas to the VRA, it becomes difficult for the generator to be able to meet its generation capacity. This is evident in the following quote of the informant at the VRA: *"the government is the one that negotiates for gas supply from Nigeria for our thermal plants to produce power, sometimes however, there are delays in the supply, even sometimes the government does not succeed in getting us the gas at all, this is challenging for us"*

Nevertheless, for the fact that only two independent power producers have been able to commence electricity generation in the country despite the sector ministry's assertion that some others have received provisional licenses presupposes that, there might be some difficulties for the private firms coming on board. Tsikata (2013) affirms this argument that private investors have not been able to join the generation of electricity in the country due to the low creditworthiness of its utilities.

Furthermore, the informant at the Ministry of Energy and Petroleum during my interview said that the government has set an objective to increase power generation from the current capacity to 5,000 megawatts by the end of 2015. But as it stands now the prevailing total installed capacity is just half of this vision – 2546.5 megawatts (see Table 4). However, the Ghana Business News reported that the government is extending electricity to about 59,000 new consumers in 530 communities within the jurisdiction of the ECG through the Rural Electrification Programme (Kudiabor, 2013). Therefore, while the government is expanding access to electrification, unfortunately, there is an inverse proportionality to the supplementing production of electricity. The consequential effect is that, there is a lot of pressure on the electricity transformers because more people are added to the grid. And since the carrying capacity of the transformers are not marching the overload, they spontaneously breakdown. This also contributes to the electricity load shedding.

The current Ghanaian population size estimated to be about twenty-six million (WPR, 2014) vis-à-vis the generation capacity of Ghana indicates that, a lot more needs to be done in terms of power generation, in order to attain an equilibrium between demand and supply. The current generation of citizens depends so much on electricity; people have so many electrical gadgets, right from the house to the office and in-betweens, there is manifold electrical equipment that ought to be powered. Some consume less, others consume much; but all in all, the consumption is massive. Thus, inasmuch as the Ministry's aim of making electricity accessible to every nook and cranny of Ghana by 2020 is very laudable, an equal attention needs to be paid to the enhancement of the generation, transmission and distribution of electricity throughout the country. A failure to do so is likely to lead to the cause of the prevailing electricity load shedding as it is being witnessed in the country.

The general argument here is that through the actions and inactions of the government of Ghana in the electricity sector, the sector has become vulnerable and it is difficult for it to be robust and withstand the shocks from the increasing demand of electricity in the country.

5.4.2 Malfunctionings of the Duty Bearers

Aside the governmental issues, the load shedding is brought about due to some of the underperformance of some of the duty bearers. This section identifies the challenges besetting the oversight institutions inability to meet their roles through the following subsections.

5.4.2.1 Generation Capacity Challenges

First and foremost, electricity must be produced and made available, for consumers to use. The inability to meet this prime duty indicates a looming problem. In Ghana, electricity is generated mainly through two sources: three hydroelectric dams and some power plants (shown in table 4). According to VRA (2015), the total electricity generation capacity of these sources stand at about 2546.5 megawatts (p. 6). However, both of these sources of generators are beset with a number of challenges making it difficult for them to be explored to their full potentials.

The hydroelectric dams are the Akosombo Dam, the Kpong Dam and the Bui Dam. These dams contribute to a total of fifty-two percent (52%) of the total national electricity generation, and they rely on a sufficient volume of water in order to generate electricity. But in recent times, the water depths recorded by these dams have been below the sufficiency level. According to the VRA informant, one of the reasons for this occurrence is that, the Volta Lake, on which all these dams are built on, takes its water source from Burkina Faso. And recently, there has been some construction of dams on this upstream water source in Burkina Faso. These constructions have thus, brought about a reduction in the flow to the Volta Lake, making the water levels in the three Ghanaian dams mentioned low.

Besides the decline of upstream water flow into the Volta Lake, the other source of water inflow is from the rains. The VRA personnel also recollected that, the Ghana Meteorological Agency indicated that after 2011 where the Akosombo Dam recorded its peak water levels, the trend was expected to start a steady decline from 2012 due to inadequate rainfall volumes. This has been the development since 2012; the rainfall volumes have declined and coupled with the upstream inflow challenges too, these dams are experiencing lower levels of water needed for enough electricity generation. These are the challenges facing the hydroelectricity generation. To indicate the intensity of these challenges the VRA informant said:

> You know the Akosombo Dam has a minimum operating level of water at 240 feet, as I talk with you now, the current recorded level as of yesterday was 244 feet. This means that, the dam is just managing with just a 4 feet water reservation. This is very unsafe; what is more worrying is that, the engineers, after their calculations, say that the rate of the water level decrease is estimated to be 0.05 foot per day. What this means is that, if the trend continues like that without any improvement, in about 3 months or say

> 100 days, the minimum level of 240 would be reached. This is very treacherous my brother.

The Akosombo Dam according to him operates on six turbines with a total generation capacity of 1020 megawatts. But then due to the decrease in the water level, all the turbines cannot be operated simultaneously so two of them had been shut down to prevent them from breaking down. The result of that action is that, the current total generation of the dam stands at about 558 megawatts – less than half of the utmost generation capacity.

Table 4: Installed Electricity Generation Sources in Ghana (Compiled by Author, 2015)

HYDRO (DAMS)			POWER PLANTS				
Name	Year Opened	Installed Capacity (megawatts)	Name	Year Opened	Installed Capacity (megawatts)	Type	Location
Akosombo	1965	1020	Aboadze T1	1997	330	Thermal	Takoradi
Kpong	1982	160	Aboadze T2	2000	220	Thermal	Takoradi
Bui	2013	133	T3	2013	132	Thermal	Takoradi
			TT1PP	2009	110	Thermal	Tema
			TT2PP	2010	49.5	Thermal	Tema
			MRP	2010	80	Thermal	Tema
			Solar	2013	2	Solar	Navrongo
			Sunon-Asogli	2014	200	Thermal	Tema
			CENIT	2012	110	Thermal	Tema

As indicated in the opening paragraph of this section, aside the hydroelectric dams are some complimentary power plants which also generate some quota of electricity in Ghana. According to VRA (2015), these power plants altogether contribute to the rest forty-eight

percent (48%) of the total national electricity generation (p. 6). These plants are in the form of solar and thermal. The solar plant is located at Navrongo in the Upper East Region, while the thermal plants are located at Tema and Takoradi in the Greater Accra and Western Regions respectively.

Just like the dams, these plants especially the thermal ones, are not meeting their latent generation power. The main reason is that, they depend solely on natural gas or light crude oil supply from Nigeria through the West African Gas Pipeline Company, and now, this supply has been erratic and unreliable. Throwing more light on this, the VRA informant asserted that:

> … on the average the current gas supply from Nigeria through the West Africa Gas Pipeline is around 20 million to 60 million standard cubic feet (scf), but what we need is about 120 million scf. This is woefully inadequate; so for instance, the thermal plants in Tema that should have been contributing about 150 megawatts of power cannot be run just because the supply from Nigeria is scanty.

An effective and adequate generation of electricity is needed for a successful and efficient distribution to consumers. However, in the case of Ghana, this generation ability has been gravely hindered by the unreliable and low levels of water and gas as explained above. This is the major cause of the electricity load shedding facing the country.

5.4.2.2 Mechanical Challenges

Nonetheless, the next challenge leading to the cause of the electricity load shedding could be classified as mechanical. The generators, transmitters and distributors of the electricity in Ghana depend highly on machines. In most of the cases, these machines like generators and transformers breakdown. In some cases, some of them are too old and need to be renewed but they are not. So after they have been overworked, they just breakdown. It has been observed that the culture of regular maintenance has not been fully adhered to in some of the cases. The ECG and GRIDCo informants indicated that sometimes, when they have some of their transformers broken down or some unexpected cut in their transmission or distribution cables, they have no option than to stop the flow of electricity so as to fix the problem and then reconnect the supply.

The informant at the MoP recounted that, the power plants at the Aboadze suffered some major mechanical hitches in 2013; this made them to be shut down for some time. According

to him, this challenge also contributed to the plunging the country into this electricity load shedding exercise.

5.4.2.3 Financial Difficulties

The third challenge is monetary. *"At times the problem that we have is financial – where we need about 14 barrels of crude oil per day to meet our generation demands. Each day we need about 3 million dollars of crude oil and now even with the exchange rate it might be more" (VRA informant).* The lack of money or in some instances, insufficient money to maintain the machines of the producers and transmitters of the electricity, to purchase new machines or even repair some of the broken ones, is also a causal factor to the electricity load shedding.

From chapter four of this thesis, it was illustrated that in Ghana, electricity is produced by the VRA and the different IPPs through the various dams and power plants (indicated in table 3). After the generation, the power is transmitted by GRIDCO to ECG and NEDCo. These two entities sell the power to the various consumes in the country. Amongst the two sellers, ECG serves a higher number of customers and sadly, ECG finds it difficult to retrieve all the money from their customers after sales. The VRA informant lamented that:

> Our fiscal figures show that, ECG owes us so much. They are not able to pay for the power we supply them to distribute. So this has made our company "broke" - we don't have money oh. So even though we wish to recapitalize our operations, we can't. We want to build new plants and renew some of the parts of the dams, but where is the money? Even some times the money that we maintain what we have now, is difficult.

Responding to this allegation, the ECG informant claimed that their incapability paying back the power generators is mainly due to the institutions that owe them. Most of these institutions are government agencies and establishments like the Parliament, Ministries, Hospitals and the security agencies like the Police Service and the Military installations. Aside these, some of the major tertiary institutions also are alleged to be indebted to the ECG as claimed below in this statement from the informant:

> …it's the government's unwillingness to pay its debts, for its institutions and agencies alongside some of the tertiary schools also that is our biggest headache. Even what they genuinely owe they can pay, so how can the

> government give funds to support us in repairing our machines when they are spoilt? This is the situation we are in now… [ECG Informant]

5.4.2.4 Bad Electricity Consumption Habits

Beside the aforesaid challenges, there are some habits solely executed by the general electricity consumers in Ghana that frustrate the duty bearers in becoming effective at their responsibilities. The first is the act of connecting to the national grid illegally. Illegal connection commonly happens in two ways – maiden is the act by which someone or a group of people tap electricity power from the electrical mains: most of the times, from a colleague's house, without an authorised endorsement from the ECG. The other way is the unlawful re-connection to the national grid after the ECG has officially disconnected a property due to debt. Whenever there is an illegal connection, the tendency is that it overloads the neighbour transformer and power lines which serve the premises. This in turn, leads to inadequate supply of electricity to the vicinity. Below is a quotation from the informant at the ECG explaining the how damaging and disturbing illegal connections are to the society:

> When it comes to illegal connections, it is disheartening; we have always advertised in the media that people should stop it but they still do it, some even die by electrocution in the attempt of trying to do it. Let's not talk about that… let me tell you what happens when someone does an illegal connection. The impact is that, it leads to light-offs, that is, we can't promise a stable supply of power and also we spend so much money working on things that had already been done – like fixing the broken down transformers and so on, you see? So simply put, if you steal electricity, you inconvenient not only the ECG, but yourself also. [Informant at the ECG]

The second bad habit of electricity consumers in Ghana that in a way, contributes to the electricity load shedding is the lack of or low energy conservation attitudes. During the fieldwork, I heard on radio stations and watched on the television adverts purported to draw the awareness of the public to the habits of energy conservation. These adverts were sponsored by the Energy Commission in conjunction with the ECG and the government. Ghanaians were asked to develop the habit of saving energy. This is because; a lot of power is wasted in the system which could have been stored for future use. As minute as it may seem, it is also contributing to the electricity load shedding in the long run.

When interviewing the primary informants, most of them established to the fact that, they would not bargain their comfort gained from the supply of electricity for anything else. They would wish to have air conditioners (ACs) or fans in their homes, or would like to use any electrical gadgets – to enhance the quality of their lives. Conversely, the EC is of the view that, this desire on the part of the consumers is making some of them not to think about conserving energy and that is causing some troubles for the energy sector. He narrated that:

> …I remember during the world cup, our head of Public Relations came out to educate the consumers about putting on AC and how much it consumes and that we can use that power alone for about 20 homes to watch the football. Sadly, some of the government agencies and institutions don't put off their gadgets and light bulbs during the weekend. The only time their times are off, is when there is a general light-off. So, all these lead to the power shortage. [Informant at the ECG]

So Ghanaians must make a conscious effort to embrace the concept of energy conservation just like it is in some of the European countries (Directive, 2012) and some others like New Zealand, Japan and India. This would help in decreasing the incidence of electricity load shedding with time.

5.5 Chapter Summary

In simple terms, the system of distributing electricity whereby one area has lights on at a particular time while another area has its lights off at the same time known as electricity load shedding. However, the various duty bearers in the electricity sector have their diverse perceptions when it comes to the concept of electricity load shedding. These varying perceptions were mostly based on their respective roles within the sector and were well explored in this chapter of the thesis.

The chapter argued that the main cause for the electricity load shedding is the discrepancy between demanded electricity capacity and the available generated capacity. The chapter further explored the various challenges that led to the electricity load shedding in Ghana.

After identifying how the duty bearers perceive the electricity load shedding, the cause of it and the challenges (malfunctionings) by the duty bearers, the next chapter will delve into issues concerning the right holders (consumers) in the electricity sector. Their perceptions of

the ‘dumsor’ and lived experiences under the electricity load shedding will be presented in the next chapter - chapter six.

CHAPTER 6

Living under the Electricity Load Shedding: Businesses and Households

6.1 Introduction

The analytical focus of this chapter is to establish the association of the right holders (consumers) in the electricity sector to the load shedding policy. More so, the chapter applies the concepts of functionings, capabilities and wellbeing (all captured in the conceptual framework) to establish how the right holders perceive the load shedding and how they live under it.

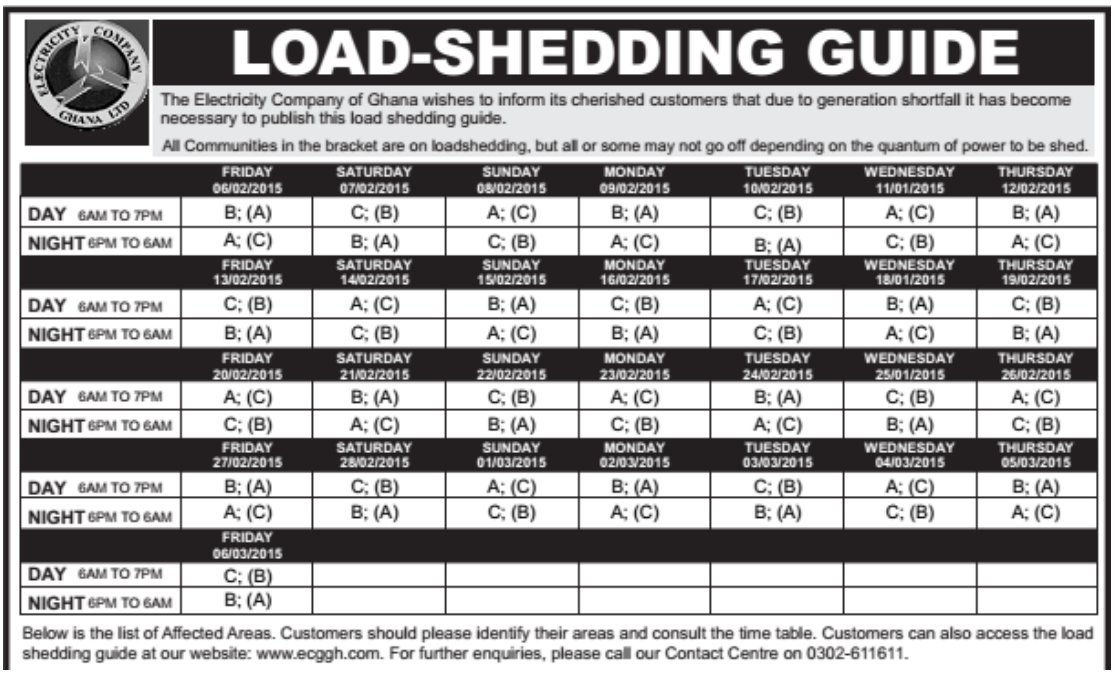
It is conceptualised under this research that, the duty bearers in the electricity sector of Ghana, are expected, in the full accomplishment of their respective roles, contribute to the quality of life of the right holders. This chapter is thus, devoted to exploring the wellbeing of the right holders in this research. It takes a look at the various ways by which daily lives are affected by the electricity load shedding. This will be done accomplished in the next three sections of this chapter; the first section will briefly give an insight into how the load shedding is conveyed to the right holders, the second section will look at how the businesses perceive and live under the load shedding and finally, the last section will be concentrating on households.

The last two sections will also explore the various capabilities and functionings that the right holders possess, even as their wellbeing under the electricity load shedding is being analysed. These sections would then be answering the next three research questions (question 3, 4 and 5) that intend to identify lived experiences and mitigating measures of the right holders under the electricity load shedding. The data for this chapter is mostly from the field; however, some secondary sources will be used to sustain the findings from the field.

6.2 Conveying the Electricity Load Shedding to the Right Holders

Ghana has been suffering from erratic electricity supply for some time now. Despite the assurances and promises from those in the affairs of electricity provisions and government that the crisis would be fixed sooner rather than later, the truth is that, the crisis still lingers on. This has made the ECG to always adjust the load shedding timetable, and these timetables have constantly been renewed by the ECG to correspond to the dynamics in the quantum of electricity they can distribute. The intention of the adjustment in the timetable is to keep the consumers abreast with the prevailing conditions of the available electricity in supply and also to help the consumers plan their activities according to the proposed times where electricity is expected to be available. Picture 3 on the next page is an illustration of the load shedding

timetable (see Appendix 3 for the full document). The Codes (alphabets – those in the brackets will not be having electricity – they will be experiencing 'dumsor') correspond to the various locations under the jurisdiction of ECG where it distributes electricity.



LOAD-SHEDDING GUIDE

The Electricity Company of Ghana wishes to inform its cherished customers that due to generation shortfall it has become necessary to publish this load shedding guide.

All Communities in the bracket are on loadshedding, but all or some may not go off depending on the quantum of power to be shed.

	FRIDAY 06/02/2015	SATURDAY 07/02/2015	SUNDAY 08/02/2015	MONDAY 09/02/2015	TUESDAY 10/02/2015	WEDNESDAY 11/01/2015	THURSDAY 12/02/2015
DAY 6AM TO 7PM	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)
NIGHT 6PM TO 6AM	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)
	FRIDAY 13/02/2015	SATURDAY 14/02/2015	SUNDAY 15/02/2015	MONDAY 16/02/2015	TUESDAY 17/02/2015	WEDNESDAY 18/01/2015	THURSDAY 19/02/2015
DAY 6AM TO 7PM	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)
NIGHT 6PM TO 6AM	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)
	FRIDAY 20/02/2015	SATURDAY 21/02/2015	SUNDAY 22/02/2015	MONDAY 23/02/2015	TUESDAY 24/02/2015	WEDNESDAY 25/01/2015	THURSDAY 26/02/2015
DAY 6AM TO 7PM	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)
NIGHT 6PM TO 6AM	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)
	FRIDAY 27/02/2015	SATURDAY 28/02/2015	SUNDAY 01/03/2015	MONDAY 02/03/2015	TUESDAY 03/03/2015	WEDNESDAY 04/03/2015	THURSDAY 05/03/2015
DAY 6AM TO 7PM	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)
NIGHT 6PM TO 6AM	A; (C)	B; (A)	C; (B)	A; (C)	B; (A)	C; (B)	A; (C)
	FRIDAY 06/03/2015						
DAY 6AM TO 7PM	C; (B)						
NIGHT 6PM TO 6AM	B; (A)						

Below is the list of Affected Areas. Customers should please identify their areas and consult the time table. Customers can also access the load shedding guide at our website: www.ecggh.com. For further enquiries, please call our Contact Centre on 0302-611611.

Picture 3: An illustration of the electricity load shedding guide (ECG, 2015)

According to ECG (2015), Ghana currently shed 650 megawatts during peak periods and 440 megawatts during off-peak hours in the months of February and March, 2015. By then, the lights were on from 6am to 7pm and off from 6pm to 6am as indicated in the figure above. Moreover, there were some of the days that people had their lights gone off for 24 hours while it stayed on for just 12 hours. These became unbearable; people were too much frustrated with the status quo and some of them showed their grievances outwardly through demonstrations (Ekpe, 2015). This assertion was confirmed in the field when most of the informants opined that, they could cope with the fact that they would not have light and it is well communicated through the timetable, but then, what they could not cope with is the fact that the timetable is not followed. If they are supposed to have electricity, that must be respected – they would rather not prefer the timetable mislead them. The following two quotations from a business and household informants respectfully buttress this argument.

> …you know what, that timetable or whatever they call it is not reliable. The timetable for ECG is just not working. You can't tell when it will be on or off. And that is very worrying and disturbing. [A Printing Press Owner]

> …it is very difficult to tell when the electricity is going off. Those times that it was very intense, it goes off every other day. So say we have light during the day today, our light will go off during the night the following day. And when will have light in the night, the following morning it goes off. It rotates in that manner. But now it is very irregular, it goes off and comes on just like that without any prior notice to us. [A Printing Press Owner]

6.3 Businesses under the Electricity Load Shedding

Electricity is very essential to the progress and maintenance of many businesses, if not all, in Ghana. So having the adversity of getting electricity for some limited periods – through a timetable, only indicates how unfortunate businesses have to cope in order to preserve productivity. It is believed that in the situations where this timetable from the ECG is strictly followed and electricity is given as and when it is supposed to, business life is a bit manageable. Business owners are aware of when they will have the lights on and then, they can plan for some mitigation measures for the periods that without light. However, the major problem arises when the electricity load shedding timetable becomes unreliable – as it has been observed in the field. During the data collection period, it was witnessed that, most of the time, the published electricity load shedding timetable was not followed. When the lights were supposed to be on, they were off and no one could tell when next they will be on. This was really making life agonizing for the businesses.

Consequently, it has compelled a lot of people to complain about the failure of the ECG to abide by their own timetable they published for the exercise. A national network of young entrepreneurs and business leaders in Ghana known as the Alliance for Young Entrepreneurs (AYE) became so frustrated by the unfortunate developments and threatened to take legal actions against the ECG (Acquah, 2015). As a result, to jump to the defence of their members, the Association of Ghana Industries (AGI) made a call for the ECG to strictly conform to its

electricity load shedding timetable as published, to alleviate the concomitant adverse impacts of the unreliability of the electricity load shedding's timetable (ibid.).

The above information gives the generality of what is happening to all businesses in Ghana. Nevertheless, this study focuses on a specific category of businesses and not the universal group of businesses. Therefore, the ensuing subsections will take a look at how commercial life of the printing presses in Accra Newtown suburb of Accra is faring under the electricity load shedding scheme. These impacts have been captured under four thematic areas and explained in a subcategory each respectfully. Moreover, to effectively convey that to the audience of this research it is apt to firstly present the local research context of Accra Newtown wherein these right holders (printing presses) were interviewed.

6.3.1 Research Context of Accra Newtown

Accra Newtown is a suburb of the Ayawaso East sub-metro of the Accra Metropolitan Area. It is classified as a Second Class Residential Area under the Metropolitan's classification of suburbs (AMA, 2014). This suburb encompasses the landmass around longitude 5°35'8"N and latitude -0°12'29"E. It shares boundaries with Kpehe and Kotobabi in the North, Kokomlemle in the South, Nima and Mamobi in the East, and South Tesano and North Industrial Area in the West.

Accra Newtown is made up of relatively old houses which are mostly compound houses. However, there are some identifiable few ones that are quite new. Mostly, these new ones are as a result of the reconstruction or renovation of the older ones by some of the banks and micro-finance companies in the area. Because it is an old suburb in Accra, it is not possible to get a completely new land to build on. Generally, the settlement is not well planned and it is densely populated. The majority of the inhabitants in this suburb of Accra are traders like market sellers and provision shop owners, printing press operators, drivers of commercial vehicles or office workers. These residents are predominantly Muslims even though there are some Christians. Ethically, the Hausa speaking people dominate the suburb even though there are some Ewe speaking people alongside some Akans and also some immigrants from Nigeria. Some of the basic services in this suburb include water, electricity, internet and telecommunication. Another notable feature of Accra Newtown is how its major streets are lined with all kinds of shops ranging from offset printing materials, bookstores, clothing stores, beauty salons, some general merchandise stores and offices like banks and micro-finance companies. It is also common to see a lot of cars parked at the shoulders of these

major roads making driving on them difficult especially as there is more often than not, a heavy traffic. The major market in Accra Newtown is the *Malamata* market. This is one of the largest and most mentioned markets in Accra. Accra Newtown is one of the busiest suburbs in Accra due to its commercial nature and has a bustling and noisy atmosphere.

The densely populated nature of this suburb, couple with the existing commercial activities indicates the importance the suburb gives to the availability of electricity. Yet, the electricity supply has not met been meeting the demand, and this was observed during the fieldwork period of this research work. Below is a map showing the Accra Newtown suburb with some its surrounding neighbourhoods in the Accra city.

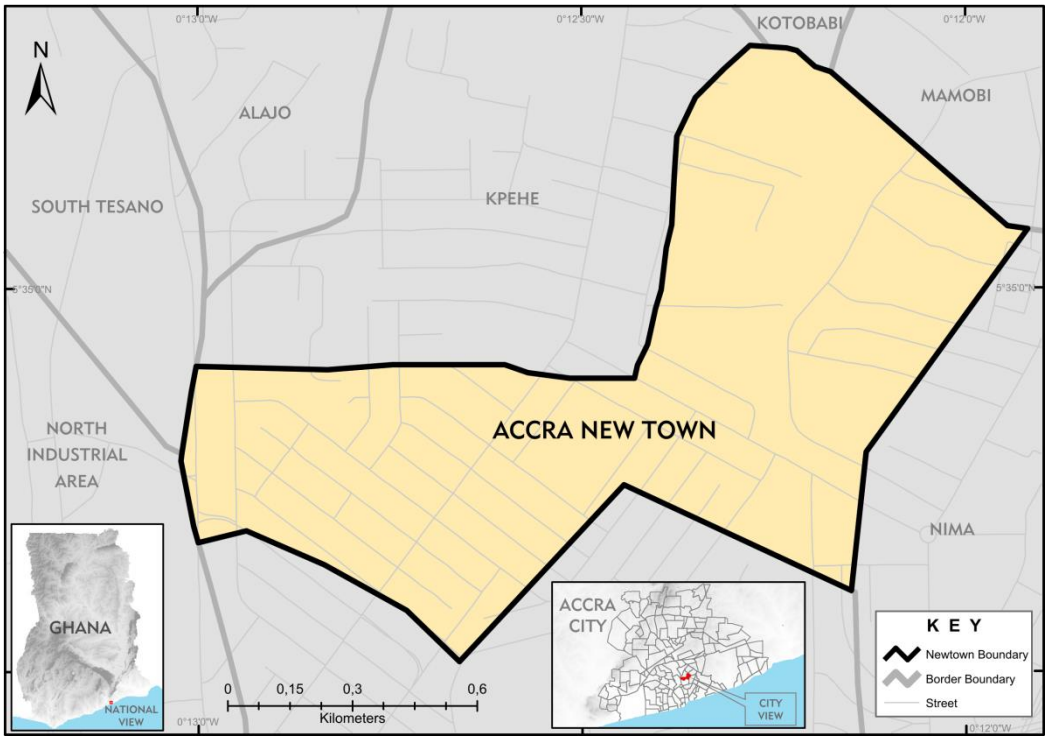


Figure 6: Map showing Accra Newtown and its border suburbs (Source: Author, 2015)

6.3.2 Impacts of the Load Shedding on the Printing Presses

After presenting the research context within which the printing presses were located in the field, the various ways by which the electricity load shedding is affecting them will be examined in the following subcategories.

6.3.2.1 Impacts on Production

In order to maintain production, keep business in progress and to meet the demands from customers, most of the printing presses that could afford, had been compelled to purchase standby generators (Picture 4 below). So anytime the lights are off by the ECG, they put on the generators to continue with business. This sounds so simple and cool; light goes off by ECG, you put on your generator and work continues. But the reality on the ground is that, the associated cost of buying and maintaining such generators is so costly. Even if one can afford to purchase a standby generator, the amount of money required to be buying diesel to power the generator anytime the light goes off, is also high.

Picture 4: A standby generator for a printing press in Accra Newtown

(Source: Author, fieldwork 2014)

The consequences of this electricity load shedding on production could be considered to be two: one, when a printing press cannot afford a generator, it means, whenever the light goes off, productivity has come to a halt leading to a fall in productivity; second, on the other hand, an operating standby generator brings an additional cost to the owner and this increases the cost of production in the long run. Normally, businesses aim at making profits, so the only way these printing presses with generators can make some profit is to add all the additional costs from the generator to their customers. One of the printing press owners who had a standby generator was elegiac that:

> …this dumsor is actually dealing with us paa oh, we are suffering. You see the generator over there, my brother, if I tell you how much I spend on diesel

> alone, anytime the light goes off, you will cry for me. As you can see, I have so many jobs to deliver, when the customers come, all they want is their jobs are delivered. Me too I want to maintain this business, I want the printing press to go on, not to collapse like some have collapsed now due to the dumsor. So I just have to keep on spending so much on diesel. But the truth is that, it is not easy, now the only thing we have to do is to increase our charges so that we can also remain in business because our cost of production has also increased.

6.3.2.2 Impacts on Machines

Nevertheless, some of the printing press owners explained that, sometimes the light goes off without any prior notification from the ECG. At other times, the light goes off and on repeatedly in one or two minutes, even occasionally, more than two minutes. One informant said it is akin to "a disco light". And when this happens, some of their machines get damaged.

> You know what, that timetable or whatever they call it is not reliable. The timetable for ECG is just not working. You can't tell when it will be on or off. And that is very worrying and disturbing. It damages our machines because sometimes even though the timetable says, you are supposed to have light, you will be working and suddenly the light is off. What even worries most is when it keeps on going on and off recurrently. [A printing press owner]

The quotation was from an informant who was worried about the nature of the lights going off and coming on. Some of the printing machines need to be shutdown systematic, so when they shutdown abruptly due to the light offs, they get damaged. The other machines that could also stand an abrupt shutdown also get their motors or such sensitive parts damaged due to the disco-like nature of the electricity. This is quite worrying because these machines are very expensive and replacing them is not easy.

6.3.2.3 Impacts on Jobs (Employment)

The impact of the electricity load shedding on employment could be captured in two forms. The first one is that with a continuous light offs; the smaller printing presses without the capability of affording generators stop working. Sadly, their customers would also want their products delivered to them, so with time, the customers take their jobs from them to the

bigger companies with the capabilities to continue production even without electricity from the ECG. With time therefore, these smaller companies loss their customers and have nothing to work on, so they fold up. The electricity load shedding had collapsed most of such vulnerable printing presses. This leaves the employees from such companies, unemployed.

> So now anytime it goes off, I tell my workers who only operate the other machines the generator can't power to go home. So it is mostly, the workers whose machines the generator can power and those for instance who are doing the manual collation and other stuffs that do not need electricity that stay. With time, if it continues like this, I have no option but to lay those who do not do anything off. Hmm, though it's disturbing and really disheartening for me to see them go, I have no option, because I can't be paying them whiles they are not working. Though it is not their fault anyway, me too it is not my fault oh, ECG must be blamed. [A printing press owner]

As read from the quotation above; on the other hand, even though some of the companies were capable of acquiring a generator to still be in production irrespective of the electricity load shedding, the impacts on their level of employment were felt. Not all the machines were powered by the generators, only the very crucial ones because the companies wanted to economise the use of the diesel. So with time, to avoid paying without getting their full time productivity, the employees whose machines are not powered by the generators mostly become redundant. This is very serious and emotional for both the employers and employees.

6.3.2.4 Impacts on Health and Wellbeing

The electricity load shedding aside all the already mentioned effects, is also affecting the health of those involved in the printing business. The generators used to provide alternative electricity, produce smoke and noise whenever they are working. This leaves the workers under the mercies of both noise and air pollution for so long as the generators work. These pollutions are very bad and harmful to the health of the workers. Henderson et al. (2006) argue that exposure to high levels of noise leads to hearing impairment while Ising et al. (1999) also opine that noise and air pollutions could equally lay a foundation to some cardiovascular health problems such as hypertension and lung cancer. Some of the workers alluded to the fact that, even though they are aware of the consequences of these pollutions, they have no other alternatives, they just have to cope with the situation or they would lose their jobs.

Notwithstanding the pollutions, it was also observed that some of the business owners go for loans from the various microfinance institutions and banks, in some cases, to buy some of the machines they use in printing. For instance, one of them that I interviewed went for a loan to buy a fairly (3 months) used 'Heidelberg Speedmaster' printing machine shown in the Picture 5 below. Although he would rather not disclose the exact amount the machine cost him, he said it was more than ten thousand US dollars ($10,000). He went for this machine in order to increase productivity because according to him, the Speedmaster has a printing capacity of about fifteen thousand (15,000) sheets per hour. The quality of the prints from this machine, together with its high efficiency, made him to deliver jobs to his customers promptly. This made his customers happy and also earned him more customers after he introduced the machine to his business.

Picture 5: Heidelberg Speedmaster' printing machine (Source: Author, fieldwork 2014)

It would have been imagined that this man would be all happy with this new machine. But on the contrary, he is not. The electricity load shedding has truncated the benefits he had been accruing from the machine barely two months after purchasing it. The machine was not used all the time because electricity was mostly off. And since he does not have a bigger standby generator that could power the Speedmaster, he only used it when the lights were on and stable. This made him indebted to the bank and due to his inability to meet his monthly obligations towards servicing the loan he took to buy the machine. At the time, the loan was just piling on with interest, and the bank was always calling him and pestering him to abide

by the terms and conditions of the loan. According to him, this had made him to always be thinking and it was affecting him psychologically:

> …as you can see, that Speedmaster over there is very new. I borrowed money from the bank to buy it, and now there's now electricity to power it and my generator too can't power it to work. Tell me my brother, how you think I will get the money to pay the bank? Hmm, the interest too is just piling on, you know these bank people. The last time I was just there and realised I was having some headache, I went to the hospital and the doctor was telling if I don't stop thinking, I will go mad. But hey, how can I stop thinking, if you were in my shoes, wouldn't you be worried?

It is quite pathetic that, instead of venturing into the printing business, and striving to expand the capacity in order to be efficient and earn a quality life, some people are in the business but, at the perils of their lives. And this is accredited to only one cause – electricity load shedding; in the Ghanaian parlance, 'dumsor'.

6.4 Households under the Electricity Load Shedding

The successful exploration of business lives under the electricity load shedding in the previous section paves way for the same observation to be carried out on the other right holders which are households. The importance of electricity in a Ghanaian house could not be overemphasised. The comfort of the rooms' temperature, the audio-visuals that are enjoyed, the foods that are preserved and cooked, the clothes that are ironed and worn, the batteries of the numerous mobile phones that are charged and even sometimes, the water that needs to be heated for bathing, all depend on electricity. The basic household life is thus, clearly well woven around electricity. One can only imagine the consequences of living without electricity in the house, because experiencing it is very spiteful.

The electricity load shedding is not just affecting businesses alone as indicated in the previous section of this chapter. Its impacts are also felt at the domestic corridors. Households are also fraught with the ill-fated drama of living without electricity for hours, if not days. This last section of the chapter explores the lives of households in North Legon under the electricity load shedding scheme. Just like the business section, the local research context of North Legon suburb of Accra will be presented first. Moreover, unlike the business section, the impacts on the households are subdivided under six main captions and explained respectfully.

6.4.1 Research Context of North Legon

North Legon is located within the La Nkwantanang-Madina municipality encompasses landmass around longitude 5°40'57"N and latitude -0°11'35"E. it has a total land area of about 21.53 $km^{2.}$ It shares boundaries with Old Ashongman in the North, Kwabenya and Legon in the South, Adenta, Redco and Madina in the East, and Atomic, Narhman and New Ashongman in the West.

Unlike Accra Newtown, North Legon is mainly a residential suburb of Accra with some isolated official offices and financial services. Compared to the former suburb, this place is a quiet area. It has some number of educational institutions right from basic to tertiary. A typical example is the Wisconsin International University College. The population here is quite diverse from almost all the ethnic groups in Ghana. Most of them are elites working in the educational institutions and corporate organizations in the suburb and beyond.

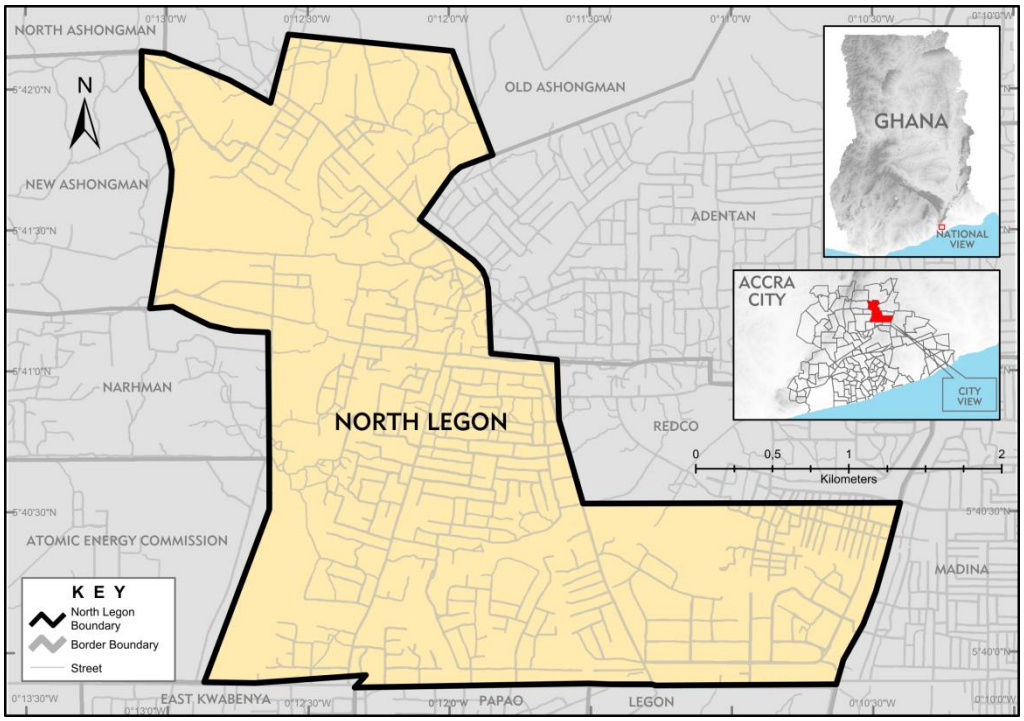


Figure 7: Map showing North Legon and its border suburbs (Source: Author, 2015)

6.4.2 Impacts of the Load Shedding on the Households

After presenting the research context within which the households were located in the field, the various ways by which the electricity load shedding is affecting them will be examined in the following subcategories.

6.4.2.1 Impacts on Food Preservation

It was really pathetic to see people throw away foodstuffs they had bought at expensive prices away because their refrigerators were not working due to lack of electricity. This phenomenon was personally observed when I was on the field on a number of occasions. It was not just mere foodstuffs that were been thrown away, but people's hard earned money that was been lost just because the lights were off. One woman I interviewed said in a very dejected tone *"all the chicken, fish and vegetables I have in the fridge are spoilt, they always get spoilt."*

Aside the spoilage of these perishable goods in their fridges, most of the informants were not able to prepare meals in larger quantities to be preserved for subsequent use like they had been doing. It was economical and time saving for them to have some vegetable stew for instance prepared and stored in the fridge or freezer and occasionally used with boiled rice or yam as and when the need arises. But with the onset of the electricity load shedding, it had become a thing of the past. Households always had to buy and cook only what they would eat for a meal. Despite the fact that some people might support the view that it is always good to eat freshly cooked food and not a stale one, the associated cost and time spent on buying the ingredients and cooking fresh meals, especially in Accra, is not cost-effective. It is even disheartening when people could not decide where or not, to choose between stale or fresh meals, but are bound to go for the later all because there is no electricity.

6.4.2.2 Impacts on Health and Wellbeing

When the lights are off, the standing and ceiling fans remain useful only as room decors. They cannot provide the breezy air that they are supposed to. In Accra, the average room temperature is around 27^{o}C (GMET, 2014), this is why in order to minimise the heat, most people use electric fans; others that can afford, go for the room air-conditioners ('AC' as it is well referred to in Ghana). But with the electricity load shedding, people are becoming very uncomfortable and even some depressed due to the heat they have to bare, especially, at nights when they some comfortable room temperatures to sleep. Some people also use these fans and ACs to prevent mosquitoes, because the breeze from them makes it difficult for mosquitoes to enter into the rooms. But at the time, they had to be at the mercies of the

mosquitoes as well. These mosquitoes are the anopheles types and their bites cause malaria. One informant said that, *"…we now sleep with mosquitoes, and what we get is malaria all because of dumsor…"*

Apart from the heat and the mosquitoes, some of the people were living with some very harmful health and disaster prone conditions due to the alternative light sources they have. The other means by which the people got light for viewing in the nights were through candles, torches and some forms of paraffin lanterns (see picture 2). The candles and the paraffin stoves are very dangerous; they can easily lead to dreadful household fires and even domestic burns. Nevertheless, the smoke emitted from these paraffin stoves is detrimental to the human body as well. One nursing mother said that:

> …with my young baby, I need light in the room always because the baby needs so much attention especially in the night, this girl doesn't sleep in the light, she's always awake, sometimes crying. Sometimes I need to get up and change her clothes or do something for her, but this is the case the light is off. So I used this candles, candles too are now expensive not to mention that it has burnt people too, sometimes I am afraid…

Another health related concern the informants had was to do with the fact that most of the health facilities like clinics and the North Legon hospital are also not exempted from the electricity load shedding. They wondered what would be their fate should any of them require some emergent medical attention whiles the lights are off. One of them asked rhetorically, *"if I fall sick and need urgent medical attention say operation, and the light is off at the hospital, what will happen?* They recounted that, until the electricity load shedding had become that serious, the hospitals were spared the electricity load shedding, but at time, it was only the very big ones like 37 Military Hospital or Korle Bu Teaching Hospital that normally do not suffer from the load leading.

6.4.2.3 Impacts on Education

> …when my kids return from school with home assignments, they cannot study at night and solve the questions because there's no light. And they don't close early from school too for you to say they should do it before the darkness sets in. So it is only in the light that they can do it. You see how it is affecting them too. Like last week just before you came, they had to go to the bank outside there which uses a power plant for their ATM machine in

> order to use the light for their work. My worry about that is safety. They are not safe if they are outside anybody can harm them.

The above quotation from a lamenting father indicates the toll the electricity load shedding is having on the education of the future leaders of Ghana. Students are finding it very difficult to do extra academic work in the house especially at nights when the lights are off. Some use the alternative light sources discussed earlier under the health impacts and the connected dangers with these sources are not lightly as they had been discussed already. It is argued therefore that, even though these students have the potentials of increasing their knowledge and are willing to go the extra mile by learning at nights, the electricity load shedding is impeding their capabilities. This is making them not to reach where they aspire to be in terms of knowledge acquisition; thus, their wellbeing is being prevented by the ECG through the electricity load shedding.

6.4.2.4 Impacts on Electrical Gadgets

The impacts of the electricity load shedding on domestic electrical properties could not be left unmentioned. Just as it was discussed under the impacts on properties under the business section, so it is with the households. The electricity fluctuations had caused some of the people to lose some of their electrical gadgets. Some people had their refrigerators, microwaves, air conditioners, home theatres and television sets either totally damaged or in some cases, malfunctioned. In the case of malfunctioning gadgets, they could not get them repaired or serviced because the repairers also do not have lights. So instead of them carrying their properties and going around through the pains of looking for a fixing place with electricity, they just left the gadgets remain in their malfunctioning mode. The question is, even if they manage to get them fixed, would the light be stable, would the light even be on for them to use them?

6.4.2.5 Impacts on Security

Some of the informants were quite worried that the electricity load shedding had adverse implications on their security. Whenever the lights go off at night, the entire neighbourhood became very dark (Picture 6 on the next page). They were of the view that the darkness brought about due to the electricity load shedding had given some criminals the advantage of breaking into people's houses and making away with valuables. Though none of the informants I interviewed had suffered from such an incident and did not know anyone either in the suburb who had suffered same, they were leaving with fear because they had been

hearing on radio that some communities had been attacked by armed robbers and thieves during the electricity load shedding times.

Picture 6: Darkness observed on one of the major streets of the suburb due to electricity load shedding

(Source: Author, fieldwork 2014)

They would have been comfortable having the outside and street lights on during the nights to prevent potential criminals away than they finding personal security measures in place during the electricity load shedding. Some of them who could afford hired night watch men, who kept watch of the houses whiles they were asleep. This, they argued could have been avoided if there was no electricity load shedding, because thieves typically like to operate under the cover of darkness, and getting personal securities weighs so much on their domestic budgets. For those who could not afford their own private security, they only hoped nothing untoward happened.

6.4.2.6 Impacts on Domestic Livelihoods

In North Legon, it is quite common to see most of the households engage in some form of domestic business. Some run small drinking spots, others have small grocery shops, some others manage hair salons and some also sell chilled sachet water popularly known in Ghana as 'pure water'. Mostly, these domestic businesses are managed by the women in as an alternative income for the household. With the electricity load shedding, these livelihoods are all collapsing, some had actually collapsed. One woman I interviewed who had a small drinking spot was of the view that, the electricity load shedding had dented her business as quoted below:

> …the drinks need to be chilled before customers take them. And can you imagine the effect it will have on us when the light goes off? All the drinks get hot and no one will drink hot beer for instance, they all prefer chilled ones.

6.5 Chapter Summary

This chapter has contributed immensely to the understanding of how businesses and households fare under the electricity in their respective research contexts. More especially, it explored the *right holders* and their *wellbeing* captured in conceptual framework of this research. It examined the several ways by which the daily lives of the right holders were affected by the electricity load shedding.

To sum up this chapter, the findings vastly portray a mismatch between the *expected* and *real* wellbeing desired of the right holders. The expected wellbeing is for them to be able to do all that they would aspire to do with electricity due to the availability of adequate and reliable electricity supply from the duty bearers. However, the reality is that the consumer items of the right holders seem to be too high for the 'non-existent' electricity to satisfy. That is to say, the consumers are not satisfied with the electricity provision in the country and this phenomenon gives less wellbeing to them (right holders) than they expect. Based on this disparity, the chapter will argue that, the electricity load shedding is preventing the right holders from attaining the quality of life that they desire: the electricity load shedding comes with so much negative impacts that it had made life under it very unbearable.

This chapter accordingly concludes the empirical data chapters based on the conceptual framework for this research. For a brief review of the other two empirical chapters, it is recounted that chapter four explored the *duty bearers* and gave an account of the totality of the *institutions* in the electricity load shedding *policy* in. It also provided an overview of how the duty bearers manage the policy and indicated their shared-responsibilities within the national research context. Chapter five mainly focused on the *functionings within the electricity sector* aspect of the conceptual framework. It examined the various perceptions of the duty bearers about the electricity load shedding policy and expounded the challenges leading to the cause of the electricity load shedding policy in Ghana.

This indicates that the research is gradually drawing down the curtains. The next chapter is the final chapter of this study; it presents a summary of the research findings, gives some recommendations and ends with a conclusion.

CHAPTER 7

Summary of Research Findings

Recommendations

Conclusion

7.1 Introduction

This qualitative study sought to explain the electricity load shedding policy in Ghana, identify the various duty bearers involved in the policy, assess the lives of right holders under the electricity load shedding, indicate the prevailing adaptive strategies to the policy and finally, provide practical and expedient recommendations to ebb the developmental canker. The intent of this ultimate chapter hence, is to show how the empirical data answered the research questions by summarizing the findings from this study. To end, concluding remarks, recommendations (answers to the last question – question six of the research) and propositions for future research into this scope of inquiry would be given.

7.2 Summary of Research Findings

The data for this research were collected in Ghana between June and August, 2014. The informants were categorised under three groups; institutions involved in the electricity load shedding, offset printing presses in Accra Newtown and households in North Legon suburbs of Accra. In all, four institutions (MoP, VRA, GRIDCo and ECG), ten business owners and ten households were interviewed with the help of semi-structured interview guides. All the interviews were conducted in both English and Twi language by the researcher except the one focus group discussion that was facilitated by a moderator. The interviews were recorded and transcribed into English and analysed thematically by the researcher.

Theoretically, I positioned myself within the Capability Approach by Sen (1993) which emphases an individual's actual ability to be or do something he or she has desire for - positive freedom. That is to say, the wellbeing of people is highly promoted or prevented by the interlinkages of the various capabilities and functionings they possess. The concepts of agents and structure by Giddens (1984) were also very useful in complementing the capability approach for the purposes of this research.

Based on the tenets of the capability approach coupled with Anthony Giddens' duality of structure, a framework was conceptualised encapsulating agents, structures and wellbeing to guide the data collection and analysis. Agents were conceived to be the right-holders of electricity in the study area and they included the commercial and residential consumers. On the other hand, the structures were considered as the duty-bearers of electricity which included the electricity load shedding policy as well as the associated institutions. Wellbeing

was thought out to be the availability of adequate and reliable electricity for consumer satisfaction and this is the ultimate goal of all of these two. However, unlike agents who need capabilities in order to achieve wellbeing, structures by virtue of their actions or inactions, can either promote or prevent wellbeing.

Based on the thematic analytical strategy adopted for this research, the data collected were evaluated under three main divisions. The first was to identify the duty bearers and their roles in the electricity load shedding under a national research context, the second was to further explore how the duty bearers perceive and also find out the challenges that has led to the causes of the electricity load shedding and last but not the least, to examine how the load shedding is impacting on the wellbeing of the right holders by focusing on business and household lives in local context of the research.

Through the lens of the duty bearers that hold the shots in the Ghanaian electricity sector, the electricity load shedding was defined as a system wherein electricity power is distributed proportionally to sections of a society in turns with a well-stipulated schedule due to a mismatch between supply and demand of electricity. The duty bearers were categorised as generators, transmitters and distributors. The generators include the Volta River Authority and some Independent Power Producers, the transmitter is the Ghana Grid Company whiles the distributors are the Electricity Company of Ghana and the Northern Electricity Distribution Company. The overall governmental ministry under which these institutions operate is the Ministry of Energy and Petroleum. The Energy Commission serves as the technical regulator of the energy sector whiles the Public Utilities Regulatory Commission is the economic regulator.

From the data, it was found out that, the electricity load shedding is as a result of two major challenges. The first major challenge boils down to the policies and decisions of the government. Insufficient investment in the electricity sector on the part of the government and the lack of more private firms coming on board the electricity sector of Ghana were issues discussed under this first major challenge. The other challenge had to do with the performance of responsibilities by the duty bearers. The issues discussed under this set of challenges include generation capacity challenges, mechanical challenges, financial difficulties and lastly bad electricity consumption habits.

Adequate, stable and reliable electricity supply is the basic source of a quality life that everyone aspires for in the study area. Almost all facilities of everyday life are directly connected to electricity. Therefore, the regretful state of the electricity provision in the study

area has led to ineffable miseries for both businesses and households. The electricity load shedding has far-reaching repercussions on both daily business and household lives in the study area. In terms of businesses (printing presses), it was found that the unreliability of electricity due to the electricity load shedding, leads to manifold difficulties. These difficulties include an increased cost of production, damage to the electrical printing machinery, loss of jobs in some cases and fear of job loss in most cases and deterioration of health of the printing press workers. On the other hand, households were suffering from food preservation worries, detrimental health issues, and educational obstacles, destruction of household electrical gadgets, security fears and finally, vulnerability of domestic livelihoods.

7.3 Conclusion

In conclusion, I would say, this qualitative study has contributed to the understanding of the electricity load shedding in Ghana. Nonetheless, the nexus between the electricity load shedding and business together with household lives had also been enlightened.

In connection with the objectives and research questions of this qualitative study, it is revealed that the intermittent flow of hydro and gas has culminated in the shortage of electricity supply in Ghana. Consequently, the transmission and distribution of electricity to all consumers have been unreliable. Accordingly, the electricity generation deficiency vis-à-vis the unreliability of electricity transmission cum distribution has led to the electricity load shedding in Ghana. Even though it is not the best for the nation, the duty bearers in the electricity sector see the ‘dumsor’ as the best way to give all consumers a ‘fair share’ of electricity. Based on the findings presented, this research argues that through the malfunctionings of duty bearers, the electricity load shedding (dumsor) in Ghana has led to an adverse impact on the wellbeing of the right holders (businesses and households) in the research area.

7.4 Recommendations

With regards to the findings of this research I make the following applicable recommendations:

One, the government of Ghana should continue to spread and expand its tentacles beyond the hydro-thermal electricity generation to other sources such as solar, wind and especially biogas

as Gold (1958) affirms that China, India, Nepal, Thailand, Germany, United State and Denmark are good examples with that experience. This would help augment the generation capacity of electricity in the country.

Second, all governmental ministries, agencies and related offices that are indebted to the Electricity Company of Ghana, should be made to redeem their financial obligations to the national distributor so that the associated challenges facing the electricity sector emanating from fiscal challenges could be solved.

Thirdly, the government and the general public should a positive attitudinal change to electricity consumption. People should adhere to energy conservation – electricity must be used wisely; where not needed, electrical appliances should be put off. In connection with that, all involved in illegal electricity connections should desist from it as a lot of revenue that could have accrued to the electricity sector is lost through such deleterious acts.

7.5 Propositions for Future Research

This research had tackled the electricity load shedding and its consequences on only the wellbeing of a selected business category and households in a suburb each of Accra, Ghana. But for future researches, the scope could be widened to capture other socio-economic perceptions. It would also be interesting to explore for instance how market sellers, farmers, artisans and financial institutions are coping under the electricity load shedding.

Besides, this research was conducted only in Accra – an urban setting, it would also be thought-provoking to do same at a rural setting to observe the emanating contrasting or complementing issues.

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Appendix 1: Introduction letter from the Department

NTNU
Norwegian University of Science and Technology

Faculty of Social Science and Technology Management
Department of Geography

To whom it may concern

Our consultant: Anette Knutsen
Telephone no.: + 47 7359 79 48
E-mail: anette.knutsen@svt.ntnu.no

Dated: 16th May 2014 Our ref.: Your letter dated: Your ref.:

Letter of introduction

We hereby confirm that Michael Ogbe is a student on the programme *Master of Philosophy in Development Studies, specialising in Geography* at the Department of Geography, Norwegian University of Science and Technology.

He will undertake his fieldwork and data collection during June to August of 2014 in Accra, Tema and Akosombo in Ghana, on the topic:

"Assessing the impacts of hydroelectricity load-shedding on business and residential livelihoods in Accra; a case study of Accra Newtown and North Legon."

We would be grateful for any assistance given to him during this process. This includes granting interviews, assisting him in making appointments, handing out materials and making information accessible to him.

Yours sincerely,

R. Lund

Ragnhild Lund
Academic leader/Professor

Anette Knutsen

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Appendix 2: GoldenTree Kingsbite Chocolate for Informants

Appendix 3: Dumsor Timetable from the ECG

LOAD-SHEDDING GUIDE

The Electricity Company of Ghana Limited wishes to inform its cherished customers that due to generation challenges it has become necessary to publish this load shedding guide. Customers may also access this load shedding guide on our website – www.ecggh.com

	TUESDAY 23rd Sept, 2014	WEDNESDAY 24th Sept, 2014	THURSDAY 25th Sept, 2014	FRIDAY 26th Sept, 2014	SATURDAY 27th Sept, 2014	SUNDAY 28th Sept, 2014	MONDAY 29th Sept, 2014
DAY 6AM TO 8PM	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6
NIGHT 6PM TO 6AM	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6
	TUESDAY 30th Sept, 2014	WEDNESDAY 01st Oct, 2014	THURSDAY 02nd Oct, 2014	FRIDAY 03rd Oct, 2014	SATURDAY 04th Oct,2014	SUNDAY 05th Oct, 2014	MONDAY 06th Oct, 2014
DAY 6AM TO 8PM	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3 C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6
NIGHT 6PM TO 6AM	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6
	TUESDAY 07th Oct, 2014	WEDNESDAY 08th Oct, 2014	THURSDAY 09th Oct, 2014	FRIDAY 10th Oct, 2014	SATURDAY 11th Oct, 2014	SUNDAY 12th Oct, 2014	MONDAY 13th Oct, 2014
DAY 6AM TO 8PM	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6
NIGHT 6PM TO 6AM	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6
	TUESDAY 14th Oct, 2014	WEDNESDAY 15th Oct, 2014	THURSDAY 16th Oct, 2014	FRIDAY 17th Oct, 2014	SATURDAY 18th Oct, 2014	SUNDAY 19th Oct, 2014	MONDAY 20th Oct, 2014
DAY 6AM TO 8PM	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6
NIGHT 6PM TO 6AM	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6
	TUESDAY 21st Oct, 2014	WEDNESDAY 22nd Oct, 2014	THURSDAY 23rd Oct, 2014	FRIDAY 24th Oct, 2014	SATURDAY 25th Oct, 2014	SUNDAY 26th Oct, 2014	MONDAY 27th Oct, 2014
DAY 6AM TO 8PM	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6
NIGHT 6PM TO 6AM	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6
	TUESDAY 28th Oct, 2014	WEDNESDAY 29th Oct, 2014	THURSDAY 30th Oct, 2014	FRIDAY 31st Oct, 2014			
DAY 6AM TO 8PM	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6			
NIGHT 6PM TO 6AM	B, B1, B2, B3, B4, B5, B6	C, C1, C2, C3, C4, C5, C6	A, A1, A2, A3, A4, A5, A6	B, B1, B2, B3, B4, B5, B6			

LEGEND: A, B, C - ACCRA | A1, B1, C1 - EASTERN | A2, B2, C2 - ASHANTI | A3, B3, C3 - CENTRAL | A4, B4, C4 - VOLTA | A5, B5, C5 - TEMA | A6, B6, C6 - WESTERN

Below is the Affected Areas. Please identify your Region and Group before consulting the time-table.

ACCRA REGION

GROUP A

Wise Way, Okponglo, Standard Board, Golf House, Parts of East legon, Frafraha, Amrahia, Amanfro, Parts of Adenta Barrier, Wireless Station, Taysec, Granite Court, Parts of Osu RE, Ako Adjei, Parts of Mallam, Lower McCarthy Hill, Weija Junction, MDPI, Afia Beach Hotel, Labour Dept, Kwame Nkrumah Musoluem, Zongo Junction, Abossey Okai, Mateheko T'adi Lorry station, Ga Mantse, Bubiashie EP Church and surrounding areas, Century, Parts of Asylum down, Niagara Hotel, Trust Towers, East Legon, Erata Hotel, Bawaleshie, Ashaley Botwe Newtown and Old Town, St Peters SHS, La Apapa, Tse Adoman, Kojo Sardine, De-gaulle Park, GIS, Du Bois Centre, NAM Village, Mallam, Gbawe and its surrounding areas, Part of Lartebiokoshie, Abossey Okai, Ghana Telecom University, Cape vars Guest House, Santana Market, Part of Osu, Papaye, Beijing Clinic and environs, Teshie Maami, Adjoman, North Ridge, BNI, WAEC, Swiss Embassy, VRA Flats, NAFTI, East Cantonments, Agbogbloshie and Surrounding areas, Auto Parts, Blowplast, Pharmacare, Pepsi, Abofu, Kisseman and part of West Legon, Akweteman, Abeka Pipe Down, Shaaba, TV Africa, SSNIT Archives, ACP, Taifa, Ofankor, Kata, Kwashiebu, Sowutuom, Ablekuman, Anyaa, Santa Maria, Nima, Paloma, Lufthanza, Makola Market, Aflao Station, Tudu, Parts of Kantamato, Liberty House, Opeibea, Airport residential, SDA Junction, Akatsi Abor, Atomic Energy, Haatso, University Hostel, Part of Legon University Campus, Food Research, Trinity House, Ghamot, Wire Weaving, Fattal Assembly, Hansonic, Kokompe, Ghana Hostel, Mamprobi, Korle Gonno, Omanjor, Parts of Sowutuom, Interplast, Printex, Adoagyiri Township, Coaltar, Adeiso, Kwashieman, Lapaz, Chantan, Comet Estates, Abom Junction, Brekusu, Ayim and surrounding towns and villages.

GROUP B

Madina, Rawlings Circle, Social Warefare, Pantang, Abokobi, Akpormam, Adjankote, Adjoa Wangara, Parts of East Cantonments, Parts of La, Morning Star School, St Thomas Aquinas, Police Hospital, Parts of Osu RE, Kukuhil and its surrounding areas, Sakama, Parts of Dansoman SSNIT flats, Zambrama line, Soko, Banana Inn, Alioma, Railways, Central Police, Police Depot, Parts of Tesano, Kwame Nkrumah Circle, Parts of Kokomlemle, Redco Flats, Zongo Junction, Reiss Junction, Dome Pillar 2, Adwoa Wangara, Labone, Coffee Shop Parts of La Apappa, Prefab, Pipes & Plastics, Melcom Plus, Ghana Carton, Bank of Ghana, TV House, TV3, Kanda Estates, Odorkor, Odorkor Official Town, Lartebiokorshie, Radio Gold and environs, Kaneshie Market, Awudome, TV Africa, Ashfoam, Joy Fm, Asante Bar, Parts of Kokomlemle, Kotobabi, Abavana Down, Agbaadzenaa, Nkansah Djan, Agblezaa, ECG District office, Teshie NDC, Teshie Demo and Surrounding areas, Ridge Church, Ringway Estates and Surrounding areas, Mataheko, Lawyer Akom,Wesley Grammar, New Times, Tractor and Equipments, SSNIT office, American Embassy, Dome, Part of Pillar 2, Achimota village, Tantra Hills, Fan Milk Factory, Ofankor Estates, Asofa, Amen Amen, Amamole, Pokuase ACP Estates, Part of Kwabenya Village, ACP Roofing Tiles Factory, Golden Tulip, Alliance Francaise, Pito House, Nsawam, Medie, Sarpeiman, Amasaman, Shikpontele, Nyamekye, Darkuman, South Odorkor, Tuba, Kokrobite, Parts of Bortianor, Animal Husbandry, Letap, Anord Quainoo, Upper McCarthy Hill, Oblogo, Adjaman, Gbawe Zero house, Agape Junction, Manet Gardens, Hydrofoam Estate, Frimpongmaa Estate, New town, Busy Internet, Kokomemle, Malam Atta Market, Airport City Enclave, Taifa Burkina, Accra Brewery Company, Akai Clinic, Parts of Medie, Kotoku, Abibiman, Obeyeyie, Amanfrom, Holiday Inn Hotel, Vodafone, Silver Star, Marina Mall.

LOAD-SHEDDING GUIDE

Continued

GROUP C

Polytex, Piccadilly, St Theresa Sch, Top Packaging, Parts of North Kaneshie, Okaishie, Rawlings Park, White Chapel, Children's Hospital, Accra Poly, Technical Unit, TUC, Geological , Cedi House, Ecobank, Ogbojo, Bawaleshie, Ashongman Estate, Parts of Atomic Energy and its surrounding areas, Ghana International School Annex, Nam Village and its surrounding areas, Awoshie, Odorgono, A-lang, Parts of Anyaa, Chorkor, Parts of Korle Gonno, Agege, State Insurance, ECG Project Office, Highways, Aviation Club House, Skanska, Perisheable Goods, Freight Entrance, Nayak, Glico, Adabraka Freetown, Odawna and its environs, Adenta, Adenta SSNIT Flats,Vineyard, Kwabenya, Comet Estates, Abom Junction, Brekusu, Ayim and surrounding areas, Switchback road, Cantonments, Parts of Odorkor Oficial town, Kwashieman, Parts of Awoshie, Mamprobi, Lartebiokorshie, Club 250, Sakaman, Zodiac,

GROUP D

Taysec, Ghana Coffee Farmers Assoc., Opeibea, Ghana Airways Head office, Ministry of Women and Children Affairs, Attorney General, Local Governments, Agbogba Township, Top Herbal, Suncity, Agbogba Cemetry, Johnson Wax Factory, Top King Estate, Kings Cottage, Salaga Market, Stanchart, Ghana House, Cadbury, St. Anthony, Parts of Sakaman, ATTC, Agoro TV, Asylum Down Roundabout, Sukura, Russia, Banana Inn, Osofo Dadzie, Dzorwulu, Sid Studio, Holiday Hotel, Parts of Airport West, Greda Estate, Ajorman, Composite, Dar El Salam, Pension House, Pegasus, School of Physicians and Surgeons, La Abormli and Surrounding areas, Dansoman Petroleum and Surrounding areas, Control market, Gbegbeyisee, Parts of Abelemkpe, New Achimota, Parts of Nii Boi Town, Pokuase, Amasaman, Parts of John Teye, Afiaman, Mayera, Islamic University, Adjiriganno, Fadama, Parts of Lapaz, Glefe, Dansoman Last stop, Osofo Dadzie, Kakari Brobbey, Parts of Agege, Osu Anglican, NDK, Safeway Press, Osu Photo Club, Ayigbe Town, Katamanso and Surrounding areas, Alhaji, Tabora, Chantan, Martey Tsuru, Regimauel Estate and Surrounding areas, Roman Ridge, Parts of Airport Residential areas, Accra Mall, Faith Action Chapel, Oyarifa, Ayi Mensah, Abokobi, Teiman, Parts of Ashaley Botwe Old Town, Movinpik, Novotel, Ministry of Information, Accra City Campus, Tigo, Bishop Girls, Supreme Court, High Street, PWD, Highways, National Theatre, Burma Camp, Adabraka Old Timers, Nigeria Airways and Surrounding areas, Spintex, Papaye, Robin Hood, Poly tank, Palays Biscuit, Devtraco, Bubiashie Taxi Rank, Bubiashie Cable & Wireless, Flair Catering, Togo Embassy, Mineral Commission, Parts of Osu and GUA, Paladium, James Town, Kotoku Academy, National Theatre, IRS, Ministry of Education, GCB High Street, Bank of Ghana, Accra Brewery Limited, Agbogbloshie, Timber Market, SSNIT Green Tower, Vector Morrisson, Taysec, NIB, Mosquito Coil Factory , Poly Group, Christ Embassy, Poly Craft, Parleys Shopping Mall, Globacom.

TEMA REGION

GROUP A5

Texpo Area, Spintex Road, Danpong Pharmacy, Baastonaa, Comm.8 (Maj. Nyantey's Area, Bea's Marternity Home Area), Comm.7 (Market Area, Amasco Area,Valco Park Area, Ashaiman Timber Market, Bethlehem, Home & Away, Comm. 5 (Railway Quarters, Dixieland Area, Aponkye Clinic Area, Miracle Life Church Area, Crismon Hotel Area), Dawhenya, Prampram, Old Ningo, Miotso, Adotey, Ghanaman Soccer Academy, Golf City, Sackey, Bediako, Hill View, ECG Afienya Office Area, Frempongman Estates, ADB, ECOBANK, GCB, K-Ofori's Area, Comm.11 (Prefab Area Bexhill School Area , Mac Baron, Women Hospital Area, Comm.22, Martin Luthur School, Lighthouse Tema Newtown, Awudum, Zigi Shore, Akrade, Atimpoku, Asikuma, Anum, Boso, Apeguso, Frankandua, Nkwakwabeo, Mpakadan, Comm.16 & 17, Texpo Market Area, Paraku Estates.

GROUP B5

Michel Camp, Afariwaa Estates, Parts of Comm.22, Ashaiman, Comm.6 (Valco Area, Marjorie 'Y' Hotel Area, Kpone Township, Kpone Kokompe, Vivian Farms Area, Regional Maritime University Area, Dutch Hotel Area, Nungua P&T Area, Katamanto, Christian Medical Centre, Comm.11, Parts of Comm.10 (Raphal Medical Centre, Mayflour, Col. Donkor's Area), Lebanon Area, Zenu, Kubekrom, Katamanso, Comm. 4 (Kaiser Flats, Vera Area, Sageco Flats, Ownership, Evergreen Shopping Centre, Narh-Bita Hospital, Chemu Sec.Sch. Area), Klagon, Comm.19 & 20, Abattoir, Bankoman, Mahean, Meridian FM, Naval Quarters, U- Compound, Somanya Township, Comm.12.

GROUP C5

Comm. 1 (Site 1, 2, 3, 4, 5, 11, 13, 14, 17 & 19), Ashaiman Official Town, Christian village, Tema Booster Station, Middle East, Shalom Spot Area, Comm.18, Devtraco Estates,Quah-Larbi, Afariwa Farms Area, Kakasunaka 1, Michel Camp Gate 1, Afienya, Mobole, Gbetsele, Mataheko, Odumsey, Sota, Abonya, Ashaiman (Jericho, Lebanon, Newtown, Monomanye), Appolonia, TOR Estates, Osubreku, Fiakonya, Chop Sticks Area, Comm. 6 (Pro-vital Hospital Area, SOS Village, M.D.C.C. Area), Nungua Buade, Addogono, Watch Tower Area, Comm.15 (Regimanuel Estates), Ravico Area, Comm. 2 (BBC), Italian Flat, Agbamame Area, PV Obeng's Area, Comm. 3 (SSNIT Flat Site A & B).

GROUP D5

Adjei Kojo, Kanewu, King Solomon, Santor, Sakumono Estates,Celebrity Golf, Buena Vista, Regimanuel Estates, NTHC Estates, Sakumono village, Comm. 1 (Site. 12, 15, 16, 21), TFS, Ecobank, Melcom, Town Centre, MPS, Nungua Channel 5, Leisure Hour Hotel, Coldstore Area, Coco Beach Area, Naomi, Nungua Township, Nungua Secondary School Area, Coastal Estates, Jehovah Witness Camp, Afrotropic Cocoa, Heathly Life, KICC, DBS, Akwaaba Estates, Manet Gardens, Comm. 22, Martin Luthur School, Dawhenya Township, Devtracco, PS Global, Magna Terris, New Dawhenya, Mlitsakpo Township, New Dawhenya, Marjorie 'Y' Hotel , Joecarl, Comm. 2 (A-Lang Area, CMB Area, Adom FM Area), Comm. 3 (VRA, ECG, GNPC, AFKO Areas), Comm. 5 (SSNIT Flat), Comm. 9, Seagull Area, Ashaiman (Tulaku, Middle East, Asensu, Homeku, Zongo Laka), Comm. 6 (Valco residence)

ASHANTI REGION

GROUP A2

Sepe Owsusansa, Buokrom Estate, Airport Roundabout, Adiebeba, Ahodwo, Melcom, Royal Park, Akorem, Adukrom, Dagomba line, Oforikrom, STC, Achiase, Nketia, Asuofua, Barekese, Quansah Stone Quarry, Mankranso, Obuasi Zongo, KTI, Basilica, Town Hall, SIC, Zongo Police Station, Suntereso, Bantama, Cambridge, Agogo Town, Kyekyewere Town, Buabenso, Buaben, Kuwait, Naachia, Sawua, Aprabon, LLL Company, Obuasi Stadium, Kentinkrono, KNUST Police Station, Afanko, Atonsu Bokuro, Monaco, Odeneho Kwadaso, Christian Village, Rexmar, Santasi, Anyinam, Asafo, Baso Club, Alhamadiya, Home Tourch, Mamponteng, Agona, Kumawu, Mampong, Effiduase, Ejisu, Edwinase, Asare Farms, Nimo, Kwadaso Estate, Patase, Cambridge.

GROUP B2

Bremang, Kronum, Afrancho, Formena Town, Yabi, Merewadwa, Nkwantwima I & II, IRS, Magazine, New Road, Tafo Nhyiaeso, Tafo, Daimond Hotel, Yenyawoso, Dichemso Plaza, Dichemso, Brigade, Adoato, Akropong, Nyankerenease, Daaba, Edubiase Town, 19 Steps, Asawase Market, Mrom, Zaabo Zongo, Roman Girls, Konongo Town, Justic Hotel, Amakom, Afari, Toasi, Nerebehi, Nkakom, Hiawu-Besease, Anwomaso Township, Adoato, Kropo, Ampabame, Bohyen, Abrepokese, Asubonteng, Adukrom, Dagomba line, Oforikrom, STC, Maxima, Maase, Ahwiaa, Abas, Meduma, UGC, Atimatim, Asafo, Baso Club, Alhamadiya, Home Touch, Asafo Cold Stores, MOW, A-G Timbers, Kumi Timbers, Fumesua, Kwamo Highways, Parts of Ejisu, Atwedie, Trabuom, Bonte, Manso-Nkwanta, Antoa, Abirem Doti, Duase, Kenyasi, Adwumam, Atonsu S-line, Gyinyase, Kotei.

GROUP C2

Takyeman, Abuakwa, Denkyembouso, Ohumasi, KMA Residency, Tigo Main office, Yegola Hotel, Fankyenebra, Tutuka Town, Fares Timbers, Habitat, STP, Bost Company, Sokoba, Ampeyo, St Lious, Kwamo, Fumasua, Baworo, Tikrom, Adagya, Esereso, Jachie, Kuntenase, Bekwai , Anwiankwanta, Sewaba, Asabi, Asokore Mampong, Ayanfuri Town, Dominase, Nkotumso, Konongo Odumasi Town, West Africa Hardwoods, Asokwa Pentecost, Asafo, Baso Club, Cocoa Clinic, A-life, Apire, Bebu, Dako, Trede, Lasab, Moshie Zongo, Airport, Pankrono, Ahwia, Meduma, GWCL Suame, A-Lang, ITTU, Parts

LOAD-SHEDDING GUIDE

Continued

of Suame Magazine, Bantama Cash office, Race Course, Asikuma Town, Mfuom, Babianiha, Dichemso, Parts of Krofrom, Domeabra Township and surrounding areas, Anwomaso New Site, Abuakaw-Makro Anwomaso, Atiwma-Koforidua, Aboabo, Asawasi, Akawatia-Line, Akrowa, Kronom, Breman West.

CENTRAL REGION

GROUP A3

Abura Dunkwa, Fante nyankumasi' Fosu township, Assin North and South, Bedukrom, Awutu-Breku, Gomoa Fete Obrakyere, Opeikuma, Kasoa-CP.

GROUP B3

Kotokuraba Market, Jubilee School, Acquarium, Bakaano, St. Augustines, Iture, Elmina Town, Ataabadze, Bronyibima, Akwanda, Bawjiase, Ofanko, Akwele, Mankrow, Akokwa, Amamfrom, Galelia, Ashalaja.

GROUP C3

Biriwa, Anomabo, Agyaa No.1 and 2, Abandzi, Saltpond Township, Mankessim, Ajumako, Breman-Esikuma and its environs, CP, Walantu, Kakraba, Lawer, Nyanyano and its environs.

GROUP D3

West End, Mfanstipim Flat, 4th Ridge, Pedu-Junction, Pedu Town, Kakumdu, Esuakyir, Ramblers, Akanful Town, Amonda, Elmina Zongo, Tokuse Township and its environs

GROUP E3

Radio Central, Sikafoambantem, Siwdu Compound, Adisadel Estate, UCC, CNC, Ameen, Industrial area, Kasoa Zongo, Auntie Mercy, Iron City, Brigade, Evalip, Apam Township and environs, Parts of Swedru, Agona, Asafo, Natifa, Kwanyanko, Nsabaa, Duakwa, Ankaase, Komenda, Kissi, Sekyere-Hemang, Praso Township, Jukwa, Efutu, Entire Winneba Township, Akosua village, Esuakyir, Ghaadze, Okyereko.

VOLTA REGION

GROUP A4

Hohoe, Tsito, Anvirawase, Peki Areas, Sokode Ando, Kpeve Township, Dzemeni, Kpalime Duga, Toh Kplime, Adidome, Ada District And Its Environs

GROUP B4

Kpando Town, Amedzofe, Tanyigbe, Nurses Training, Barracks, Police Depot, Akpenamawu, Deme, Tokokoe, Tsikpota, Kpenoe, Takla, Sogakofe, Keta, Parts of Akatsi Districts, and its Environs.

GROUP C4

Sovie, Aflao, Golokwati, Ho Central, Ola, Big Market, Mawuli Estate, Dzodze - Panyin, Agbozome, Parts of Akatsi, Ave, Cross Border Towns and its Environs

GROUP D4

Have, Mafi Kumasi, Torkor Township, Kpando, Aziavi, Kpetoe, Denu, Sokode Towns, Poly, Ssnit Flat, Abutia, Akrofu, Klefe, Sky Plus, Chances, Stevens Hotel, Matse, Adaklu Towns, Nkonya, Jasikan, Nkwanta, Dambai Districts and its Environs

EASTERN REGION

GROUP A1

Achiase, Swedru & Others, Adweso, Korley, Two Streams, Subi, Asuom, Abomosu, Abodom, Kukurantumi & Others, Afraim Plains, St. Joseph Hospital, Oyoko, Asokore, Nankese, Akwadum & Parts of Suhum, Novotex, Kwasihu, Alright Hotel, Market & Joeduro, Akwatia, Kade, Kusi

GROUP B1

Osino, Anyinam, Kwabeng & Others, Effiduase, Parts of Asokore, Zongo & Others, Asesewa District, Asikuma & Others, Parts of Okorase, Adawso, Mangoase & Others, Nkawkaw Township.

GROUP C1

Kibi and Parts of Suhum District, Old Estate Area, Kwahu Mountains, Akroso & Others, Oda Township, K'dua Central Hospital, Srodae, VHF, New Tafo, Old Tafo, Osiem, Bonsu, Begoro

GROUP D1

Asamankese Township, Odumase, Asikesu, Kwapong & Others, New Abirem Township, Afosu, Pankese & Others, Mile 50, Poly, Capital View Hotel, Osabene, New Market & Others, Ogua, Betom, Srodae, Parts of Korley, Vodafone, Okorase & Parts of Mile 50, Ofoase, Ayirebi & Others.

WESTERN REGION

GROUP A6

Agona, Airforce, Chapel Hill, Kokompe, Shippers Council, Collins Avenue, Esikafoambentem 1 & 2, Railway Training School, Sekondi Ridge, JCM, New Takoradi, New Site, T-Poly Wamco 1 &2, Windy Ridge Extension, Monkey Hill, Takoradi Gas, Lagostown, Kwesiminstim, Adiembra, Ekuasi, Nkontompo, Beahu, Bokoro, Busua, Dixcove, Nsuaem, New Obuase, Jejetraso, Asankragwa, Enchi, Half Assini, Tarkwa (Town 1 & 2), Town 2 – Tarkwa.

GROUP B6

Kojokrom, Essipong, Aboadzie, Inchaban, Shama, High Street, Esikado, Naval Base, Sekondi, Ketan Estates Rd, Maxwell Rd, East Tanokrom, Cirrus Oil, Windyridge, Takoradi Post Office, Norpalm, Kejebir, Ayiem, BOPP, Mpohor, Adum Banso, DUPAUL, Assakae, Mpatado, East Tanokrom, Tti, Effiakuma, Skyy FM, Ghacem (Mill 4), Bonsa, Aboso Township, Wassaw Nkran, Axim, Bogoso, Dwenase

GROUP C6

Anaji Estate, Snnaps, Ntankoful, West Tanokrom, Bankyase, Tadisco, Top Ridge, St Francis, Apowa, GDC, New Amanful, Beachroad, Atlantic Hotel, Harbour, Dixcove Hill, Star Hotel, SIC, Liberation Road, Chapel Hill N.I.B, Ghacem (Small Mills), Nkroful Junction, Fijai, T-Poly (BU Campus), Ketan, Power House, Mondial, Metrostar, Wassa, Akropong, Eikwe, Awaso, Manganese

Appendix 4: Interview Guide for Institutions

Norwegian University of Science and Technology (NTNU), Trondheim, Norway
Fieldwork Interview Guide

EXPERT INTERVIEW QUESTIONS FOR INSTITUTIONS

1. What is this load shedding concept all about?
   - How does your organization define it?
   - What infrastructures are involved in it?
   - What is the efficiency of the strategy (to share the electricity)?
   - Who are involved or left out from load shedding (do you have a map)?
2. What is your organization's designated role in the electricity sector in the country?
3. How effectivelyis the organization meeting this role?
   - Personnel – are they experts enough, and/or adequate?
   - Facilities– are they well -functioning and the required ones
   - Whatchallenges does the organization face in this role of yours?
4. What measures need to be taken, in your opinion, to solve this load shedding issue?
   - Policies:
   - Changed mechanisms:
   - People's attitudes:
   - Other:
5. What other comments/issues could be said about this load shedding?
6. How do I contact the organization should there be a need for further and relevant information afterwards?

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Appendix 5: Interview Guide for Businesses

Norwegian University of Science and Technology (NTNU), Trondheim Norway
Fieldwork Interview Guide

QUESTIONS FOR BUSINESSES (PRINTING PRESS)

1. How old is your business?
2. Aside the electricity from the ECG,do you use any alternative energy?

2.1. Could you please elaborate on the alternative energy source(s) and why you choose it (them)?

3. How much does it cost you per month (monthly)?
4. How many employees do you have?

4.1. How does the electricity issue affect how you hire workers

- Temporary:
- Day workers:
- Compensation issues:

5. How is the load shedding affecting your business?

- Productivity
- Employment
- Other factors

6. How often does you electricity go off? (Do you know the schedule?)
7. What other comments/issues could be said about this load shedding

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Appendix 6: Interview Guide for Households

NorwegianUniversity of Science and Technology (NTNU),Trondheim – Norway
Fieldwork Interview Guide

QUESTIONS FOR RESIDENCES (HOUSEHOLDS)

1. How big is your household?

- Numberof members:

Spouse	Children	Dependents

- Economic situation:

Main sourceof Livelihood	Othersources of Livelihood	Main expenditure Items

2. Which household activities of yours dependon electricity?
3. Which problems do you have with the irregular electricity supply?

3.1. How is the load shedding affecting your household?

- In terms of Employment:
- In terms of Health:
- In terms of Security
- Others:

4. Aside the electricity from the ECG, do you use any alternative energy?
5. How much does it cost you per month (monthly)?
6. How often does you electricity go off? (Do you know the schedule?)

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