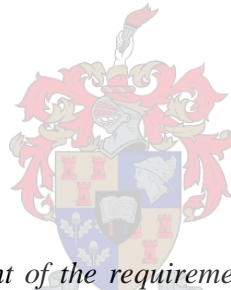


**AN EXPLORATION OF THE CONTENTS OF AN
INTEGRATED HOUSEHOLD ENERGY SAFETY
POLICY FOR SOUTH AFRICA'S INFORMAL
SETTLEMENTS**

By

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Thesis presented in partial fulfilment of the requirements for the degree Masters in Public Administration in the Faculty of Economic and Management Science at Stellenbosch University

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March 2016

DECLARATION

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ABSTRACT

Energy is the lifeblood of our national and household economy. Every day millions of people use energy to cook light and heat their homes and to conduct a variety of other household chores. In the process of fulfilling these functions, many people are injured, maimed or even killed whilst using household energy sources and appliances. These household energy-related accidents occur frequently in South Africa's vast informal settlements, with devastating and far-reaching consequences. They exert exorbitant costs on the economy, the fiscus, the public health system, communities, households and individuals in the country. They now constitute a grave public policy problem that necessitates a public policy response. However, this issue has been completely ignored and excluded from the South African policy landscape, even though evidence-based research and calls by various stakeholders highlight the need for such policy intervention. The premise of this research thesis is that South Africa needs a household energy safety policy, specifically engineered and designed for informal settlements, and that is developed with the active participation of the people who live in these communities.

OPSOMMING

Energie is die lewensbloed van ons nasionale en huishoudelike ekonomie. Miljoene mense gebruik elke dag energie om mee te kook, hulle huise te verlig en te verwarm en om 'n verskeidenheid van ander huishoudelike take uit te voer. In die proses om hierdie take te verrig, word baie mense beseer, vermink of sterf selfs terwyl hulle besig is om huishoudelike energie en toestelle te gebruik. Hierdie huishoudelike energie-verwante ongelukke gebeur dikwels in Suid-Afrika se uitgebreide informele nedersettings met vernietigende en vêreikende gevolge. Dit oefen buitensporige koste op die ekonomie, die fiskus, die publieke gesondheidstelsel, gemeenskappe, huishoudings en individue in die land, uit. Dit is nou 'n ernstige openbare beleidsprobleem wat 'n openbare beleidsrespons vereis. Hierdie kwessie word egter volledig ge-ignoreer en van die Suid-Afrikaanse beleidslandskap uitgesluit, selfs te midde van getuienis-gebaseerde navorsing en oproepe deur verskillende rolspelers wat die noodsaaklikheid vir so 'n beleidsintervensie beklemtoon. Die premis van hierdie navorsingstesis is dat Suid-Afrika 'n huishoudelike energieveiligheidsbeleid benodig wat spesiaal ontwikkel en ontwerp is vir informele nedersettings met die aktiewe deelname van die mense wat in hierdie gemeenskappe lewe.

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Finally, I would like to dedicate this thesis to Likhwezi, Lelihle, Afikile, Gcobisa and Yonela. With God everything is possible, however difficult it may be.

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LIST OF ACRONYMS

ACRONYM	FULL NAME
AGECC	Advisory Group on Energy and Climate Change
AIDS	Acquired Immune Deficiency Syndrome
ALRI	Acute lower respiratory infections
CEF	Central Energy Fund
COPD	Chronic Obstructive Pulmonary Diseases
CRCs	Child Resistant Closures
DFID	Department for International Development
DOE	Department of Energy
EDC	Energy Development Corporation
EIA	Energy Information Administration
ERC	Energy Research Centre
FBAE	Free Basic Alternative Energy
FBE	Free Basic Electricity
GDP	Gross Domestic Product
GNESD	Global Network on Energy for Sustainable Development
HES	Household Energy Safety
HESASA	Household Energy Safety Association of Southern Africa
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis
IPCC	Intergovernmental Panel on Climate Change
IPPs	Independent Power Producers
LPG	Liquefied Petroleum Gas
LPGASA	Liquefied Petroleum Gas Safety Association

ACRONYM	FULL NAME
MRC	Medical Research Council
MDG	Millennium Development Goals
NDP	National Development Plan
NEEA	National Energy Efficiency Agency
NGO	Non-Governmental Organisations
NEPAD	New Partnership for Africa's Development
NPC	National Planning Commission
NRCS	National Regulator for Compulsory Specifications
OECD	Organisation for Economic Cooperation and Development
PASASA	Paraffin Safety Association of South Africa
PDC	Palmer Development Cooperation
SABC	South African Broadcasting Corporation
SABS	South African Bureau of Standards
SACN	South African Cities Network
SALGA	South African Local Government Association
SANEDI	South African National Energy Development Institute
SAPIA	South African Petroleum Industry Association
SETAR	Sustainable Energy Technology and Research
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Economic and Social Council
UNHP	United Nations Habitat Programme
WEC	World Energy Council
WHO	World Health Organization

ACRONYM	FULL NAME
OFID	OPEC Fund for International Development
UNDP	United Nations Development Programme

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CHAPTER 1: AN INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Energy is the lifeblood of our national and household economy. Every day millions of people use energy to cook, light and heat their homes and to conduct a variety of other household chores. In the process of fulfilling these functions, many people are injured, maimed or even killed whilst using household energy sources and appliances. These household energy-related accidents occur frequently in South Africa's vast informal settlements, with devastating and far-reaching consequences. They exert exorbitant costs on the economy, the fiscus, the public health system, communities, households and individuals in the country. They now constitute a grave public policy problem that necessitates a public policy response. However, this issue has been completely ignored and excluded from the South African policy landscape, even though evidence-based research and calls by various stakeholders highlight the need for such policy intervention.

The premise of this research thesis is that South Africa needs a Household Energy Safety Policy, specifically engineered and designed for informal settlements, and that is developed with the active participation of the people who live in these communities. But, before delving deeper into the subject, the factors that occasioned the need for this research need to be examined. This introductory section provides a background to the study in that it traces the history of attempts by various players to draw the South African government's attention to harmful energy-related problems. It discusses the factors that motivated the study, outlines the research approach by looking at the research problem, and identifies research questions. After outlining the hypothesis and objectives of the study, it explains the research methodology and design as well as the techniques to be followed in the study. It concludes by stating the significance of the study.

1.2 BACKGROUND TO THE STUDY

The background to this study can be traced back to 2004 when the Paraffin Safety Association of Southern Africa (PASASA) – a public benefit organisation that focused on the prevention of harmful paraffin-related incidents – convened an Experts Forum in both Cape Town and Pretoria. Its aim was to deliberate and “promote further understanding of the causality and scope of harmful [household] energy-related incidents and seek ways to determine both realistic surveillance records and preventative mechanisms for harmful ... incidents” (PASASA, 2004:4). This evolved into a process of consciously linking energy poverty and household energy safety issues, particularly in informal settlements, to the public policy discourse.

Between May and June 2007, PASASA held a further series of three inter-provincial summits in Cape Town, Durban and Port Elizabeth that were attended by ordinary citizens, including those from informal settlements. This process culminated in a National Summit which was held in Johannesburg and attended by more than 240 ordinary household energy users from all nine provinces (mostly from low-income communities) as well as other key stakeholders, such as doctors, nurses, fire prevention officials, energy practitioners, oil company representatives, energy researchers, municipalities and community-based organisations. The aim was to engage directly with, and consolidate, the views of low-income household energy users on energy poverty, household energy-related problems and possible solutions.

The delegates agreed on a declaration (see Appendix A) that was signed by all community representatives and called for the government to implement a comprehensive and integrated household energy policy premised on safety and alleviation of energy poverty to realise constitutional imperatives (PASASA, 2007:1). It stated that the Department of Energy (DoE) should “take leadership and accelerate interdepartmental, intersectoral and stakeholder collaboration to address household energy safety problems. It must also accelerate the establishment of paraffin policy within the broader context of other energy options for low-income households” (PASASA, 2007:1). It emphasised the need for government-wide involvement and an institutionalised approach to dealing with

household energy safety from a policy perspective. At the end of the summit, the declaration was handed over to a DoE official, who promised to present it to the higher echelons of the department (see Appendix 1 at the end of report).

On 31 August 2008, PASASA held a seminar attended by over 100 practitioners involved in household energy safety and injury prevention. They included hospital burn unit specialist physicians, surgeons, nurses, firefighters, paediatricians, energy policymakers and energy researchers. The seminar reemphasised that “government needs to be convinced of the seriousness of household energy safety so that legislation can be put in place...” (PASASA, 2008:17).

In February 2010, a multi-stakeholder workshop was convened by PASASA and was attended by over 150 experts involved in areas such as energy research, policy analysis, public management, medicine, and civic activism. The session concluded with another resounding call for government to implement an integrated household energy policy for the poor. At this workshop, the seed was also planted for the establishment of the Household Energy Safety Association of South Africa (HESASA), which replaced PASASA in 2013 (Kulati & Mushauri, 2010:5).

In May 2012, PASASA, in partnership with the South African National Energy Development Institute (SANEDI) of the Central Energy Fund (CEF), convened another high-level expert panel in Johannesburg. The session had three overarching goals, namely “to bring household energy use into the forefront of the policy agenda; to identify the gaps in current policy and the challenges regarding the impact of development and urbanization, energy access for rural and/or informal communities, energy supply, efficiency and safety; and to suggest best practices and recommendations for a national household energy strategy and policy” (PASASA, 2012:4).

The outcome of the meeting was a joint submission to the National Planning Commission (NPC), a government agency that developed a National Development Plan (NDP) for South Africa. In essence, the submission highlighted that the lack of any integrated household energy policy “has meant a singular focus on electrification, and only ad-hoc

and poorly implemented programmes to deal with any other household energy carriers. The lack of a comprehensive, integrated household energy policy prevents true development and perpetuates poverty” (PASASA, 2012:4). As such they concluded “that establishing a household energy policy should be a key activity outlined in the NDP in order to facilitate South Africa reaching its vision for 2030. This policy would serve to provide an integrated and overarching framework to direct programmes related to household energy and tackle energy poverty” (PASASA, 2012:4).

In June 2012, PASASA made a presentation to the Parliamentary Portfolio Committee on Energy. The purpose was to share research results on the problem of household energy-related incidents in South Africa and to expose the underlying causes and their impacts. It was also to lobby and advocate for a Household Energy Policy targeting informal settlements.

The discussion above highlights the importance of household energy safety policy issue and shows strong stakeholder voices consistently calling on “government to adopt a more integrated approach to household energy ... policy which recognises the safety and multiplicity of energy sources used in poor households...” (PASASA, 2007:5). Unfortunately, the government has not responded in any meaningful manner to these developments. Is it possible that this lack of response by government is due to an absence of comprehensive proposals that clearly set out the content of such a household energy policy? Is it possible that there has not been any articulation of institutional arrangements for the implementation of such a policy? This research addresses these crucial gaps by objectively exploring and postulating on the practical contents on which the policy can be crafted and implemented.

1.3 MOTIVATION FOR THE STUDY

First and foremost, this study has been conducted to achieve a Master’s degree in Public Administration. It will therefore contribute scholarly information about household energy safety policy content for informal settlements. This is because there is insufficient

research on household energy safety, particularly from a policy angle. Hamidi and Ewing state that “despite its large share of energy use, little attention has been focused on residential energy ... Residential energy use ... remains less studied than energy use in the industrial and transportation sectors...” (2012:3). The significant amount of energy used by the residential sector warrants “a comprehensive analysis of patterns of energy use in this sector in an effort to promote conservation, efficiency, technology implementation and energy source switching” (Swan & Ugursal, 2009). What makes this study even more relevant is that whilst, conceptually, energy poverty has been the closest to the issue of household energy safety, research data on energy poverty glaringly omits the issue of energy safety. This research will contribute to the building of an information base on household energy safety from a public policy perspective.

Poor informal settlement households in developing economies, including South Africa, expend a large part of their financial resources, “often as much as 15 to 22% on energy” (Global Network on Energy for Sustainable Development, 2014:12). Although the South African government provides energy subsidies designed for the poor, such as the Free Basic Electricity (FBE) and Free Basic Alternative Energy (FBAE), the costs of energy for the poor exceed their capacity to pay. The DoE describes FBE as the amount of electricity that is deemed sufficient to provide elementary electricity services to poor households. This amount of energy is adequate for basic items such as water heating in a kettle, lighting a room and similarly basic activities. In terms of this policy, 50 kWh of electricity is granted per household per month for those qualifying to be connected to the grid and “50 Wp per non-grid connected supply system for all households connected to the official non-grid systems” (www.doe.gov.za). The FBAE is intended to provide poor households with alternative energy where electricity is not available. Although these are pro-poor and progressive policies, they are often inadequate to address people’s needs, and whatever benefits they provide are overshadowed by an increasingly regular electricity price, which leads to energy poverty for many poor households.

Energy poverty and the devastating harmful household energy-related incidents unremittingly impact informal settlements across South Africa. According to Noseweek

magazine, quoted in Kulati, “every day, some 20 million South Africans – 40% of the population – use dangerous, sub-standard paraffin stoves to cook their meals and warm their shacks. Every year tens of thousands of poor people are rendered homeless by the devastating fires these stoves cause. Every inhabitant of an informal settlement in South Africa must be prepared to see all of their possessions burned as often as three times in his lifetime. Added to this is the shocking number of children who are burned to death each year in South Africa (burns are the leading cause of death amongst young children) and the fact that for every child who burns to death, ten live the remainder of their lives hideously maimed and scarred” (2013:4).

The costs of these incidents to the economy and public health system are astronomical. To address the socio-economic ramifications of fires caused by paraffin appliances – which is just one energy source among many – costs an estimated R104 billion annually (Palmer Development Cooperation in Co-operation with Science Consultancy Enterprises, 2003:18). This figure includes the treatment and rehabilitation costs of avoidable energy-related incidents that are absorbed by the public health system, as the majority of people accessing the public health system are from very poor informal settlements. The estimated cost is also made up of other hidden costs, such as absenteeism from work, water used, loss of employment, building materials provided by local authorities for communities to rebuild their shacks, food provisions, temporary alternative accommodation provided by government, and many other public service costs.

The safety of the energy sources used by poor people in informal settlements has not received high enough priority from a policy angle. This is despite the fact that there is a constitutional obligation on the democratic government of South Africa to realise their citizens’ right to an environment that is not harmful to their health and well-being. Available anecdotal evidence “indicates that a larger proportion of government financing, subsidies and ... aid is aimed at developing modern energy infrastructure that largely serves the needs of the urban-based formal sector, commercial and industrial sectors, medium and high income urban and peri-urban households” (Global Network on Energy for Sustainable Development, 2014:12). This shows that the energy policy regime in

South Africa has failed to comprehensively meet its constitutional obligation. In fact, Tait, Merven and Senatla state that “policies impacting household energy usage are disparate, [with] no overarching framework” (2012:10). This is a serious flaw that requires urgent policy attention.

The central core of South Africa’s entire energy system, which is electricity generation, is old, out-dated and unable to meet current needs. The democratic government’s lack of long-term planning for energy and the lack of early investment in growing the capacity of Eskom, which is the state-owned electricity company, to meet the growing energy needs spurred on by a growing economy and population is a serious policy flaw. The situation is worsened by the growing demand for energy by various sectors including industry and households. As a result, since 2006 South Africa has been experiencing electricity black outs and load shedding where electricity provision is shut down for periods of time during the day to manage demand. The cost of electricity has also increased sharply each year in order to pay for infrastructure upgrades. These price hikes serve to push many poor people further into poverty, particularly energy poverty.

The government’s policy of singular focus on electricity whilst neglecting other widely used household energy sources is another important matter to consider. Most government policy and programme implementation have centered around access to and affordability of electricity, despite the fact that households in South Africa use a variety of energy sources, which include electricity, liquid petroleum gas, coal, candles, wood and paraffin on a daily basis for basic activities, such as cooking, lighting and heating. As a result of little attention being paid to energy sources other than electricity, many households are exposed to countless energy safety risks and energy poverty that are not being addressed.

There have been many credible organisations and individuals that have placed the matter of household energy on public platforms (Swart & Bredenkamp, 2012:1), calling on the South African government to implement an integrated and holistic household energy safety policy (ibid).

For instance, HESASA's key strategic focus is to lobby parliament and government for the implementation of such a policy, thus signifying its importance for South Africa (HESASA, 2013:16). Added to this is the perceptible groundswell of ordinary household energy users who recognised "that energy was essential for poverty eradication and sustainable development" and called for the DoE "to implement a household energy policy focussing on safety and energy poverty alleviation" (PASASA, 2007:1).

This research is both feasible and useful. It is feasible because the information is easily accessible and available to the researcher because he currently works for HESASA, and previously for PASASA, and has worked extensively with communities affected by energy-related incidents for over nine years. Therefore, he has access to the latest information on household energy safety, knows the various experts in this field and has a personal understanding of the key policy issues. It is useful because the outcomes will add to the body of academic information on household energy safety. It will also contribute to tangible and carefully researched proposals to policymakers and legislators on the actual policy substance.

All the factors mentioned above reinforce the need for investigation into the content of an integrated household energy safety policy as proposed by this research. The absence of an integrated, household energy policy in South Africa is a fundamentally problematic reality, especially for poverty-stricken informal settlements. Furthermore, it is of public and national interest from diverse perspectives because the lack of household energy safety affects practically everyone in South Africa.

1.4 THE RESEARCH APPROACH

Thompson (in Dirks, 2005:1) defines research as "the systematic investigation into and study of materials, sources, etc., in order to establish facts and reach new conclusions". To achieve that goal, this research study is exploratory and descriptive in nature. Jackson states, "the principal use of exploratory research is to increase a researcher's understanding of a subject" (2010:1).

Essays UK states that descriptive research is “concerned with describing ... characteristics. It can be used to explain a particular issue or problem. The focus of descriptive research is to provide an accurate description for something that is occurring ... It is used extensively when the research purpose is to explain, monitor and test hypotheses...” (2013:6). Its purpose is “to describe a phenomenon, to explore factors that influence and interact with it” and to “document conditions, attitudes, or characteristics of individuals or groups of individuals (Jackson, 2010:1).

This research project will explore and describe global and South African energy systems, as well as the socio-economic conditions of South Africa’s informal settlements. It will identify energy-related problems and their impacts on the lives of people in informal settlements and will explore how public policy can help address these problems through an analysis of available materials and engaging with experts in the field of energy and household energy.

1.4.1 The Research Problem

A research problem “refers to some difficulty that the researcher experiences in the context of either a theoretical or practical situation and to which he or she wants to obtain a solution” (Welman, Mitchell, & Kruger, 2005:14). In order to define a problem correctly, “the researcher must know what a problem is. To answer (solve) a research problem, the researcher must be able to answer the following two questions: “What is the problem? What is the best way to solve the problem?” (Welman, Mitchell, & Kruger, 2005:14). This research project is preoccupied with the problem of the lack of an integrated household energy safety policy for low-income households in South Africa. It seeks to identify the content of such a policy for the purpose of facilitating the eradication of energy poverty and harmful energy-related problems in South Africa’s informal settlements.

1.4.2 The Key Research Questions

The primary research question is: What could be the most effective and implementable content of the proposed integrated household energy safety policy in South Africa's informal settlements?

The secondary research questions include:

- What is the overview of household energy and its associated problems in informal settlements in the context of the global energy system?
- To what extent do these problems constitute a public policy problem?
- What are the theoretical underpinnings of public policy instruments in general and their relevance on household energy choices in informal settlements?
- How do current the South Africa's energy policy and legislative framework, government programmes and institutional arrangements for energy governance look like?
- What could constitute key components for an integrated household energy safety policy that could be implemented in South Africa's informal settlements

1.4.3 Hypothesis

Dirks define a hypothesis as “a statement of the possible relationships among the variables in a research study. The research hypothesis is a proposed, tentative answer to the research question or research problem. It supports a research prediction about the behaviour of the variables. The purpose of research is to support or reject this hypothesis, and that purpose guides decisions about what data are to be collected.” (2005:1).

The hypothetic premise of this research is that, if effective content for an integrated household energy policy for low-income households was designed and implemented, household energy-related problems in South Africa's informal settlements would be prevented. It is therefore worth considering what the constituent contents could be.

1.4.4 The Aims and Objectives of the Research Study

The primary aim of the study is to explore and propose effective components or contents of an integrated household energy safety policy that could be implementable by government to prevent harmful household energy-related problems in informal settlements.

The objectives of the study are:

- To provide an overview of household energy and its associated problems in informal settlements in the context of the global energy system
- To discuss the extent do these problems constitute a public policy problem
- To describe the theoretical underpinnings of public policy instruments in general and their relevance on household energy choices in informal settlements?
- To explain how current the South Africa's energy policy and legislative framework, government programmes and institutional arrangements for energy governance looks like
- To propose ideas on what could constitute key components for an integrated household energy safety policy that could be implemented in South Africa's informal settlements

1.5 THE PROPOSED RESEARCH METHODOLOGY AND DESIGN

There are fundamentally two overarching research approaches in the social sciences, namely quantitative and qualitative research (Mondele, 2010:10). The methodology used in this research is qualitative. Gadbois specifies “qualitative researchers use observations, interviews, historical and narrative documentation, and similar subjective data as a basis for discovering and confirming relationships among variables. Many questions probe social situations and use field research techniques, which give considerable attention to describing the context of the social environment”. It focuses on “obtaining a truthful description of how a problem or situation is experienced by those who live it” (1999:1).

As such, this research will be based on an extensive examination of the existing literature and in-depth interviews with experts on household energy issues, government officials and community leaders.

1.5.1 Research Study Design

Mouton defines research design as “a plan or blueprint of how you intend conducting the research” (2001:55). In other words, it is “the plan by which we obtain research participants ... and collect information from them. In it we describe what we are going to do with the participants, with a view to reach conclusions about the research problem” (Welman, Kruger & Mitchell, 2005:52). However, a research design is not just a plan, but serves as a force “to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible” (Welman, Kruger & Mitchell, 2005:52). To do so, Creswell outlines four steps in the process of research design, namely defining the research question, designing the research, data collection and analysis as well as writing up the report (2003:12).

The objective of this research design is to explore the literature and expert views relating to the research questions outlined above. The research design seeks to provide answers on effective components for an integrated household energy safety policy. Since the research design is qualitative, it adopts an approach that is interpretive to the data. In other words, it interprets available data.

1.5.2 Techniques Used to Conduct the Research Study

1.5.2.1 Literature review

The researcher will undertake an extensive literature review in order to expose himself to the latest theoretical developments and thoughts by scholars and specialists on household energy, informal settlements and public policy. This will enable the researcher to

formulate informed views based on current information and research by other people. Themes will be developed based on the review and analysed to produce findings and recommendations.

1.5.2.2 Expert sampling

Expert sampling will be utilised in order to access the views of specialists in the field. Expert sampling occurs when “the researcher is looking for individuals who have particular expertise that is most likely to be able to advance the researcher’s interests and potentially open new doors” (Paly, 2008:1). In this regard, the researcher will identify individuals with particular expertise and experience in the field of household energy, public policy and informal settlements to add value to the research. This will include energy experts, community leaders and DoE officials.

1.5.2.3 Data-collection techniques

During the study the researcher will use multiple techniques to collect the relevant data. These include interviews, questionnaires, the literature review, as well as content selection and analysis.

i) One-on-one interviews

Kvale (quoted in Valenzuela & Shrivastava) states, “the qualitative research interview seeks to describe the meanings of central themes in the life world of the subjects. The main task in interviewing is to understand the meaning of what the interviewees say” (2008:1). There are two types of interviews in research, namely “structured interviews, in which a carefully worded questionnaire is administered, and in-depth interviews in which the interviewer does not follow a rigid form” (National Science Foundation, 2002:50). In this research, both types of interviews will be conducted.

The aim of the interviews will be to elicit and document the opinions, experiences and interpretations of the interviewees on the questions posed. An interview schedule of all types of questions will be prepared and implemented. This will include probing, direct, indirect, specifying, silence, and interpreting, structuring and follow-up questions. The majority of questions will be open-ended, allowing participants to share their views and feelings openly and freely. The questions will be grouped according to the broad themes developed during the literature review process.

The interviews will be recorded on tape to avoid the distraction of taking copious notes during interviews. This will enable repeated listening and therefore ensure accuracy. Participants based in Cape Town will be interviewed at their offices or homes and those further away will be interviewed either in person or telephonically. After each interview, notes will be drawn up about the content of the conversation as well as the meeting process. The recordings will be transcribed and patterns of thought or themes that emerge from the discussions will be noted. Each participant will be identified by a colour code, in order to avoid mixing his or her identities. Afterwards, each participant will be given the transcript to enable them to clarify information and provide additional information. If necessary, follow-up contacts will be made with some, albeit shorter. This will ensure the veracity and credibility of the information.

ii) Administering written questionnaires

Depending on the accessibility and availability of some of the respondents, a list of written questions may be emailed to a respondent for completion in the absence of the researcher. The researcher will keep in constant contact with the respondent to encourage them to fill in the questionnaires and to get return the completed questionnaires to him.

1.5.2.4 Data analysis

All research fieldwork leads to data analysis. Taylor and Bogdan (quoted in Mondele) explain that “data analysis consist of three specific activities: the first entails scrutinizing the data for themes, concepts and propositions; the second requires coding the data and

refining one's understanding of the subject matter, and the final activity involves, understanding the data in the context it were collected" (2010:34). This is precisely what will be done in this research study. For example, as part of the analysis the data will be broken into manageable themes, patterns, trends and relationships (Mouton, 2001:108). The main aim is to comprehend the various "constitutive elements of one's data through an inspection of the relationship between concepts, constructs or variables; and to see whether there are any patterns or trends that can be identified or isolated, or to establish themes in the data" (Mouton, 2001:108).

In this research, a substantial amount of analysis will be done from the secondary data that will be collected. Hewson highlights the usefulness of secondary data analysis as "the study of specific problems through analysis of existing data which were originally collected for another purpose'..." or "the further analysis of an existing dataset with the aim of addressing a research question ..." (2006:24). The sources of data will include an extensive review of relevant literature, which is secondary data. Literature will be composed of books, academic journals, peer reviewed papers, newspaper articles, internet searches, reports, policies, pieces of legislation and case studies relevant for this purpose.

An appraisal and analysis of the data transcripts from interviews, observations and recordings will be undertaken to enhance the notes taken immediately after the interview and also to identify and document trends and patterns, thematic issues and new ideas. Similar themes will be grouped together under each of the issues being addressed by this research. Relationships between themes will be carefully considered and documented.

Wherever relevant and possible, attempts will be made to use computer software to facilitate analysis of the data. This will help speed up the process and improve the quality of the final research product. Issues that are irrelevant and have no bearing on this research will be filed and those that are relevant will be used in the report.

1.6 KEY CONCEPTS

Under this heading, the definitions of the following key terms will be provided:

- Public policy
- Household energy
- Household energy safety
- Harmful household energy-related incidents
- Energy poverty
- Energy transition theory
- Energy ladder model
- Informal settlements

1.7 THE SIGNIFICANCE OF THE STUDY

A study of this nature will contribute to the actual development of the Household Energy Safety policy. According to Sustainable Energy Africa (SEA), the DoE has decided to undertake a process that will lead to the establishment of an integrated household energy policy (2014:1). So, too, has the City of Cape Town (SEA, 2014:1). Although these attempts appear tentative and weak at best, they could benefit substantially from the outcome of this study because it will make clear recommendations about the content of such policy.

Considering the dearth of research information on household energy policy contents, the study will contribute to scholarship and research on household energy policy for low-income households. As other countries in the developing world are also grappling with how best to address energy poverty and provide safe energy to low-income households, the outcomes of the study could be helpful to energy policy specialists in those countries. Non-governmental organisations (NGOs) advocating for household energy policy will have evidence-based and carefully researched proposals at their disposal. Ordinary household users will benefit by experiencing access to sustainable energy, a reduction in

harmful energy-related incidents and increased productivity in their daily economic activities.

1.8 ETHICAL CONSIDERATION

According to Schurink (quoted in Mondele), “Ethical issues are the concerns and dilemmas that arise over the proper way to execute research, more specifically not to create harmful conditions for the subjects of inquiry, humans, in the research process” (2010:24). The study will comply with all ethical research standards. It will be submitted to the University of Stellenbosch Ethics Committee for approval.

1.8.1 Confidentiality

In order to improve credibility and protect the integrity of this research and the researcher, all information gained from participants will be confidential. The researcher will draw up a simple and short confidentiality document to be signed by both the researcher and participants. The researcher and participant will retain a copy of this signed document to increase their confidence in the research process.

1.8.2 Informed consent

A consent form will be drawn up and handed over to the participants in order to gain their consent for the use of the information.

1.9 CONCLUSION

This chapter introduced the study by tracing the history of attempts by various players to draw the South African government’s attention to harmful energy-related problems in

informal settlements. It discussed the factors that motivated the study, outlined the research approach, stated the research problem and identified the research questions. After outlining the hypothesis and objectives of the study, it explained the research methodology and design as well as the techniques to be followed in the study. It concluded by stating the significance of the study.

CHAPTER 2: HOUSEHOLD ENERGY, INFORMAL SETTLEMENTS AND PUBLIC POLICY

2.1 INTRODUCTION

This chapter illuminates the scope of the research question by conducting an extensive literature review. Boote and Beile state that a literature review is “an evaluative report of studies found in the literature related to your selected area. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical basis for the research and help you determine the nature of your own research” (2005:3). LeCompte, et al (quoted in Randolph) refers to it as a “legitimate and publishable scholarly document” (2009:1). This literature review aims to frame an in-depth theoretical exploration of three broad and overarching issues: informal settlements, household energy and public policy. These issues form the three pillars or sections around which the review pivots.

The first section briefly discusses the phenomenon of informal settlements in South Africa. Specifically, it gives the definition, characteristics and magnitude of informal settlements in South Africa. It then concludes with a description of the socio-economic conditions of informal settlements.

The second section provides an overview of the household energy problems in informal settlements. It defines both household energy and household energy safety respectively and describes the global and South African energy systems. The nature and magnitude of energy poverty and household energy-related problems, or lack of household energy safety, and how people in informal settlements experience these are identified and discussed in detail. It makes a case that household energy-related problems in informal settlements in South Africa constitute a public policy problem that necessitates a household energy safety policy.

The third section deliberates on the concepts of a public policy problem and the public policy as areas of academic enquiry. It analyses the extent to which the latter is an

effective tool for social transformation. In order to give more substance and practicability to the issue of public policy, the chapter concludes by enumerating some of the key public policy instruments that can be used to carry out public policy objectives.

2.1.1 The Informal Settlements Phenomenon in South Africa

According to Raphela, “informal settlements are often seen as a problem which needs to be eradicated. Little attention is given to the problems facing informal settlement dwellers” (2011:3). This attitude exposes these areas to regular and devastating household energy-related problems. It also causes authorities to ignore the problems mentioned. The main purpose of this chapter is to unpack some of the most critical issues relating to informal settlements and household energy. In this section, a definition and history of informal settlements are proffered and the characteristics and magnitude of the informal settlement phenomenon are provided. Since informal settlements are a global and a growing phenomenon, the review analyses some of the factors that drive these, such as population growth and urban migration. It concludes by highlighting the impact of informal settlement conditions on household energy usage.

2.1.2 The Definition and History of Informal Settlements in South Africa

The idea of informal settlements is quite expansive and can incorporate a number of factors, including rural communities, backyard shacks and the illegal occupants of inner city buildings (Misselhorn, 2008:4). However, for the purposes of this study, informal settlements are defined as “residential areas where a group of housing units has been constructed on land to which the occupants have no legal claim, or which they occupy illegally; [they are] unplanned settlements and areas where housing is not in compliance with current planning and building regulations” (United Nations Department of Economic and Social Affairs, 2001:21; Statistics South Africa, 2004:5).

Informal settlements in South Africa have their historical roots in the apartheid government's discriminatory housing policies (Hunter, 2006:153). During apartheid, the overwhelming majority of black South Africans were excluded from access to housing. They were also not provided with reliable energy access. The country's energy system and housing policy were "... characterised by overt and covert discrimination along lines of race, gender and class..." (Eberhard & van Horen, 1995:44). Apartheid spatial planning, influx control and other racial laws meant that black people were effectively denied security of tenure in urban centres. Under the Group Areas Act, they were forced to live in rural homelands where no or little development or service delivery took place. In cities, they were evicted from properties that were in areas designated as 'whites only' and excluded from housing provision. They were forced to live far away from sources of employment in shanty townships established for each of the three designated non-white race groups (blacks, coloureds and Indians) whose energy and other needs were ignored (Eberhard & van Horen, 1995:44). When apartheid ended in 1994, millions of people moved into urban centres, creating thousands of informal settlements.

2.1.3 The Socio-economic Characteristics of Informal Settlements

Informal settlements are characterised by abject poverty and insecurity. They are often built on hilly and dangerous landscapes that are unsuitable for human habitation. They commonly lack municipal services, such as water, electricity and sewerage. According to the Housing Development Agency, "the shacks in such settlements are usually very close together or may even be virtually continuous with one another with narrow footpaths representing the main form of access, there being limited or no road access. There is characteristically no open space within such settlements, which has not been used for building accommodation. There are few if any 'gardens' or 'yards'. Such settlements are typically very difficult to formalise without significant relocations (even if innovative 'densified' housing options and layouts are pursued)" (2013:9). As a result of the layout of informal settlements, emergency services such as ambulances and police often battle to get into these communities in times of crises.

Typically, informal settlements are inhabited by economically deprived and depressed people who experience high levels of unemployment and poverty (Shack Dwellers International, 2012:3). In such conditions, people lack money to purchase and maintain safety-compliant and reliable cooking, lighting or heating equipment (PASASA, 2011:10). They are often forced to use combustible and heat conducting building materials, such as cardboard, plastic, wood, iron sheeting, cloth and paper for shelter and to insulate their homes. They procure and utilise sub-standard, cheap, faulty and unsafe household energy appliances, such as stoves, heaters and lamps, in order to meet their thermal needs of cooking, lighting and heating at tremendous personal risk. These render informal settlements extremely dangerous locations prone to serious harm to people, property and environment, thus digging them deeper into poverty.

2.1.4 The Magnitude of the Informal Settlement Phenomenon

The phenomenon of informal settlements is growing exponentially, not only in South Africa, but also worldwide. Sverdlik is of the view that the magnitude of this problem is such that informal settlements “now house a significant proportion of the world’s urban population...” (2011:123). According to the United Nations Global Report (quoted in Bolnick, 2010:32), over 50% of people worldwide reside in urban centres. An astonishing 32% of this number – amounting to 1.06 billion urban dwellers – lives in slums or informal settlements. This figure is predicted to double in the ensuing 30 years (Bolnick, 2010:32).

Wolpe and Reddy posit, “trends indicate that informality is here to stay and is growing at an unprecedented rate not only in South Africa but across the developing world” (2010:2). In South Africa, even under the democratic dispensation, the situation is not getting better. In fact, since 1994 the number of informal settlements has grown exponentially. According to former planning minister Trevor Manuel, South Africa has almost the same number of people living in informal settlements now as it did in 1994 “in spite of the fact that government has provided nearly three million houses during the

period...” (Moneyweb, 2013:1). Approximately 10% of South African people (comprising an estimated 1.6-million households or approximately 4.7 million people) live in informal settlements (Misselhorn, 2008:16; Business Day; 2014:1; Parker, 2015:1). Not only is the number of informal settlements growing uncontrollably, but also “likewise, the population inside these ghettos is increasing rapidly. This imposes increased service delivery pressure upon resources like electricity, water, sanitation, health services and housing” (City Press, 2013:1).

This massive increase of informal settlements, combined with unsafe household energy appliances and behaviours, plus the lack of service delivery creates conducive conditions for serious household energy-related incidents (Mahajan, 2014:20). Harmful household energy problems “are acknowledged as major problems and threat to the health and well-being of the people living and working in [informal] communities” (Friedl, Holm, John, Kornelius, Pauw, Oosthuizen & Van Niekerk, 2008:16). Evidently informal settlements are extremely dangerous to their inhabitants from the household energy use perspective. The deeper problem is that public policies on energy and housing have not been designed to address such problems effectively in informal settlements (Misselhorn, 2008:5).

2.2. THE GLOBAL ENERGY SYSTEM OVERVIEW AS A CONTEXT FOR HOUSEHOLD ENERGY PROBLEMS IN INFORMAL SETTLEMENTS

This section provides a global overview of the global energy system to create a proper context for the discussion on household energy related problems in South Africa’s informal settlements. Definitions of household energy and household energy consumption are also provided. Household energy consumption choices of people in informal settlements are explained by discussing the energy ladder model as a theoretical framework for poor people’s choice of energy sources. The section concludes by discussing the lack of household energy safety and detailing household energy-related problems that are unique to the informal settlements and their impact on the economy, public health system, communities, households and individuals.

2.2.1 Growing Importance of Energy

According to Haraldsen, “energy ... governs all” (2014:1). Energy, as a fundamental human need and an economic imperative, has dramatically migrated from the periphery to the central nexus of the global developmental agenda. The United Nations Secretary-General, Ban Ki-moon characterises energy as “the golden thread that connects economic growth, increased social equity, and an environment that allows the world to thrive” (UN-Energy, 2013:3). This growing importance of energy has been recognized at every major United Nations conferences since the 1990s, starting with the Rio Earth Summit (UN Conference on Environment and Development) held in 1992 (UNDP, 2000:3). It is now regarded as central to the achievement of the Millennium Development Goals (MDGs) because it catalyses the realisation of the majority of the goals (Abrahamse, Steg, Vlek & Rothengatter, 2005:41).

2.2.2 Household Energy and its Growing Importance

Also growing exponentially in prominence is household energy. According to the Energy Sector Management Assistance Program (ESMAP), “Household energy is ... as important as ever” (UNDP/World Bank, 2003:8). Eberhard and van Horen describe household energy as “one of the services required by households for survival and for comfort and convenience. It is essential for the preparation of meals and the lighting of homes, and is desirable for heating or cooling homes, heating water for washing, refrigerating food and powering a range of appliances which save labour or provide opportunities for entertainment and education” (1995:82). Household energy affects human lives at a very basic level, every day, all day, everywhere on earth. It is therefore foundational to human development and growth.

Energy facilitates some of the most basic household services such as “lighting and basic utilities, water pumping, improved cooking fuels, and cleaner fuels for heating ...” (Bast & Krishnaswamy, 2011:2). In this way it enables growth and development in households across the world. One of the driving factors behind the increasing prominence of

household energy is the growth in its consumption patterns. With an unprecedented growth in population and a rapid rate of urbanisation, Van Ruijvens posits that “the residential sector is currently the main energy consuming sector in many developing regions” (2008:3). This creates serious problems in the burgeoning informal settlement phenomenon.

2.2.3 Description and Importance of the Energy System

Energy is “a commodity that is vital for the existence of modern life” (Eakins, quoted in Danlami, Islam & Applanaidu, 2015:196). Marquard describes the energy system as “a societal subsystem, which unlike the energy sector, was not the sub-set of the formal economy, but embraced a far wider range of energy transactions or energy ‘flows’ from production to end use; the path along which energy flowed between the various conversion technologies was referred to as an ‘energy chain’” (2006:51). It is composed of an energy supply sector and energy end-use technologies and its object is to deliver to consumers the benefits that energy offers (UNDP, 2000:4). Within those broad components, there are four fundamental elements namely: generation, transformation, delivery and use (United Nations Energy Agency, 2007:7). The household plugs into the system through the use element on the demand side of the supply chain.

The energy system supply chain commences from the point of primary energy extraction through to conversion, distribution and end use. In the process it is converted into primary, secondary and final energy (see Figure 2.1). Final energy is the form in which it can be used for productive purposes. In other words, it is “converted into energy carriers, such as electricity or ...oil that are suitable for end uses” (Eberhard & Van Horen, 1995:81). Crucial in this configuration and for discussion, are the energy end-use technologies and equipment such as stoves and heaters which transform and convert “final energy into useful energy, which provides the desired benefits: the energy services”. It is for this reason that Kern and Smith characterise energy systems “as socio-technical systems...” meaning, “the linkages between elements necessary to fulfil societal

functions” (quoted in United Nations Energy Agency, 2007:1). The societal functions include the delivery of the benefits that energy offers to, inter alia, households (UNDP, 2000:4).

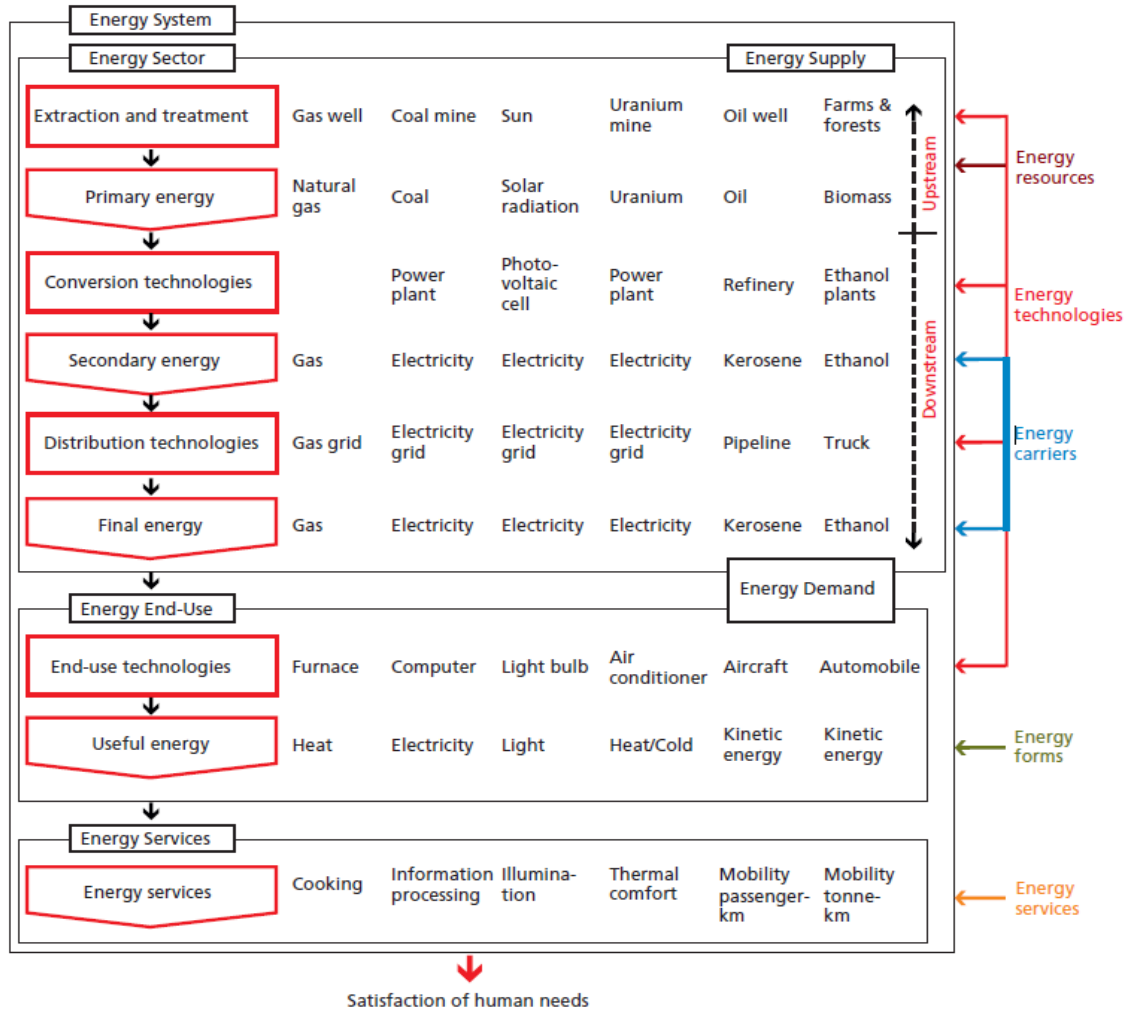


Figure 2.1: The complex energy system
Source: GEA (2012)

2.2.4 Energy Services as Key Outputs and Benefits of the Energy System

One of the key outputs and benefits of the energy system are energy services. The United Kingdom Department for International Development (DFID) asserts that the demand for energy “is a ‘derived demand’ [in other words] no one wants energy in itself but rather for the services it can provide” (2002:7). The term energy services is used to describe,

“...benefits, which in households include illumination, cooked food, comfortable indoor temperatures, refrigeration, and transportation. Energy services are also required for virtually every commercial and industrial activity. For instance, heating and cooling are needed for many industrial processes, motive power is needed for agriculture, and electricity is needed for telecommunications and electronics” (UNDP, 2000:4).

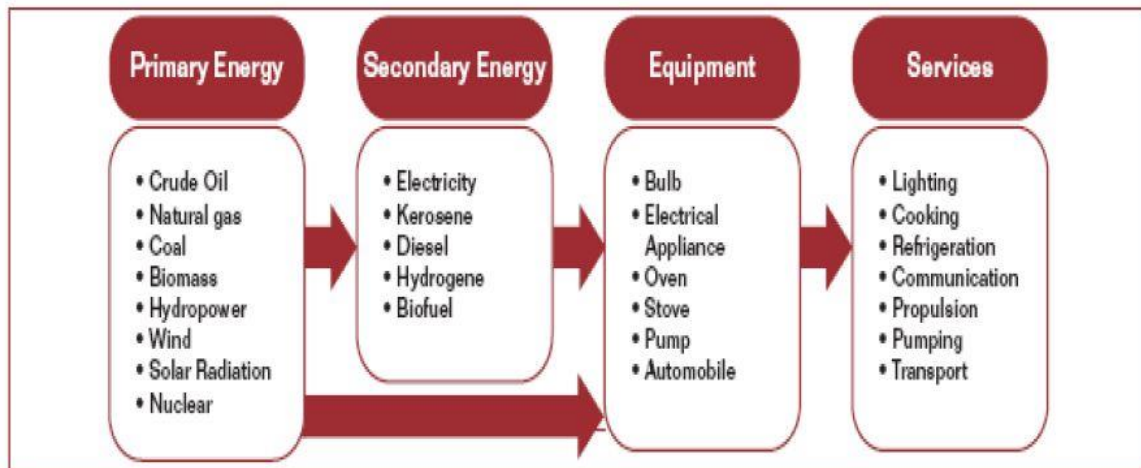


Figure 2.2: Energy services as key outputs: Source: World Bank, 2000

The provision of energy services “involves a chain of activities and processes from resource exploitation to end-user conversion” (Eberhard & van Horen, 1995:19). Energy services result from “a combination of various technologies, infrastructure (capital), labour (know-how), materials, and primary energy (UNDP, 2000:6). They are therefore a crucial developmental cog that lubricates businesses and propels the engines of households forward in giant leaps. This is more so from the household angle because energy services contribute toward the satisfaction of human needs. However, serious problems arise when the energy system and supply chain fails to deliver sufficient, efficient, sustainable, safe and affordable services at the household level. These problems affect informal settlements more. The absence of adequate, affordable, reliable, safe “and environmentally benign energy services can be a severe constraint on sustainable economic and human development” (DFID, 2002:7). Therefore, energy services are

indispensable for the development of society in general and informal settlement households, in particular.

2.3. THE SOUTH AFRICAN ENERGY SYSTEM OVERVIEW AS A CONTEXT FOR HOUSEHOLD ENERGY PROBLEMS IN INFORMAL SETTLEMENTS

This section first traces the evolution of South Africa's energy system and governance and describes energy demand and consumption patterns, especially in informal settlements. Household energy consumption patterns in informal settlements will be explained through an overview of the energy ladder model, which is normally used to explain poor people's energy choices. It will serve as a foundation to base a detailed description of household energy-related problems in South Africa's informal settlements.

2.3.1 Tracing the Evolution of South Africa's Energy System and Governance

It is impossible to paint an accurate picture of the South Africa energy system without reference to its apartheid history. Four important factors in the evolution of the South Africa energy system from the time of apartheid to the time of democracy have been identified. These factors include the apartheid government's "persistence in the use of coal as a primary energy source, and the associated energy chains that have been built around it. The second is the extraordinary inequality in access to energy services between different sections of the population, and thus the persistent use of energy carriers such as firewood and other fuels such as paraffin in a domestic context. The third is the relatively high consumption of electricity as a percentage of final energy demand, and the fourth is the geography of the South African energy system" (Marquard, 2006:64). The combination of these factors presents a seriously dangerous, unsafe and unhealthy energy system especially for low-income energy consumers who live in combustible shacks.

During apartheid "the improvement of social equity has historically not featured as a goal of energy policy in South Africa" (Eberhard & van Horen, 1995:16). The primary focus of the apartheid government's energy policy was energy security for the privileged few.

Like all other state policies, the energy policy was designed in such a way that modern energy services such as electricity were provided sufficiently to the white population only, thus ensuring “limited or no services at all to the rest of the population” (Marquard, 2006:19). This was predicated on what Marquard calls “the militant neglect of the welfare of black households” which meant systematical exclusion from energy provision (2006:389). An equally crucial feature of apartheid energy governance was that the energy policy “did not have a concern for household energy needs” in general, let alone black informal settlement households (Marquard, 2006:390). Energy demand was “not at this stage considered a site for state intervention” (Marquard, 2006:392). This means that black households, in particular informal settlement households, were sadly neglected and given unsafe energy sources such as paraffin, coal, candles and wood to use in their homes.

Under the new democratic dispensation, inaugurated in 1994, the South African government shifted the energy policy focus from the supply-side to include the demand-side (Winkler, 2006:43). The dawn of democracy heralded socio-economic development, which included extending energy services to the previously excluded majority, as a driving motive behind policy. According to Winkler, “the new government was determined that energy should not only support economic development, but also improve the lives of the poor – the black majority” (2006:43). As such, the government embarked on an aggressive and successful electrification programme. The DoE reports that, by the close of 2012, over 75% of households (including informal households) were electrified, totalling 9 809 136 households in South Africa (2013 c: 112). This number was projected to increase to include 93% of South Africa households by 2035 in the future (DoE, 2013 a: 13).

2.3.2 The Major Players in South Africa’s Energy System

According to the DoE “energy is an integral part of the economy and the energy sector is a key enabler for the attainment of national policy imperatives such as those expressed in

the National Development Plan...” (2013 a: 5). A huge section of the South African energy sector is under the control of the state. For instance, “the electricity industry is an effective state monopoly, as is the nuclear industry, and along with the petroleum industry, they are tightly regulated” (Eberhard & Van Horen, 1995:19). Having said that, currently there are basically three major role players operating in the energy system of South Africa in as far as household energy services are concerned. They are the DoE, which acts on behalf of the government; Eskom, the state owned electricity outfit; and the petroleum industry. These players have a significant impact on the energy policy direction of South Africa as well as household energy provision in informal settlements.

The DoE is in charge of energy governance, including the household energy sector in South Africa. Its mandate “is to formulate and exercise oversight in the implementation of overall energy policies, to ensure access to affordable and reliable energy by all South Africans and to promote environmental friendly energy use...” (DoE, 2010:2). Their strategic objectives include ensuring a balance between energy supply and energy demand and reliable energy delivery, achieving universal energy access, diversifying energy mix and improving access to quality and affordable energy whilst promoting safe use of energy and developing effective legislation, policies and guidelines are part of their responsibility (DoE, 2010:4).

The role of Eskom is to generate, transmit and distribute electricity in South Africa in an efficient and sustainable manner. Its purpose is to provide sustainable electricity solutions to grow the economy and improve the quality of life of the people of South Africa. Eskom delivers over 94% of the electricity in South Africa whilst an insignificant amount of electricity is supplied by municipal power stations (DoE, 2010:52). One of the distinguishing factors of the country’s energy system is that it “is dominated by coal, which contributes 70% of the country’s primary energy ... and fuels 93% of electricity production...” (Winkler, 2006:4). This is followed by crude oil with 21.6%, renewable and wastes with 7.6% and gas with 2.8%. Nuclear, hydro and geothermal solar constitute the smallest portion with 0.4%, 0.1%, and 0.1% respectively, as shown for 2006 (DoE, 2010:63).

The petroleum industry is involved in the refining, production, distribution and marketing of various petroleum products to various markets, including the informal households (SAPIA, 2007:1). It is currently made up of seven major oil or petrochemical companies operating in SA, namely British Petroleum; Chevron; Engen; PetroSA; Sasol; Shell; and Total (DoE, 2010:39). The companies own and operate four oil refineries, located across the country, including Calref in Cape Town, owned by Chevron; Enref in Durban, owned by Engen; Sapref, also in Durban, owned jointly by BP and Shell; and Natref in Sasolburg, owned by Sasol and Total. South Africa imports the majority of its crude oil from other countries and refines it in South Africa. By 2010, they were supplying approximately 18% of South Africa's primary energy needs (SAPIA, 2010:3). The petroleum product supply chain includes products that are used in households for thermal applications including cooking, lighting and heating. The products include paraffin, petrol, diesel, liquefied petroleum gas and candles.

2.3.3 Energy Demand and Consumption in South Africa

The DoE's projects that demand for energy will increase substantially in terms of total energy demand by 2050 (2012:8). Whilst the biggest contributor to the demand for energy will be the transport sector, household energy demand will also grow substantially due to increased urbanisation, migration and population size (See Figure 2.3 below). The projected growth in energy demand puts an added strain on South Africa's old and unsafe energy system. It suggests that whatever is defective and unsafe in our energy system, especially as it pertains to the household, has to be addressed urgently and effectively.

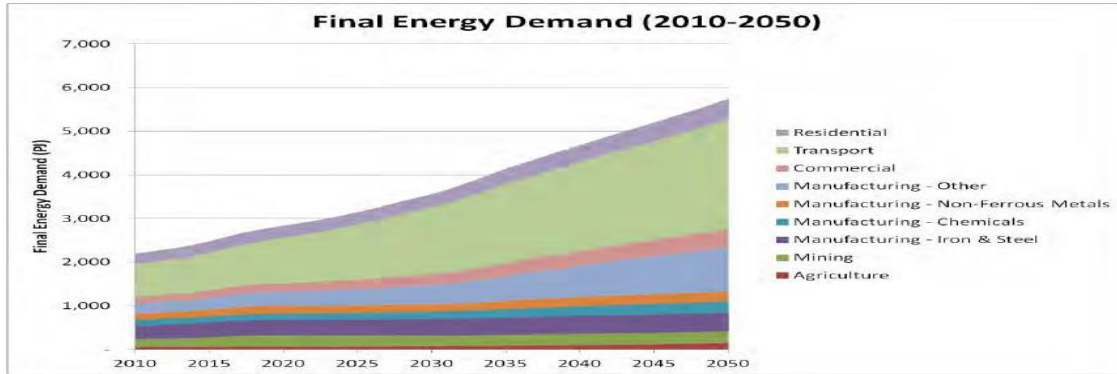


Figure 2.3: Projected energy demand for the entire economy by sector

Source: Department of Energy: Draft 2012 Integrated Energy Plan (2012)

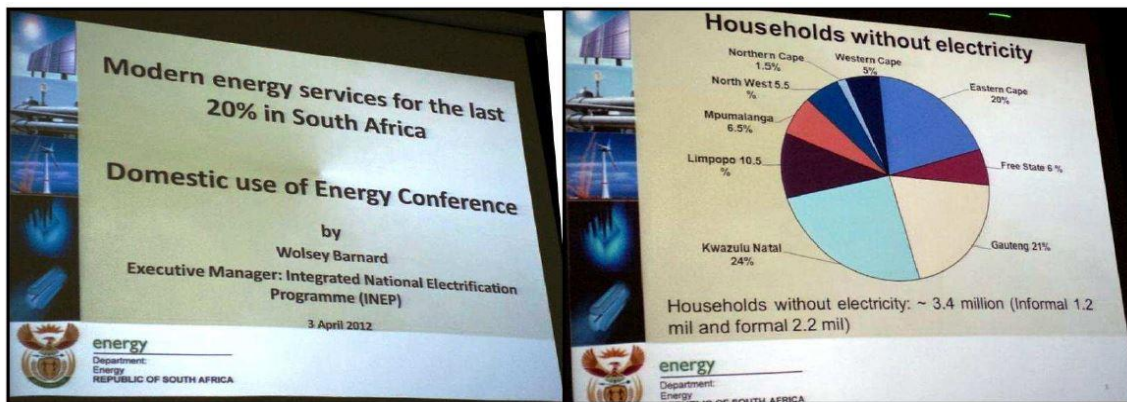


Figure 2.4: The challenge of addressing household energy poverty

Source: Swart and Bredenkamp (2012).

The government’s national electrification programme has been successful since its inception. Notwithstanding that, the DoE reports that despite the success of South Africa’s electrification programme, about 3.4 million households currently remain without access to electricity (see Figure 2.4 above). It translates to about 25% of households of which a third are informal households and two thirds are formal households (quoted in Swart and Bredenkamp, 2012:3). The majority of the 3.4 million households without access to electricity are informal households that use wood, dung and

other vegetable matter, coal, paraffin, candles and gas. This number constitutes a substantial demand for domestic energy.

Danlami, Islam and Applanaidu refer to household energy consumption as “the amount of energy resources that are being spent by households on various appliances used by the households. The various energy resources include: biofuel and waste, kerosene, electricity, gas, petroleum, diesel, and solar” (2015:196). The amount of energy used per household varies widely, depending on the standard of living of the country, climate, and the age and type of residence. With unprecedented growth in population and a rapid rate of urbanisation, household energy is increasingly becoming an important issue for developing countries as its consumption increases (Maryam, 2011:1). Van Ruijvens, et al. state that “the residential sector is currently the main energy consuming sector in many developing regions” (2009:3).

Although statistics on the amount of energy consumed by households in the world differ, it is clear that consumption is increasing. For example Danlami, Islam and Applanaidu quantify the energy consumption of the residential sector as accounting “for about approximately 30% of the total world energy consumption” (2015:196). For their part, Saidur, et al (quoted in Hamidi and Ewing, 2012:3) posit that “Residential energy use accounts for 16-50% of all energy consumption in the world”. Minor statistical differences notwithstanding, the point being made is that household energy consumption is very significant and requires urgent policy attention, especially in South Africa.

By way of example, Figure 2.5 below breaks down energy consumption by sector, which includes industrial, residential, commerce and public services, as well as agricultural sectors. Utilising electricity as an example, it shows that electricity consumption is “dominated by the industrial sector which consumes 60% of all electricity, followed by residential consumption with 20.4% and commerce and public services with 14.8%. The remaining 4.8% is consumed by agriculture and transport” (DoE, 2010:84). South African households consume about 20% of South Africa’s final electricity, which is the second highest among the sectors considered. This illustrates that residential consumption is relatively high, meaning that it ought to be an important area for policy intervention,

especially due to the safety implications of consumption, especially in informal settlements.

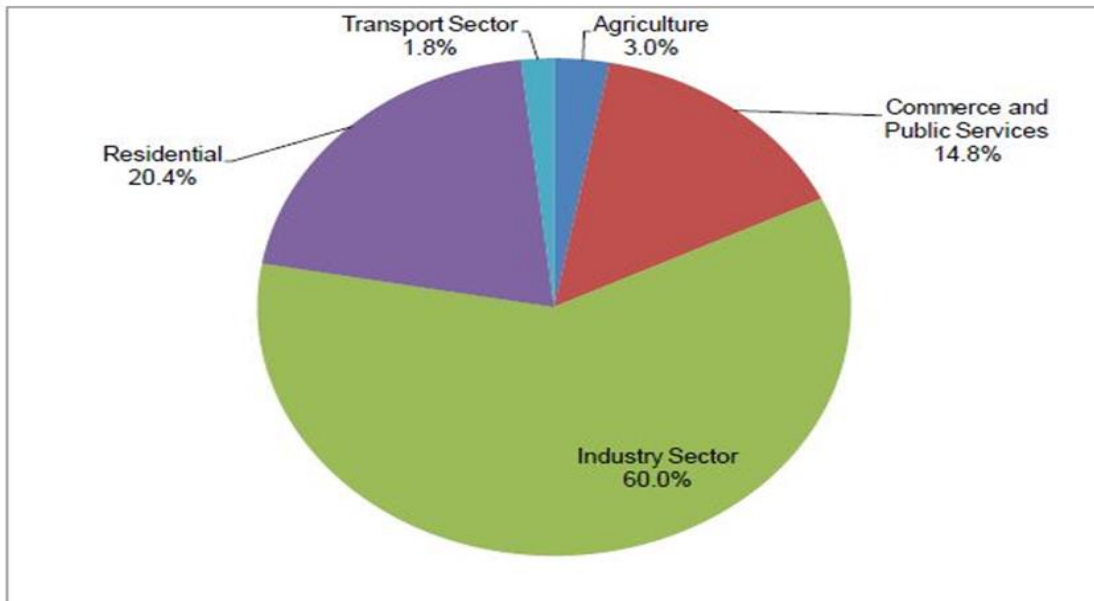


Figure 2.5: Electricity consumption by economic sector for 2006, total: 700 PJ.

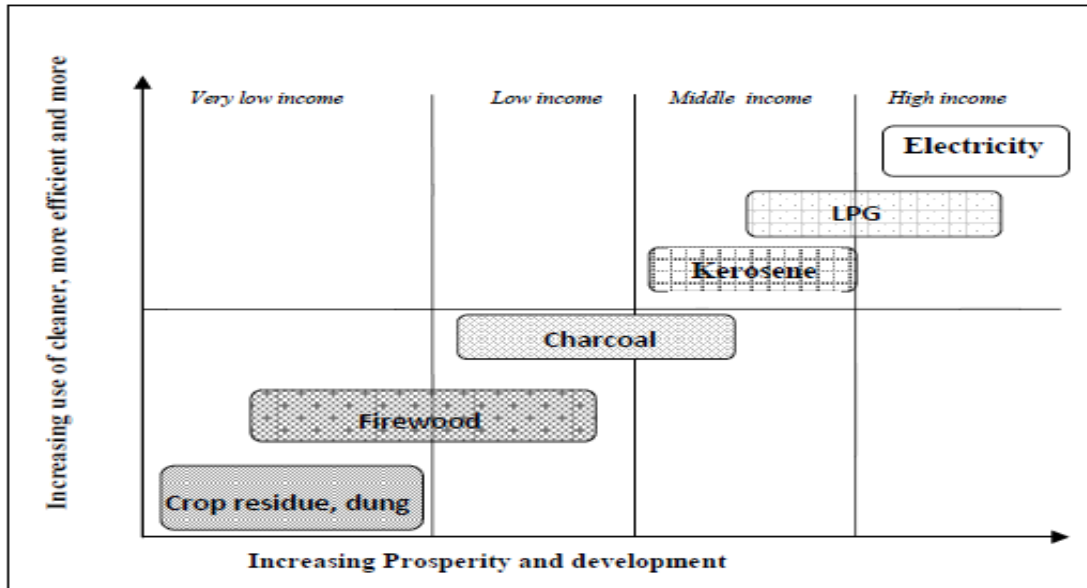
Source: Doe (2010).

Behind this growth, not only in electricity, but also in general household energy consumption is what Abrahamse, et al. refer to as “macro-level ... TEDIC factors” which are “technological developments (e.g. energy intensive appliances), economic factors (e.g. increase of household incomes), demographic factors (e.g. population growth), institutional factors (e.g. governmental policies) and cultural developments (e.g. emancipation, increasing mobility of women)” (2005:2). They state that these factors, influence ‘micro’ or individual considerations such as “motivational factors (e.g. preferences, attitudes), abilities and opportunities. As such, to effect policy changes “it is necessary to consider macro-level as well as micro-level variables” (Abrahamse, et al., 2005:6). This issue is crucial for informal settlement households because “the energy consumption patterns of poor people – especially their reliance on traditional fuels in rural areas – tend to keep them impoverished” (UNDP, 2000:7).

2.3.4 Overview of the Energy Ladder Model

The energy ladder model (ELM) is widely acknowledged and utilised to explain energy consumption choices and behaviours of poor people at household level, especially in informal settlements (Mekonnen & Köhlin, 2008:4; Kammen, Bailis, & Herzog, 2001:18). According to Suliman, “Household fuel choice and demand have been often conceptualized in terms of the ELM, where more diversified choices and demands for fuel sources are predictable in terms of the nature of the appliances used and the purpose as income increases” (2010:12). It is “a generic concept that postulates that household energy use often shows a transition from traditional biomass fuels ... through direct use of liquid and solid fossil fuels ... to modern energy forms (Van Ruijvens, 2008:27).

This model (see Figure 2.6 below) is premised on a theory known as Energy Transition Theory (ETT), whose undergirding notion is that “household’s face a range of energy supply choices, which can be ordered from least to most technologically sophisticated” (Van Ruijvens, 2008:28). As will be elaborated later, literature on household energy demand and choice associates the ETT with income levels. In other words, as the households ascend up the income scale, they graduate from the lowest level energy sources such as biomass toward the higher end and more expensive energy sources such as electricity. Those households in transition “between traditional and cleaner (and more efficient) energy sources consume what are called transition fuels, such as kerosene and charcoal” (Van Ruijvens, 2008:25).



Source: Adapted from WHO (2006)

Figure 2.6: Energy ladder model

Source: Van Ruijvens (2008:27).

The theory has implications for government policy on household energy as countries climb up the economic development ladder (Burke, 2011:14). Treiber states that, “the dominant approach on which most governmental ... activities and policies are based is the energy ladder model which emphasizes household’s income as major driver and implies a complete transition from one fuel to another” (2013:13). For his part, Pratibha asserts that “most of the energy policies focus, almost exclusively on the possibilities to influence the transition at, or towards the top of the ladder, and more for the urban users, than the rural” (2011:9). In South Africa the energy policy has focused on improving the sophisticated higher levels of the ladder whilst ignoring the improvement of lower unsafe and unhealthy rungs. This explains the lack of focus on household energy safety in informal settlements, which languish at the bottom of economic development ladder.

2.3.5 Energy Sources Used in South African Informal Settlement Households.

Informal settlement households utilise multiple energy sources (Kulati, 2013b:4; Tait, 2012:45). The range of energy carriers used includes electricity, paraffin, candles, coal, wood and gas for different thermal applications, such as cooking, heating and lighting. South Africa has a population of 51 million people, which make up roughly 14.5 million households (HESASA, 2013:1). Of these households 82.7% are electrified. As reported earlier, approximately 3.4 million households are non-electrified and use other domestic energy sources and 2% access electricity through dangerous and illegal electrical connections (see Figure 2.7 below). In other words they “do not apply the single-fuel substitution and linear transition ... but rather employ a variety of fuels simultaneously potentially including all levels indicated on the energy ladder” (Treiber, 2013:6).

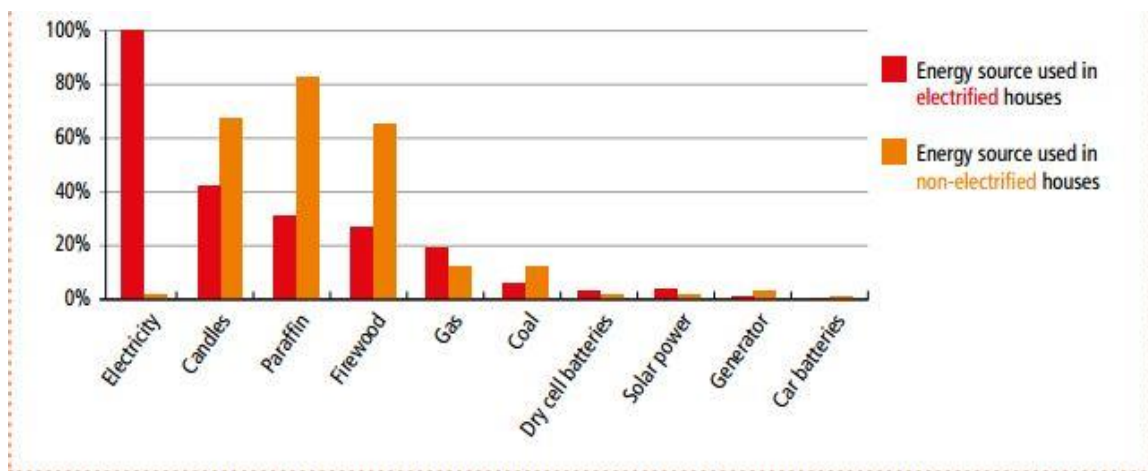


Figure 2.7: Use of energy sources in households by electrification status

Source: HESASA (2013)

This is borne out by data collected by PASASA from over 12 000 households in South Africa’s informal settlements over a three-year period, which indicates that although South Africa’s policy is focused primarily on electrification of households, the reality is that informal households use multiple sources of energy (Swart, 2012:1). For example, they use electricity for lighting and recreational activities such as watching TV, listening to the radio and cellphone charging, whilst they use paraffin for cooking and heating.

Wolpe and Reddy's analysis of the DoE's 2012 survey on energy-related behaviour and perceptions in South Africa shows that, "in informal urban settlements, candles and paraffin are more extensively used" (2010:9). They point out that "in the absence of a domestic electricity connection, 59% of non-electrified households rely primarily on candles as the main lighting source while the remaining third rely mainly on paraffin" (Wolpe & Reddy, 2010:10). HESASA reports that of the electrified households, approximately 45% use electricity for lighting whilst 43% use multiple energy sources. For cooking, 54% of the non-electrified households (which are predominantly in informal settlements) use paraffin, whilst 38% use firewood as the dominant energy source. For space heating, percentages vary depending on the energy source used, costs involved and other factors, but the point remains that households, especially in informal settlements, use multiple sources of energy.

The reasons for variations in the energy sources and appliances used for different thermal applications are predicated on a number of factors. Among them are levels of material deprivation of the poor (Wolpe & Reddy, 2010:9). They also include affordability of energy source and appliances, behavioural preferences of people, availability of funds, appliances used, the nature of service required, and times of day or even weather patterns involved. It is for this reason that the energy policy of the future needs to take this reality into consideration in a comprehensive manner.

2.4. THE HOUSEHOLD ENERGY-RELATED PROBLEMS IN SOUTH AFRICA'S INFORMAL SETTLEMENTS

Informal settlement residents experience some of the worst problems in their daily use of energy in the home. According to Wolpe and Reddy, they "are burdened with relatively high energy costs, the use of unsafe and unhealthy fuels and associated appliances and thermally inefficient dwellings" (2010:2). Below is a detailed description and discussion of the problems associated with household energy usage in informal settlements, particularly in South Africa. In order to facilitate a proper and coherent analysis, the

problems are grouped under five interconnected categories. The categories are health, safety and environmental problems, socio-economic impacts, gender- and child-related problems, energy poverty problems. The problems discussed below fall within these broad categories.

2.4.1 Shack Fires in Informal Settlements

One of the key socio-economic problems experienced regularly by large numbers of informal settlements and residents worldwide, is shack fires. According to Peck; Molnar, & Swart, “The burden of suffering from fire is exceedingly distributed among the poor” (2009:4). The United Nations estimated in 2009 that about 200 million people worldwide perished as a result of shack fires with one third of those estimated to being in sub-Saharan countries (Raphela, 2011:17). In the same year, approximately 798 900 000 shack fires were recorded globally, meaning that 17% of the world population were affected by shack fires directly or indirectly (Raphela, 2011:19). In other words, roughly one out of every seven human beings is affected by shack fire-related deaths today.

In South Africa, *Nosweek Magazine* states that, “paraffin poisoning and pollution are big factors in the cost calculation [of household energy incidents], but fire is by far the biggest” in informal settlements (2005:11). Tait and Merven add that “in South Africa, between 2000 and 2010, over 230 000 people were made homeless by fires” (2012:23). On average in South Africa over the last five years there have been ten shack fires a day with someone dying in a shack fire every other day (Abahlali, base Mjondolo, 2008:13). Although informal settlement fires are more regular and widespread, research indicates that, as urbanisation increases, more household fires take place across all communities. This means that fires increasingly affect both formal and well-off households and those that are informal and poor. Research conducted by the Fire Protection Association of South Africa in formal homes, indicates that in 2011, 410 South Africans died in nearly 38 000 fires (HESASA, 2013:2). Approximately 8 268 fires were reported to have happened in private formal homes (HESASA, 2013:6). Nevertheless, evidence shows that the problem of fires is more pervasive and endemic in poor informal settlement communities.

The causes of residential fires in informal settlements include unsafe and inappropriate utilisation of faulty and badly designed energy appliances, such as paraffin, gas or electrical stoves and heaters, illegal and faulty electrical connections, as well as some energy sources such as candles and paraffin stoves that are used in informal dwellings (UNDP, quoted in Raphela, 2011:16). In addition to these, there are other factors that create conducive conditions for shack fires that have been outlined by Abahlali base Mjondolo (2008). For instance, the lack of land available to poor people coupled with their limited financial resources to build brick houses forces them to live in makeshift houses that are packed closely together. This facilitates the quick migration of fire from home to home – both because of proximity as well as the materials used to build shelters. The lack of electricity provision causes people to use the unsafe energy sources and appliances referred to above. People also complain about lack of access to emergency services in cases of fire breakouts and this causes even small amounts of fire to spread out (Abahlali, based on Mjondolo. 2008:3).

The socio economic implications for both formal and informal communities are that people lose their property, livelihoods, possessions, homes and important documents, such as school certificates, diplomas and training certificates, as well as ID books and lives. This results in homelessness and destitution for thousands of people after shack fires, some repeatedly (Abahlali base Mjondolo, 2008:7). Their precarious ability to earn a living is further compromised by the loss of small informal businesses, their meagre stocks and tools of trade. Many are forced to be absent from work whilst dealing with the aftermath of the fires and rebuilding their homes. Some of those are not paid for the time they are absent from work and others even lose their employment. As such, the already poor households cannot recoup these losses and are pushed deeper into poverty.

The costs to the economy are staggering and, as mentioned earlier, are estimated to be approximately R104 billion (PDC & SCE, 2003:83). It is for these reasons that Kulati concludes, “shack fires are a socio-economic construct. At the heart of the problem is abject poverty. People live in congested houses, built from combustible materials. Many of them are unemployed and therefore cannot afford safe energy sources and appliances.

In addition, excessive levels of alcohol consumption lead to risky behaviour and lack of proper supervision of children in the home. Sometimes children are left alone with a flame burning in the home. Any solution must urgently address these deep seated issues” (2011:1).

Although, the accurate impact of fires is poorly recorded and the true magnitude on human lives and livelihood has never been fully calculated, it is clear from the preceding discussion that lack of access to safe energy systems undermines socio-economic development (Raphela, 2011:2). It deepens and propagates poverty through “the loss of personal and community assets and also strains government resources where recurring fires require continuous government spending” (Raphela, 2011:2). Furthermore, it diverts resources away from service delivery, which could be of benefit to people and breeds deep inequality between the poor and the well-off. All this shows convincingly that shack fires are a serious problem in informal settlements.

2.4.2 The Problem of Burn Injuries and Deaths

Shack fires lead to serious injuries and deaths. One of the most serious injuries caused by fire is burn injuries, which are rife in informal settlements. In their World Report on Child Injury Prevention, the WHO defines a burn as “an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals. Skin injuries due to ultraviolet radiation, radioactivity, electricity or chemicals, as well as respiratory damage resulting from smoke inhalation, are also considered to be burns” (2008:98).

Globally, the fire-related burns’ mortality rate is very high, accounting for over 310 000 deaths annually, with Africa being the worst affected continent (HESASA, 2013 b: 2) (See Figure 2.8 below). Around the world fire-related deaths rank among “the 15 leading causes of death among children and young adults 5-29 years old” (Practical Action, 2010.8). Approximately 95% of fire-related mortalities happen in low- and middle-income countries, meaning that the burden of burn injury falls overwhelmingly on the

poor (Peck, Molnar & Swart, 2009:7). In South Africa the burns picture is equally appalling, with 3.2% of the population amounting to 1.6 million people suffering burns annually (HESASA, 2014:2). Bradshaw (quoted in Panday & Mafu) suggests “twelve percent of deaths in South Africa are attributable to injuries ... of which burns account for approximately 11 percent” (2007:25). Among children worldwide, burns are the fourth highest cause of injuries (WHO, 2008:98). In South Africa, the Medical Research Council (MRC) highlights that approximately 1300 children, mainly under the age of three perish annually from burn injuries. Of these, the male childhood mortality and injury rates are higher than female rates (HESASA, 2013b:2). The majority of affected people is poor and resides in informal settlements.

Chandran, Hyder and Peek-Asa point out that deaths are not the best indicator of the gravity of the burns problem (2010:1). They state that burns can result in significant, but non-fatal long-term consequences, which “represent a large component of the injury burden” (Chandran, Hyder & Peek-Asa, 2010:3). Sometimes burns leave the survivor with disabling scars and often due to the severity of their injuries, the need to amputate a limb arises (Van Niekerk, et al., 2012:45; WHO, 2008:101). Often, burn survivors develop “burn wound contractures and other physical impairments that limit function, lead to handicaps and reduce their chance of leading economically productive lives” (Peck, Molnar & Swart, 2009:7).

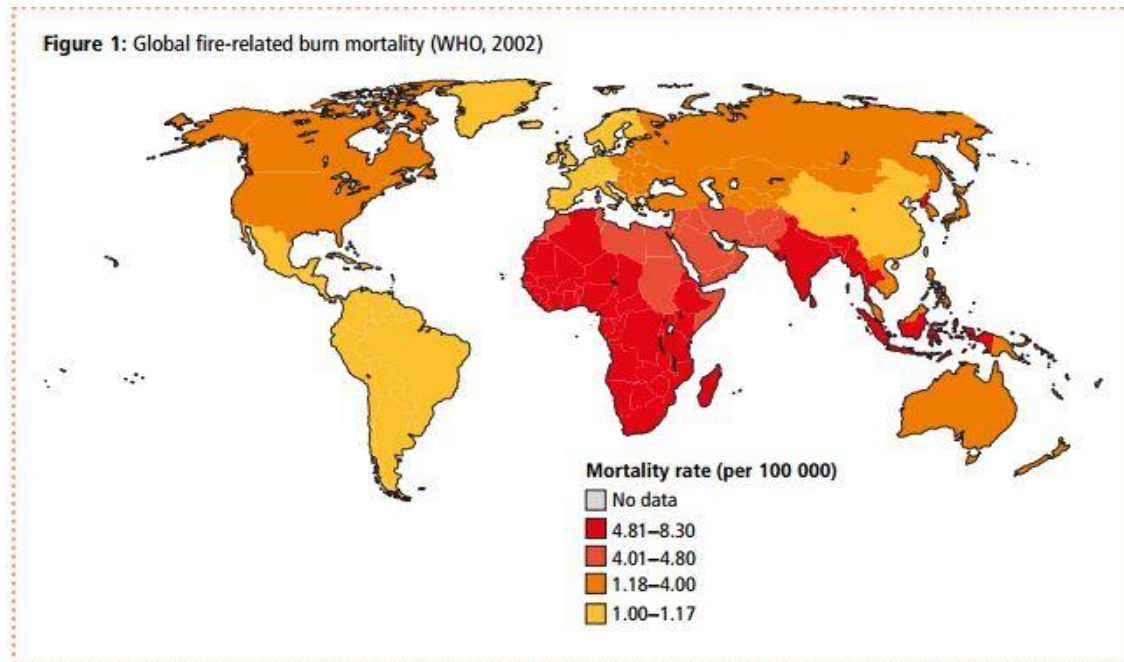


Figure 2.8: Global fire-related mortality

Source: HESASA (2014:2)

However, as much as the burns impose serious physical trauma and disabilities, much of the impact of burns is not on the skin or the body of the survivor, but on his or her psyche, meaning it is psychological (Van Niekerk, et al., 2012:1; Peck, Molnar & Swart, 2009:7). For example, facial or visible body burns resulting in gross disfigurement often lead to extremely low self-esteem of survivors, particularly children and adolescents. In addition, burn victims often experience discrimination and insults from other people, such as being called derogatory and hurtful names like Kentucky Fried Chicken (Kulati, 2014:32). Some children can no longer study in normal schools and require specialist care. Another crucial factor is that because injuries usually occur in young individuals, the number of years lived with disability, as the result of an injury is usually very long, thus prolonging the bad experience. Research studies conducted in America show convincingly that the post-injury capacity to adjust is affected by the psychological condition of the burn survivor and, as such, this problem has long-lasting implications beyond the physical level.

Burn injuries and deaths often result in serious financial costs and losses for poor people. Peck, Molnar & Swart state that “Injuries from shack fires are severe ... all patients required at least one surgical procedure. The mean length of [hospital] stay was 24 days, with a range of 8 to 47 days” (2009:7). The need for extended hospital stay can result in costs of between R30 000 and R100 000 to treat just one burn (PASASA, 2009:3). Often the burn victims are breadwinners in their families, so their long hospitalisation often means loss of real and potential income. In addition, because the majority of the victims are poor people with no medical aid, people are also left with long-term debts for medical procedures and treatment. Their inability to afford reconstructive surgery and other medical solutions deepens their depression further, thus driving them further and further into poverty. Sadly, Sverdluk states that injuries have been termed a “neglected epidemic” in policy terms (2011:138).

2.4.3 The Inequity of Injury

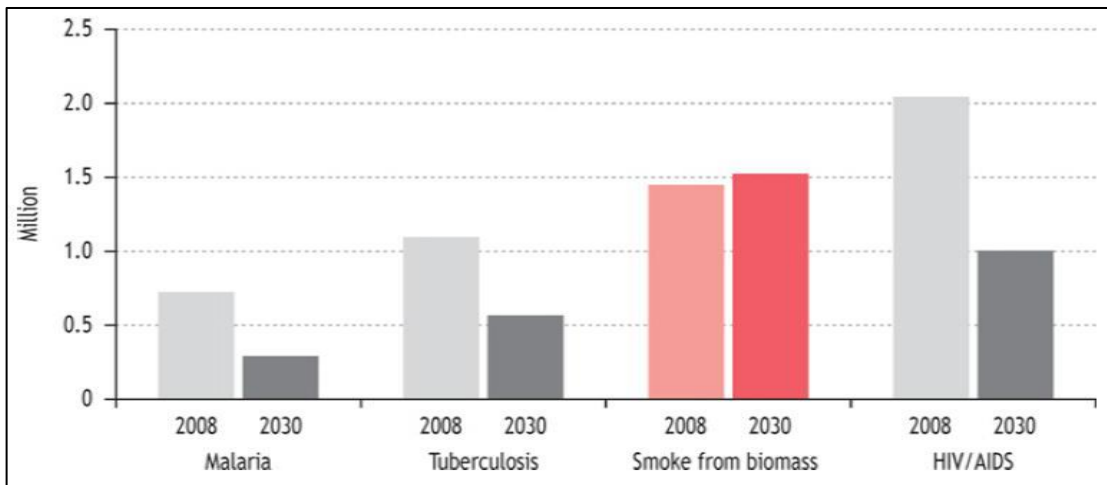
The huge burden of burn-related injuries is “unfairly borne primarily by those in low and middle income countries where prevention programmes are common and the quality of acute care is inconsistent. Burn injuries are dramatic examples of inequity” (Peck, Molnar & Swart, 2009:7). Within countries such as South Africa, poor people in informal settlements shoulder this burden. This is fundamentally about the lack or insufficiency of public health services for poor people living in informal settlements. Many affected people do not have access to the highly sophisticated care services that are necessary for proper care due to their lack of financial resources. As a result, many leave hospital with long-lasting physical and psychological effects, whilst the well-off can afford reconstructive surgery.

2.4.4 The Indoor Air Pollution Problem in Informal Settlement Households

Indoor air pollution is one of the most important causes of poor health in developing countries. Over three billion people are affected by it every day (Stockholm Environment

Institute, 2009:14). It is caused by the use of unsafe household energy sources and appliances in households (Environmental Performance Index, 2013/4:1). In fact, the WHO indicates that “Indoor air pollution from burning solid fuel, mostly for cooking, has been recognized as one of the top ten global health risks and is responsible for 1.6 million deaths and 2.7 percent of the global burden of disease” (quoted in PASASA, 2011:4). Foell (quoted in Andreasson, 2014:10) blames the inefficient combustion of traditional cooking fuels such as cow dung, wood and coal. The result of incomplete combustion is the production of carbon monoxide and other toxins (Panday & Mafu, quoted in Kulati, 2013c:19).

Research indicates that paraffin is also a dangerous indoor air pollutant when burned in a poor quality appliance (Kulati, 2013:22). This is because the majority of the paraffin appliances used do not burn the fuel efficiently (Truran, 2009:8). Another source of indoor air pollution is smoke from shack fires, especially if they occur when people are asleep or inebriated. Small children, the disabled, the old and/or sick people often become victims of this and become overwhelmed by the fumes. Equally dangerous are paraffin lamps, which have been shown to emit some of the most dangerous pollutant particles because “they are taken deeply into the lungs” (Practical Action, 2010:3).



Source: Foell, Pachauri; Spreng & Zeriffi (2011:88)

Figure 2.9: Premature annual deaths from household air pollution and other diseases

Evidence shows that exposure to indoor air pollution increases the risk of acute lower respiratory infections (ALRIs). Barnes, Mathee, Thomas and Bruce refer to ALRIs as “the single leading killers of South African children less than five years old” (2009:4). They cause and multiply the chronic obstructive lung diseases (COPD) as well as lung cancer in both children and adults, along with other health conditions, such as tuberculosis, perinatal mortality (stillbirths and deaths in the first week of life), low birth weight, asthma, otitis media, cancer of the upper airway, and cataracts (WHO, 2002:12).

Approximately “21% of deaths caused by lower respiratory infection worldwide, 35% of deaths from chronic obstructive pulmonary disease and about 3% of deaths from lung cancer” can be linked directly to indoor smoke inhalation (Practical Action, 2010:10; WHO, 2008:56). In the immediate fire context, low levels of carbon monoxide poisoning can cause dizziness, drowsiness and headaches, and higher levels or longer exposure may cause coma and death (Panday & Mafu, quoted in Kulati, 2013:19).

The worst part is that, although public health specialists predict that death from diseases such as HIV/Aids and malaria will decrease by 2030, sadly “the premature deaths from air pollution are expected to continue to rise” (see Figure 2.9 above) (Foell, quoted in Andreasson, 2014:10). These factors illustrate the seriousness of indoor air pollution in the use of household energy sources and their appliances, meaning that public policy on energy must help mitigate this eventuality.

2.4.5 The Problem of Unsafe Paraffin and Other Energy Appliances

Widespread use of unsafe domestic paraffin appliances is among the leading causes of fires and burns in South Africa (Paulsen, 2010:2). The appliances include stoves and heaters. According to Mrubata, et al. they are the “main contributor to harmful fires, burns and indoor air pollution incidences” (quoted in Kulati, 2013:32). South Africans in informal settlements use primarily two types of paraffin appliances, namely the non-pressure and pressure-based appliances. Of the two categories, non-pressure appliances constitute 90% of the market (PASASA, 2011:5). In other words, they are the ones that

are most often used and, as such, cause the most fire and burn incidents. This is because they are often defective, badly designed, and faulty, of poor quality and sub-standard (Medici, quoted in Kulati, 2013:32).

They “burst into flames when knocked over and when they are left on for more than an hour the temperature inside the fuel tank often exceeds the 43 degrees Celsius ... so that the stove catches alight ... Sadly, South Africa is currently flooded with these stoves because our borders and ports are porous and criminal gangs bring in illegal and unsafe appliances from other countries. This poses a persistent danger to local communities” (Noseweek Magazine, quoted in Kulati, 2013:20).

This is compounded by conditions of overcrowding and “substandard living conditions; faulty design; improper use of the device; ignorance; inexperience; intoxication or carelessness” (Peck, et al., 2007:22). Clearly these present serious problems in informal settlement households and the continued and easy availability of these unsafe appliances in the South African market points to a serious lack of enforcement of regulations on the manufacture, distribution and use of the appliances by government authorities, something that can be addressed by effective implementation of policy.

2.4.6 The Problem of Paraffin Poisoning in Children

In South Africa, paraffin constitutes 56% of the energy mix used in an estimated 21 million low-income households for cooking, lighting and heating. It looks like water and in informal settlements it is often sold in cold drink bottles; thereby causing small children to think it is a drink (HESASA, 2014:4). According to the WHO “The most common agents involved in childhood poisonings in low-income and middle-income countries are hydrocarbons ... such as paraffin”. The MRC states that paraffin ingestions account for 25% of all recorded ingestions (quoted in HESASA, 2014:1).

These ingestions often result in fatalities, trauma, and huge economic costs (Kimemia, 2013:1). The WHO (quoted in HESASA, 2014:1) estimates that “approximately 950 000

children (under the age of 18) die every year as a result of injuries ... and 90% of these deaths are categorised as ‘unintentional’ with 3.9% being poisoning related”. It is estimated that between 60 000 and 80 000 children are harmed via paraffin ingestion on an annual basis, with hospital records revealing that the majority of these victims are under the age of five (Matzopoulos & Carolissen, 2006:6). Approximately 60% of paediatric poisonings are attributed to accidental paraffin poisoning (Matzopoulos, 2005:12). Although some of these cases are non-fatal injuries, many children are left with lifelong disabilities, such as weakened lungs due to pneumonitis, which leads to paraffin-related pneumonia and constant coughing.

2.4.7 The High Energy Costs for the Poor in Informal Settlements

Another socio-economic problem affecting informal settlement households is the high costs of energy for poor people. Underprivileged households in developing countries consume less energy than their wealthier compatriots, but they often spend “a significant proportion of their limited cash incomes – often as much as 15 to 22% – on energy” (Practical Action, 2010:67; GNESD, 2014:9). South Africa, like most of the world, is “a highly regressive and inequitable energy financing environment ... whereby lower income households are seen to spend more on their household energy needs (up to 26% of their monthly incomes), when compared to their better off counterparts” (Swart & Bredenkamp, 2012:2).

The rapid increase in the price of energy deepens poor people’s vulnerability. For example, whilst indigent households experience such high percentage of energy costs, as mentioned above, the wealthy pay only 2 or 3% of their income towards energy expenditure (SEA, 2006:5). These energy costs are exacerbated by the indirect costs arising from ill-health caused by poor people’s reliance on unsafe, unhealthy and sometimes expensive fuels and associated appliances for some energy intensive domestic activities such as cooking and heating (White Paper on Energy, 1998). Part of the problem is that the various spheres of the South African government take shack fires as a

normal phenomenon (Raphela, 2011:4). Hence they have no motivation to address it effectively.

Women and children often pay the highest costs of household energy-related problems such as fires, burns and air pollution among others (UNDP, 2000:32). Because poor women tend to spend a lot of their time at home looking after the children and doing household chores, such as cooking, they are the most adversely affected when incidents such as fires occur. In many parts of the developing world, especially in rural areas, they extend a lot of the physical labour collecting biomass (WHO, 2008:1). As a result millions of women and children get sick or die from hard labour and exposure to indoor air pollution caused by burning solid fuels in poorly ventilated spaces.

2.4.8 The Problem of Energy Poverty in Informal Settlement Households

The current energy system engenders energy poverty which is a serious problem affecting multitudes of people, especially the poor. Olatoregun defines energy poverty as “the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development” (2007:27). It is “the inability of households to afford adequate energy services in the home, which can have several impacts on health and well-being” (Nierop, 2014.1). In other words, it is not just about lack of choice, but also lack of ability to procure energy due to material deprivation of poor people.

Globally, around three billion people are energy poor and approximately 1.5 billion, of those have no access to electricity whilst the energy access of another billion is unreliable and unsafe (AGECC, 2010:9; Wykes, Garside & Leopold, 2014:34). They rely on traditional biomass and other unsafe energy sources as their primary source of energy. The large majority of electricity-deprived people – around 85 percent – live in rural areas of the developing world, mainly in Sub-Saharan Africa and South Asia (Mainhardt-Gibbs, Bast & Kretzmann, 2010:3). The OECD/IEA posits that if additional dedicated policies are not enacted, by 2030 the number of people that lack access to electricity may

drop, “but only to 1.2 billion,” while “the number of people relying on traditional use of biomass is projected to rise from 2.7 billion today to 2.8 billion in 2030” (2010:23).

Statistics South Africa states, “Energy poverty is rife in South Africa” (quoted in CURES Southern Africa Region, 2009:1). It is one of the major factors characterising informal settlements in South Africa (Wolpe & Reddy, 2010:3). Approximately 3.4 million households, accounting for 26% of the population, do not have access to electricity (Swart, 2012:1; South African Institute of Race Relations, 2012:650). In South Africa “almost 7 million households continue to largely rely on unsafe, and inferior forms of energy” (Sustainable Energy Africa, 2014.1). The main drivers behind energy poverty have been identified as general poverty, low incomes and high energy prices (Bouzarovski, quoted in Nierop, 2014:7).

With the rapid rate of urbanisation and migration, informal settlements are proliferating. Under these conditions of energy poverty and material deprivation, people are forced to utilise unsafe energy sources and appliances. This has serious impacts on the poor who are the overwhelming majority of people who lack access to safe modern forms of energy and reside in informal settlements. Many are forced to get energy through illegal electric connections. These illegal and unsafe connections expose people, particularly children, to electrocution, injuries and even death. As stated before, the energy-poor suffer the health consequences of inefficient combustion of solid fuels in inadequately ventilated buildings.

Tait and Merven assert that the Department of Energy “has a clear mandate to address household energy safety and consumer protection as laid out in the Energy Act of 2008. However, this has been largely neglected to date” (2012:56). This section discussed this neglect in the context of the informal settlement phenomenon. It described the global energy system and highlighted the problems associated with the use of energy in informal settlements. It also discussed public policy as a mechanism that can catalyse social transformation. In this regard, it provided a brief South African energy policy and legislative overview and identified gaps and its failure to address the energy needs of

informal settlements. It concluded by a brief discussion of the proposed household energy safety policy framework as a basis for further investigation.

2.5. CONCEPTUALISING PUBLIC POLICY

2.5.1 Definition of Public Policy and Public Problem

Richards and Smith argue, "...Public policy is a more specific term applied to a formal decision or a plan of action that has been taken by, or has involved, a state organisation" (quoted in Cairney, 2015:3). It is "a formally articulated goal that the legislator intends pursuing with society and with a societal group" and an "authoritative allocation through the political process of values to groups or individuals in the society" (Cloete & Wissink, 2004:11; Chirawu, 2012:54). In simple terms a public policy is a government tool to address or not address a problem that negatively affects the public. It must be influenced by many stakeholders, have clear aims and objectives as well as clear societal outcomes (Cloete & Wissink, 2004:12). The allocation of resources by government is a decisive factor in determining the value placed on the public matter and public policy. A public problem has been defined as "an unrealised need, value, or opportunity for improvement attainable through public action" (Dunn, quoted in Kulati, 2013:20). In other words, a public policy problem is an issue that affects enough people long enough and severely enough for government to do something about it. We can therefore safely conclude that the lack of household energy safety in households is a public problem.

2.5.2 The Role of Public Policy in Effecting Societal Transformation

The International Energy Agency (quoted in Bast & Krishnaswamy) indicates "there are clear costs for development, health and the environment in continuing the status quo" and that these will be exacerbated "without additional dedicated policies" (2011:3). Public policy facilitates social transformation through government action to change the problematic status quo. According to Torjman, the function of public policy is to address

issues that are considered to be in the interest of everyone in society, whilst it may target the specificities of various societal groups (quoted in Tremblay, 2010:10). At its heart “policy intervention is about influencing behaviour – of businesses, organisations and individuals” (Commonwealth of Australia, 2009: iii). Public policies are utilised by government to allocate resources and express their intent and direction (Harman, quoted in Kulati, 2014:24). Public policy intervention is therefore vital to cause lasting societal transformation and to change the status quo of harmful energy-related problems in informal households.

2.5.3 Examples of Public Policy Interventions by Governments to Effect the Required Changes

For a long time, governments around the world have been utilising a wide range of policy measures to influence household decision-making and to change undesirable situations within countries (OECD, 2011:23). Literature reveals that this task is achieved through what is known as public policy instruments. Below, the definition and description, along with types and characteristics of public policy instruments, are outlined.

2.5.4 Definition and Description of Public Policy Instruments

Peters and van Nispen (quoted in Kulati, 2014:35) suggest, “the solution to policy failure lies in the development instrument theory and doctrine”. In this regard, Lascoumes and Le Gales state, “a public policy instrument constitutes a device that is both technical and social, that organizes specific social relations between the state and those it is addressed to, according to the representations and meanings it carries. It is a particular type of institution, a technical device with the generic purpose of carrying a concrete concept of the politics/society relationship and sustained by a concept of regulation” (2007:4).

Its central theory is that governments can achieve certain outcomes by selecting and using various policy instruments, a choice that is based on how effectively and cost efficiently

the objectives can be realised (Tremblay, 2010:9). It is for this reason that Kulati posits the idea that public policy instruments are “powerful mechanisms in the hand of government to effect the desired change in society” and “for advancing public policy” (2014:34; Treasury Board of Canada, 2007:8).

2.5.5 Types and Characteristics of Public Policy Instruments

The Australian Public Service Commission states, “a range of policy tools are available to governments to meet the challenge of maximising the total value to the community...” (quoted in Kulati, 2014:35). There are basically three categories of policy instruments namely: economic incentives, ‘the carrots’; regulatory constraints, ‘the sticks’; and information ‘the sermons’ (Vedung, quoted in Cooksy, Mark & Trochim, 2009:104). As indicated, they range “from the most intense regulatory instruments, also referred to as ‘command-and-control’ mechanisms, to a mix of incentives and disincentives (economic instruments) and to the least intense-educative/voluntary instruments” (Environmental Justice Organisations, Liabilities and Trade, 2012:1). Below is a table reflecting the three classes or families, and characteristics, of policy instruments which are then described in more details later in the document (Kulati, 2014:36).

Table 2.1: Three families of policy instruments

POLICY INSTRUMENT	POSITIVE	NEGATIVE
Regulatory	Prescriptions	Prohibitions
Economic	Grants, subsidies	Taxes, user charges
Communicative	Information	Propaganda

Source: Van den Doelen; Bemelmans-Videc et al. (quoted in Van Nispen, 2011:16).

2.5.5.1 Regulatory mechanisms

Regulatory instruments are legal rules or regulations that are put in place by government to address a public policy problem and engender specific outcomes in society. Knowandpol (2011:1) points out that they “identify and describe the processes through which collective action is promoted, guided and coordinated in order to achieve goals set up as desirable solutions regarding specific situations conceived as problems”.

The examples of regulation include appliance standards, codes, procurement regulations, mandatory packaging and labeling, certification and mandatory audits, to mention a few. Regulations are further broken into normative and functional categories. Whilst the former provides an accountability loop and link to the political system, the latter focusses on achieving efficiency and effectiveness. This suggests that for regulation to be implemented there must be a serious enough problem to necessitate government action.

This research has outlined in detail some of the key problems related to household energy use that could be drastically reduced if suitable regulatory instruments were to be designed and implemented in South Africa. Although some regulations exist to address, for example, paraffin appliance safety, the enforcement thereof is seriously lacking (Truran, 2009:6). Hence the need for careful consideration of effective regulations as possible tools in South Africa in a manner that meets the criteria above.

2.5.5.2 Economic or financial instruments

Kulati describes these instruments as “incentives and disincentives implemented by the government in order to motivate individuals and companies to conduct themselves in certain ways” (2013:40). Examples include a plethora of tools including taxes and fees, subsidies, deposit-refund systems, performance contracting, incentives and tradable permits (UNEP & CEU, 2007:2). The WHO indicates that a key component of all economic instruments “is that they effect change or influence behaviour through their impact on market signals. Economic instruments are a means of considering ‘external

costs', i.e. costs to the public incurred during production, exchange or transport of various goods and services, so as to convey more accurate market signals" (WHO, 2015:1). For example they can be used to increase "prices of goods and services that damage health and environment, as well as increasing financial returns in the case of more sustainable approaches that foster more environmentally-friendly production and consumption patterns" (WHO, 2015:1). There is clearly a role for economic or financial instruments to address household energy-related incidents and energy poverty in South Africa's informal households.

2.5.5.3 Communicative or information instruments

Communicative or information instruments are "...initiatives by government to persuade people to behave in a specific way" (Kulati, 2013:24). They are government-directed and sponsored efforts to "communicate to large numbers of citizens in order to achieve a policy result..." (Weiss & Tschirhart, 2007:1). Examples include awareness-raising programmes, publicity campaigns and information dissemination strategies. They can be executed through the media, such as television, radio, newspapers, websites, social media, statements or community addresses by leaders, door-to-door initiatives and other projects designed and intended to effect behavioural change on their target audience. In their analysis of the effectiveness of information-based instruments, Weiss and Tschirhart concluded that, although there are some disadvantages to their use, their advantages overwhelmingly outweigh whatever problems they exhibit. As such there was a strong justification for their inclusion, especially when they are carefully planned and carried out (2007:3).

2.6 OUTLINING THE PUBLIC POLICY DEVELOPMENT PROCESS

After the above theoretical overview of public policy, public policy instruments and how they work to effect social transformation, it is proper to outline the policy cycle or the

stages involved in the policy development process. However, before this is done a brief description of policy-making theories is presented as a context.

2.6.1 A Brief Description of Policy-Making Theories

Cloete and Wissink indicate that numerous theories have been put forward to explicate the process of making public policies (2004:26). A brief description of the major ones is given below.

2.6.1.1 Classical theory

According to classical theory (also known as institutional theory), the issues that receive policy priority are those that concern the government. The government's institutional considerations supersede all other stakeholder issues. In other words, "public policy is the product of public institutions" (Cloete & Wissink, 2000:26).

2.6.1.2 Liberal democratic theory

In liberal democratic theory the views and priorities of the political party in power assume "the position of primary force in policy making" (Cloete & Wissink, 2004:26).

2.6.1.3 Elite theory

Anderson (quoted in Cloete & Wissink, 2004:33) points out that this theory is premised on "the assumption that a small elite group (usually government) is solely responsible for policy decisions and that this group governs an ill-informed public (the masses). Policy decisions made by the elite flow downward to the population at large and are executed by the bureaucracy".

2.6.1.4 Systems theory

In this theory, the focus is on the political system's response to the "needs and demands of special interest groups" (Cloete & Wissink, 2004:26). In other words, stakeholders outside of government make an input into the policy development process by influence.

2.6.2 The Policy Cycle

Regardless of the various theories, there is a consensus in public policy literature that public policy making follows a cycle made up of interlocking and interrelated phases (Cloete & Wissink, 2004:26; UNEP, 2009:7). Despite small differences in the literature, there is a broad agreement on some of the key stages in the process, as outlined below in Figure 2.10.

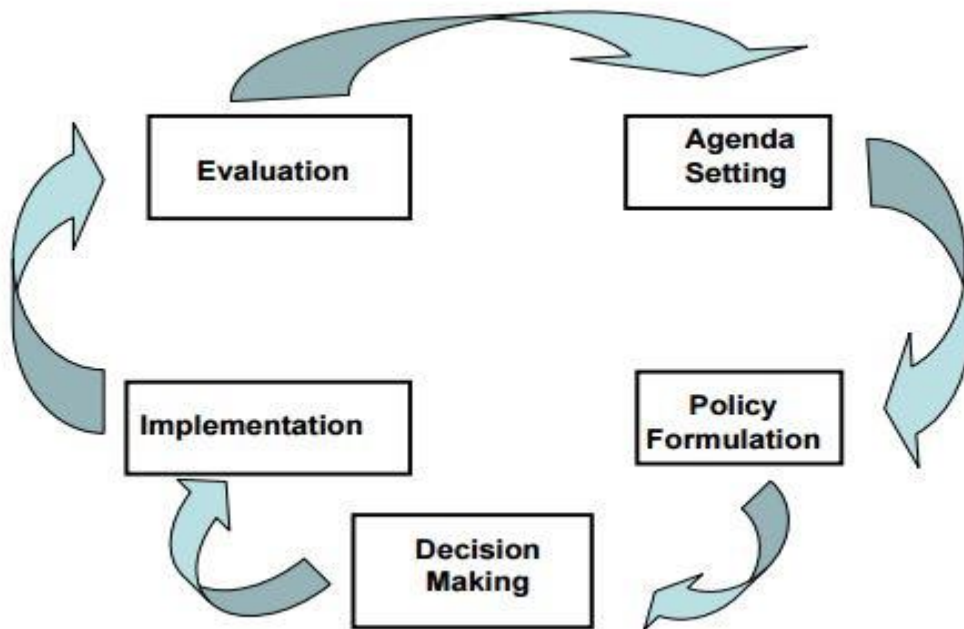


Figure 2.10: Public policy cycle

Source: United Nations Department of Economic and Social Affairs (2001)

2.6.2.1 Agenda setting

Cloete and Wissink define agenda setting as “a deliberate process of planning and action which defines and prioritises policy issues and problems, mobilises support and lobbies decision-makers to take appropriate action” (2004:98). It is a process in which policy initiators recognize that certain issues are public and are thus worthy of the government’s attention (UNEP, 2007:7). It entails a narrowed down list of prioritised problems that need solutions.

2.6.2.2 Policy formulation

During policy formulation, a number of policy options are produced to respond to the problem prioritised in the agenda-setting phase. In this process, “policy formulators – both inside and outside of the government – identify, refine, and formalize policy options to prepare the ground for the decision-making stage” (UNEP, 2009:7).

2.6.2.3 Decision making

According to UNEP (2009:8), in public policy sciences, “decision-making is described as a stage where a government decision-maker or an official decision-making body selects a course of action or non-action among a small set of policy options identified at the policy formulation stage with a view towards policy implementation”. Political players and considerations heavily influence this stage.

2.6.2.4 Implementation

Policy implementation, according to Pressman and Wildavsky (quoted in Cloete & Wissink, 2004:166), “is the ability to forge subsequent links in the causal chain so as to obtain the desired result”. It is at this stage that the identified and selected public policy

options are transformed into implementable action to address the identified problems. It is “probably the most difficult, demanding, and critical stage in a policy process” (UNEP, 2009:8). Yet it is at this stage where most policy processes break down due to neglect (Cloete & Wissink, 2004:166; UNEP, 2009:9).

2.6.2.5 Evaluation

The last stage in the process is evaluation, which is a “judging process to compare explicit and implicit policy objectives with real or projected outcomes or results or impacts” (Cloete & Wissink, 2004:166). In other words, it is the process of monitoring and assessing the extent to which the policy has achieved its intended goals and objectives.

2.6.2.6 Integrated policy approach

The stakeholders, who have been calling for the Household Energy Safety Policy in South Africa, have highlighted and emphasised that the policy must be integrated. However, according to Meijers and Stead, “...policies are often not sufficiently integrated to effectively address policy issues, particularly those that have a strong cross-cutting nature” (2004:12). As a result, there have been international calls for policy to be made in an integrated manner (UNEP, 2009:10). The purpose of the integrated approach is to promote a holistic collaboration and interconnectedness between public policies in order to achieve a sustainable policy impact and result in the development of policy that is multi-dimensional and multi-sectoral in its effect (European Commission 2010:4; Meijers & Stead, 2004:3).

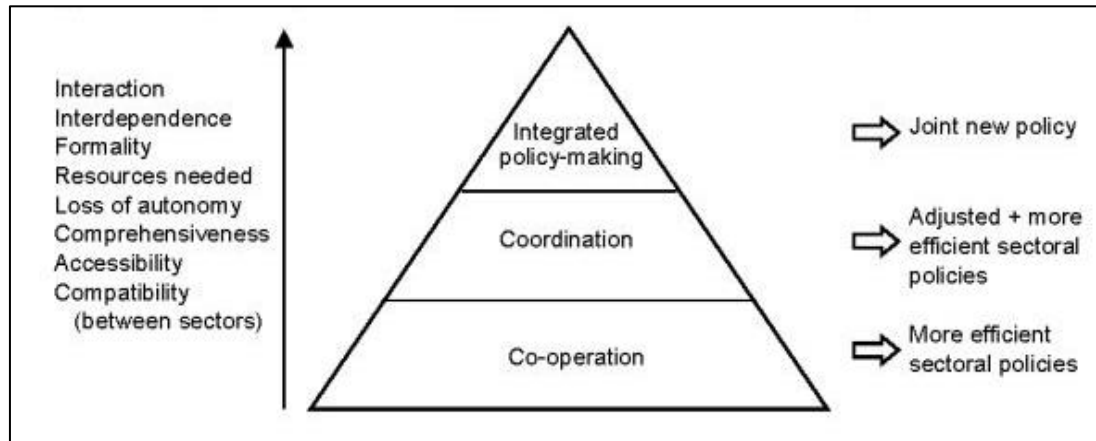


Figure 2.11: Policy integration model

Source: Meijers & Stead (2004).

Policy integration “concerns the management of cross-cutting issues in policy-making that transcend the boundaries of established policy fields, which often do not correspond to the institutional responsibilities of individual departments. It also refers to the management of policy responsibility within a single organisation or sector” (Meijers & Stead, 2004:1). This includes vertical and horizontal integration between various government spheres and departments impacted by the policy. Underdal (quoted in Meijers & Stead, 2004:2) highlights some factors that qualify public policies as integrated. These factors include “comprehensiveness (recognizing a broader scope of policy consequences in terms of time, space, actors and issues), aggregation (a minimal extent to which policy alternatives are evaluated from an ‘overall’ perspective) and consistency (a minimal extent to which a policy penetrates all policy levels and all government agencies)” (Meijers & Stead, 2004:2). So integration is integral to developing a new policy that has implication for diverse sectors.

2.7 CONCLUSION

This chapter illuminated the scope of the research question by conducting an extensive literature review. This literature review framed an in-depth theoretical exploration of

three broad and overarching issues: informal settlements, household energy, and public policy. These issues formed the three pillars or sections around which the review pivots. The review provided an extensive description of the informal settlement conditions and the household energy problems. It concluded with a comprehensive overview of the importance of public policy as a tool to effect social transformation.

CHAPTER 3: INSTITUTIONAL AND POLICY FRAMEWORK

3.1. INTRODUCTION

According to the Department of Health, over the last 20 years many developed nations “have reduced their injury death rates, some by as much as half. These reductions can be attributed to concerted and sustained injury prevention efforts, often instigated by government as part of a national strategy or programme. National strategies have been especially effective in reducing injuries in countries such as Australia, Canada and France” (2012:15). However, in South Africa, reports of horrific household energy-related incidents and energy poverty regularly punctuate the media because they occur unabatedly in informal settlements. The government has no policy or strategy to address this issue holistically and effectively. In order to address the dire problems described in Chapter 2, steps must be taken to change policies, approaches and actions on household energy for informal settlements (Bast & Krishnaswamy, 2011:3). PASASA and other significant non-governmental stakeholders in the household energy arena have proposed a household energy safety policy framework.

This study seeks to review and expand on that framework by exploring possible contents for it. This chapter aims to achieve five primary objectives. Firstly, it is to present an overview of South Africa’s energy policy and legislative framework and identify some gaps in it. This includes programmes and projects that the government has implemented to address household energy-related problems, especially those specifically relevant for informal settlement households. Secondly, it is to provide a description of South Africa’s existing and relevant energy institutional arrangements because for any policy to be effective it relies heavily on the country’s existing institutional arrangements and frameworks (Scorgie, Burger & Sowden, 2001:6).

Thirdly, it is to present a theoretical overview of public policy by defining and describing some of the key public policy theories and concepts, such as energy transition theory,

public policy problems, public policy and public policy instruments. Fourthly, the study describes the policy development process and focuses on an integrated policy approach.

Finally, it concludes by presenting and describing the household energy safety policy framework that has been proposed by the various stakeholders, as indicated above, with a view to draw lessons for the development of the contents for the proposed new and integrated household energy safety policy framework later in this study.

3.2 THE OVERVIEW OF SOUTH AFRICA'S ENERGY POLICY, LEGISLATIVE AND PROGRAMME FRAMEWORK

The national government in South Africa makes most policy decisions, and specifically energy policy decisions, centrally. The DoE is the driver of the process of developing energy policies within the national government, albeit in consultation with the nine provincial governments. South Africa's current policy and legislative framework on energy was designed to address the imbalances caused by its political history which continue to negatively impact on the present domestic energy situation (Africa, Blore, Dwight, Reichhardt, Retief & Mpando, 2007:5).

The problem is that, although they exist, South Africa's energy policies, legislations, institutions and programmes have no overarching or unifying framework that addresses energy poverty and problems in informal settlements (HESASA, 2014:1). They "tend to be characterised by insufficient inter-sectoral collaboration, fragmentation, unsystematic co-ordination, inappropriate resource allocation, and insufficient adoption of evidence in planning, implementing and monitoring interventions" (Department of Health, 2012:14). The section below therefore provides an overview of the energy policy and legislative framework. It also identifies some policy gaps within the framework.

3.2.1 The Constitution of South Africa (1996)

Jaglin (quoted in Tait, Merven & Senatla, 2012:5) states that South Africa implements “a rights-based and a ‘universal service’ approach to basic services”. The South African Constitution projects those services as basic rights. For example, although energy services are not stated explicitly as constitutional rights of people, they are often equated to water and sanitation rights in policy parlance (Dugard, quoted in Tait, Merven & Senatla, 2013:6). The Constitution of South Africa places an obligation on the government to protect its citizens from harm.

For instance, Section 24 of the Constitution guarantees every citizen’s “right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures – prevent pollution and ecological degradation” (Tait & Merven, 2012:23). This, by extension, includes the right to safe household energy and services. Consequently, the growing prevalence of energy poverty and household energy-related problems is indicative of government’s failure to fulfil its constitutional obligation.

3.2.2 The White Paper on Energy (1998)

The White Paper on Energy of 1998 “places health as an important underlying drive behind interventions around energy provision for poor households” (Tait & Merven, 2012:12). The Act directs government institutions to work proactively toward the reduction of energy-related harmful effects. In this regard, the DoE commits the government to promote access to basic energy services for poor households, “in order to ameliorate the negative health impacts arising from the use of certain fuels ... [to] ... work towards the establishment and acceptance of broad national targets for the reduction of energy-related emissions that are harmful to the environment and to human health” (Tait, Merven & Senatla, 2012:5). Even though the White Paper acknowledges and anticipates the future burgeoning of informal households, provides for lower-level

programmes and regulations to be enacted, promotes an integrated approach to household energy and puts an emphasis on alleviating energy poverty and improving energy access it “does not attempt to deal with strategies for implementation” (DME, 1998:3-4). Nor does it pay enough policy attention to thermal needs, particularly safety needs of informal households (PDC, 2003:166). In other words, though this act is progressive, it stops short of obligating the state to address household energy safety and addressing the general energy needs of the poor.

3.2.3 The National Energy Act (No. 34 of 2008)

According to Tait, Merven and Senatla “This Act therefore clearly places the responsibility for safety of different forms of energy under the jurisdiction of the Minister of Energy and gives the Minister a mandate to promote standards for appliances involved in the consumption of energy.” (2012:7).

Again, as laid out in the White Paper (DME, 1998), the Energy Act refers in all instances to energy and not specifically to electricity. The Act further empowers the Minister of Energy to “adopt measures not contemplated in any other legislation, to minimise the negative safety, health and environmental impacts of energy carriers” (Tait & Merven, 2012:13). Its objectives include promoting appropriate standards, regulations and specifications for the equipment, systems and processes used for producing, supplying and consuming energy; providing for optimal, coordinated and safe supply, transforming, transporting, and storing of energy; ensuring safety, health and environment; and facilitating energy access so as to improve quality of life (HESASA, 2014:1).

However, in reality its implementation has focussed primarily on electrification provision thus ignoring safety in the use of other energy sources. Even the regulations and standards that have been established for the other energy sources have not been equally applied and enforced in South Africa (Truran, 2009:5). For example, gas appliance safety regulations are fully applied and enforced, whilst paraffin appliance standards and

regulations are not effectively enforced, as stated above, because there are approximately three inspectors for this regulation across the country (Truran, 2009:6).

3.2.4 Integrated Energy Plan (2003)

The Integrated Energy Plan (IEP) was initiated by the DoE in 2003 “to determine the best way to meet current and future energy service needs in the most efficient and socially beneficial manner” (Tait, Merven & Senatla, 2012:7). Its purpose was to develop an energy policy road map that would not only guide energy source issues but also related technology development factors to guide and influence investment in energy infrastructure (Earthlife Africa, 2013:3; DoE, 2013:5). For example, it sets out “to guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector; to guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels); to guide investment in and the development of energy infrastructure in South Africa; and to propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors” (DoE, 2013:35).

It is clearly a very important policy tool with the potential to catalyse and influence real changes in informal settlements in relation to household energy safety because it intends to ‘balance energy demand with supply resources in concert with safety, health and environmental considerations’ (Tait, Merven & Senatla, 2013:7).

However, there are some problems with the IEP. For example, “despite the requirement to balance consideration of demand and supply, the plan is dominated by supply-side considerations and does not adequately analyse future trends in demand for the household sector” (Tait, Merven & Senatla, 2013:7). With regards to energy safety, the plan has a limited view. It states, “In addition, it is essential that all citizens are provided with clean

and modern forms of energy at an affordable price. The IEP will take these and other constraints into consideration” (DoE, 2013:6).

On this point, it focuses only on carbon emission reduction by focusing singularly on environmental considerations, thus ignoring all aspects of energy safety such as use, fuel, and appliances. Although it punts the notion of integration, closer analysis casts doubts and questions on its implementation of the concept as it fails to incorporate the issue of household energy safety that regularly affects so many people in South Africa. Also, nowhere does it mention or include household energy safety as a crucial policy dynamic in informal settlements.

3.2.5 Electricity Basic Service Support Tariff Policy (Popularly Known as Free Basic Electricity)

Due to the pervasive poverty and inability of poor people and households to afford electricity, the South African government introduced the Free Basic Electricity (FBE) policy. This is a subsidy funded by the national government and implemented by Eskom to electricity consumers in order to assist them towards paying for their electricity consumption of services such as lighting, media, limited ironing and water heating (Mohlakoana & Annecke, 2008:8; Tait, Merven & Senatla, 2013:6). Free Basic Electricity is defined as the “amount of electricity, which is deemed sufficient to provide basic electricity services to a poor household (defined as a residential customer with an official point of electricity supply)” (HESASA, 2014:1).

According to Mapako and Prasad, the policy of FBE seeks to “bring relief to poor electrified households ... through the provision of affordable electricity, to enable these households to access the socio-economic benefits from the National Electrification Programme” (2005:1). According to this policy, 50 kWh of electricity per month is provided to households for basic lighting, ironing and use of TV and radio, as well as occasional use of an electric kettle or hotplate” (University of Cape Town, quoted in Mohlakoana & Annecke, 2008.8).

The problem with this policy is that it is applicable only to households connected to the electricity grid and thus excludes vast areas of the country that are not electrified, including informal settlements and rural areas. In the same vein, the subsidy excludes other sources of energy used in the informal households. Another serious limitation is that, due to the limited amount of such free provision, energy intensive household activities such as cooking, which happens daily, and heating, especially in winter, are excluded in its configuration (Mohlakoana & Annecke, 2008:8). Equally problematic is the fact that, although it is about energy access facilitation for indigent households, the safety of that access is not considered and secured. As a result of this, informal householders are forced to use unsafe fuel and appliances.

3.2.6 Free Basic Alternative Energy Policy (FBAE)

Tait, Merven and Senatla identify the FBAE as “The only ... ongoing significant policy programme that deals with other fuels” except electricity (2013:5). It subsidises the consumption of energy sources such as paraffin, liquefied petroleum gas, candles, coal and bio-ethanol gel. This policy is intended to provide indigent households with alternative energy sources where electricity is not available, minimise health risks by promoting safe use of these energy carriers and to ensure that energy carriers chosen are sustainable, safe and easily accessible to the indigent households (DME, 2007:2; Tait, Merven & Senatla, 2013:9).

The FBAE targets households that are not connected to the grid, such as informal and rural households. It is channelled through a grant by the national government to local authorities, which are responsible for selecting relevant energy carriers. In terms of the policy, municipalities are also required to “conduct awareness campaigns informing the beneficiaries on how best to apply the chosen energy carrier(s). The campaigns must include but [are] not limited to safe use of the energy carrier, safe handling and storage to minimise health risk of such energy carrier(s)” (DoE, quoted in Tait, Merven & Senatla, 2013:9). The problem is local authorities generally poorly implement this subsidy

(Mapako & Prasad, 2005:4; Tait, Merven & Senatla, 2013:6). It is compromised by a lack of capacity, funding and planning, which is prevalent among many municipalities. An equally crucial flaw is that the FBAE subsidy excludes energy appliances, such as stoves, heaters and lampstands, which fall outside its gambit, thus failing to address energy safety concerns.

3.2.7 The National Development Plan

Although government has many policies that impact significantly on society, there are also high impact policies that are overarching, multiple-focussed, high-level in the institutional positioning and have unidirectional impact, specifically on energy policy (DoE, 2013:46). The DoE states, “Energy policy must therefore be developed in such a manner that the policy constraints or targets set by these policies are adhered to as closely as possible (taking into consideration other conflicting factors)” (2013:46). One such policy is the National Development Plan (NDP). In terms of the NDP, by 2030 South Africa should have adequate supplies of electricity and liquid fuels to avoid disruptions to economic activity, transport and welfare.

Regarding the energy of the indigent households, the NDP recognises that they are “still inadequately met” but does not offer or promote innovative, sustainable and safe household energy alternative solutions and technologies (Tait, Merven & Mohlakoana, 2013:7). It states that more than 90 percent of the population should enjoy access to electricity by 2030, which is highly unrealistic (DoE, 2013:46). To illustrate the NDP’s lack of appreciation of the importance of household energy, in the NDP energy access issues are dealt with as a small part in a chapter that deals with infrastructure development issues clearly as a business facilitation matter.

The NDP completely ignores household energy issues, even though many organisations made submissions to the National Planning Commission, which oversaw the development of the NDP, about the importance of including household energy safety as a key feature of the plan. Perhaps the greatest flaw of the NDP is its myopic and unsustainable view

that a coal-based electrification programme is the solution to the country's energy problems. It also seems to ignore the fact that South Africa electricity production is dirty, unsafe and unsustainable and is contributing to growing greenhouse gas emissions levels.

3.2.8 South African Presidency's Twelve Key Outcomes

The South African presidency aims to achieve 12 key outcomes as part of the South African Government Programme of Action – 2009 to 2014 (Presidency, 2010:3). The Programme of Action and Presidency's 12 key outcomes were derived from the election manifesto of the African National Congress (see Figure 3.1 below). One of the key outcomes relevant to household energy is the government undertaking to, amongst others, promote safety, reduce selected injury risk factors, and create structural and institutional enablers for a better life. The minister in the Presidency, highlighting the importance by which these outcomes are regarded, is the driver of this.

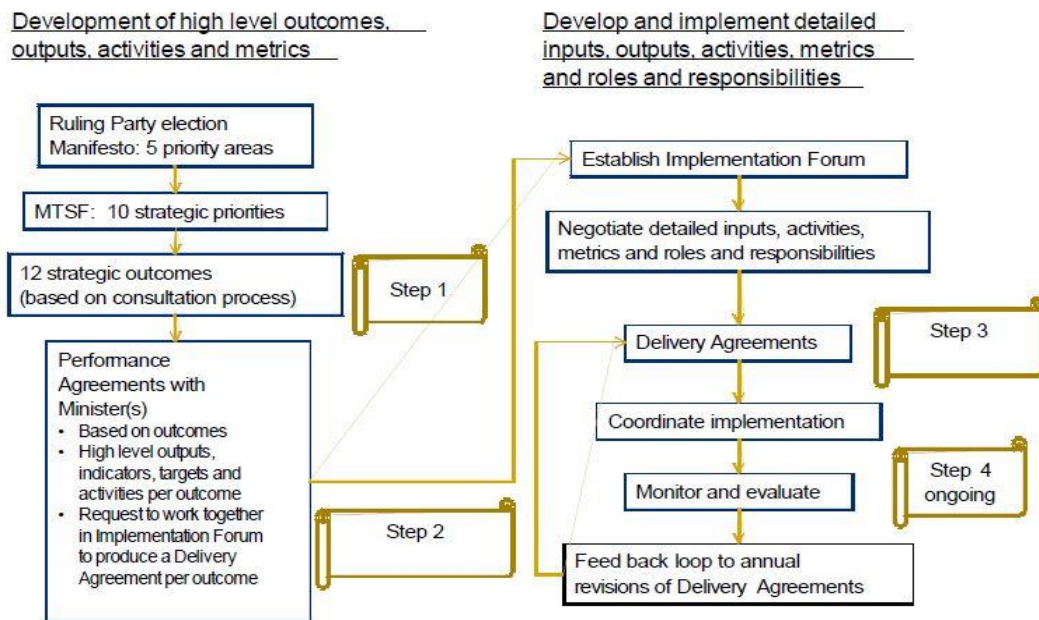


Figure 3.1: South African presidency's 12 key outcomes

Source: Presidency (2010:3)

One serious omission is that household energy safety is not included in the definition of safety in the document. The document emphasises safety from a criminal perspective, but leaves out the household energy safety concern that occurs all day, every day, in all households but which is devastatingly more pronounced in informal settlements. As a result, the issue is not monitored. Nor is there anyone held accountable by the Presidency for the prevention of the devastating incidents that daily punctuate poor people's existence in South Africa.

3.2.9 Energy Efficiency Strategy (2008)

Rosenberg and Winkler define energy efficiency as “an activity which generally contributes to greater efficiency in the use of energy sources”. It relates to the “economical and efficient production and utilisation of an energy carrier or resource” (DoE, 2013: 56). In order to achieve this, the South African government established the Energy Efficiency Strategy to contribute toward affordable energy for all, and to minimise the negative effects of energy usage upon human health and the environment (DME, 2008:12).

The Energy Efficiency Strategy's overarching goals include the improvement of the nation's health, creation of jobs, alleviation of poverty, and the reduction of environmental pollution and greenhouse gas emissions. Households are a key target sector for the strategy. However, although this strategy is good, it is delinked from household energy safety, rendering it inapplicable to the prevailing dangerous conditions in informal settlements (Swart, 2012:4). There is no focus whatsoever on improving the efficiency of the majority of appliances, such as paraffin stoves, used in poor communities.

3.2.10 Integrated Household Clean Energy Strategy

According to the DoE, “International literature cites numerous quantifiable cases on the harm caused to humans from airborne emissions derived from combustion pollutants” (2004:9). Domestic indoor air pollution contributes 69% of the overall air pollution when compared with the other significant sources (Department of Minerals and Energy, 2004:10). As a result of this, the government implemented the Integrated Household Clean Energy Strategy (IHCES), which had three phases, namely the low-smoke generating top-down ignition method for coal fires known as Basa njengo Magogo, low-smoke fuels manufacture and distribution, and housing insulation and design. This section focuses on Basa njengo Magogo (see figure 3.2) because it has the potential to reduce the smoke emissions of a conventional coal fire by up to 50% and appears as the only phase of the strategy that has been implemented and documented (DME, 2004:10).



Figure 3.2: Basa njengo Magogo fire ignition method

Source: DME (2004)

The Basa njengo Magogo (BnM) project is government's initiative to address air pollution in residential areas. Although electrification has progressed significantly and people's access to electricity has been enhanced, coal is still being used by poor people for cooking and heating the homes, especially in the Highveld regions of South Africa. Statistics show that "approximately 1 million households consume just over 1 million tonnes of coal per annum, most of which is burnt during winter" (DME, 2004:3). This creates a tremendous amount of air pollution that leads to serious illnesses. According to Terblanche "epidemiological data have indicated that acute respiratory illnesses (ARI) are one of the leading causes of death in black South African children. The mortality rate of ARI in South Africa is reported to be 270 times greater than for children in Western Europe" (quoted in Scorgie, Burger & Sowden, 2001:6).

The factors above and others occasioned the installation of the BnM project. Tait and Merven describe it as "an alternative fire ignition method for coal fires using braziers or 'imbaulas' which reduces smoke and pollutants" (2012:13). It is premised on a principle that attempts to achieve a complete combustion, which means a completely smokeless fire as the fire develops.

According to Ekurhuleni Municipality "apart from producing significantly less smoke (Figure 3.2 above), the BnM technology is quicker to ignite (implying that cooking and heating can be enjoyed in a relatively short space of time compared with the long wait when using the other conventional method), it burns longer for the same amount of coal and has been shown to use approximately 20% less fuel" (undated: 6).

Kulati is of the view that, although the programme addresses the health problems associated with the use of coal in households, it has not received sufficient support in terms of budget and prominence in government. It is limited in its scope in that there does not appear to be proof that it is implemented sufficiently and sustainably beyond Johannesburg, thus neglecting areas such as Mpumalanga, where coal is used the most in South Africa (Kulati, 2013:29). The BnM appears to be shifting from place to place within government such as the Department of Environment, Department of Energy and

Central Energy Fund (DoE, 2011:5 and Department of Environmental Affairs, 2012:13). This may be interpreted as lack of political and organisational support.

3.2.11 Occupational Health and Safety Act (OHS Act) and the Pressure Equipment Regulations (PER): Gas

One of the energy sources utilised in households is gas, the use of which is highly and effectively regulated under the OHS Act and PER regulations. The Liquefied Petroleum Gas Safety Association of South Africa (LPGASA), which has been mandated by the Department of Labour to enforce these regulations states, “from a consumer’s perspective, there are three main areas which they need to be aware of when considering using Liquefied Petroleum Gas (LPG), all of which are requirements under the Occupational Health and Safety Act (OHS Act) and the Pressure Equipment Regulations (PER): the Appliance, the Installer, and the Cylinder” (Kitchen Specialists Association, undated:36).

In terms of the OHS Act, the requirement is that any LPG appliance, such as stoves and heaters, distributed or sold in South Africa must comply with the South African National Standards (SANS) 1539, which is the relevant national standard. In terms of SANS 1539, “appliances must be tested at an accredited test house and if they are found to comply with the Standard, the ... LPGSASA will issue a Verification Permit which has its own unique number. The brand, model, description, is then listed on the LPGSASA website” (Kitchen Specialists Association, undated: 36).

The OSH Act also regulates that the installers of gas equipment must be competent and registered by a lawful organisation that is approved by the Department of Labour. The registered installers are given identity cards with a registration number, name and photograph to ensure safety of people. On the completion of their work, installers have a duty to issue a certificate of conformity (Kitchen Specialists Association, undated: 37). When it comes to the regulation of the cylinders, the OSH Act determines how much gas the cylinders should be filled with. The cylinders must be thoroughly checked to ascertain

integrity and they must have a seal that is shrink-wrapped around the cylinder valve. This seal should always bear the logo of the company that owns the cylinder. The logo should match the logo on the cylinder itself. (Kitchen Specialists Association, undated: 38).

As can be seen above, the gas distribution and use system is safe and ideal. The problem is that the government has taken a hands-off approach on this matter. The government has outsourced their function to the LPGASA for the latter to do what government should be doing. Therefore, the industry is saddled by an enforcement of a government regulation, which raises doubts about government's attitude and commitment to household energy safety.

3.2.12 New Households Electrification Strategy

Another development is the South African cabinet's decision to implement a new Household Electrification Strategy (DoE, 2013:5). The objectives of the strategy are to realise or achieve a universal access rate of 97% of households, electricity grid connection of about 90% of households, and a high-quality non-grid solar home systems roll out for the rest. Apart from the fact that this strategy repeats the energy policy trajectory that the government has been pursuing without success (which is to define energy as electricity), it fails again to accommodate other energy sources for the diverse energy uses of poor people. It also fails to consider Eskom's lack of capacity to generate electricity at the required rate for industry, households and other sectors. It does not take into consideration the increasing prices of electricity in the context of high unemployment and the job-losing economy that South Africa has. Therefore, instead of exploring new and bold ideas to address the needs of poor people, it seeks to address the needs of the middle class.

3.2.13 Government Energy Programmes

According to Tait, Merven and Senatla “There have been few programmes targeting other household fuels in South Africa” (2013:15). This section briefly mentions some of the programmes that the South African government has implemented.

3.2.13.1 Integrated Energy Centres Programme

The Integrated Energy Centres (IECs) Programme was initiated in 2002 by the DoE, in collaboration with strategic partners in poverty-stricken rural areas. The IECs are one-stop energy shops that provide energy services and information to communities. They were established as cooperatives of the local community and serve as sales outlets for energy products, such as petrol, diesel, paraffin and gas. Through the programme, “energy products and gadgets such as efficient bulbs, Eskom pre-paid cards, solar cookers etc. are also available at the centre ... Information on energy in general (including FBE) is provided by Information Officers at the IEC” (Department of Environmental Affairs and Tourism. 2005:11). The IECs also work with schools, businesses, municipalities and households (see Figure 3.3 below).

Although the IEC programme provides access to safe and affordable energy resources to poor households, it is too limited in scope and it lacks budget and political prominence. By 2013, there were only thirteen IECs around the country, all positioned in rural areas (DoE, 2013:9). It is wholly funded by the oil industry and, as such, the centres are to all intents and purposes, garages or petroleum distribution centres. (DoE, 2013:10).

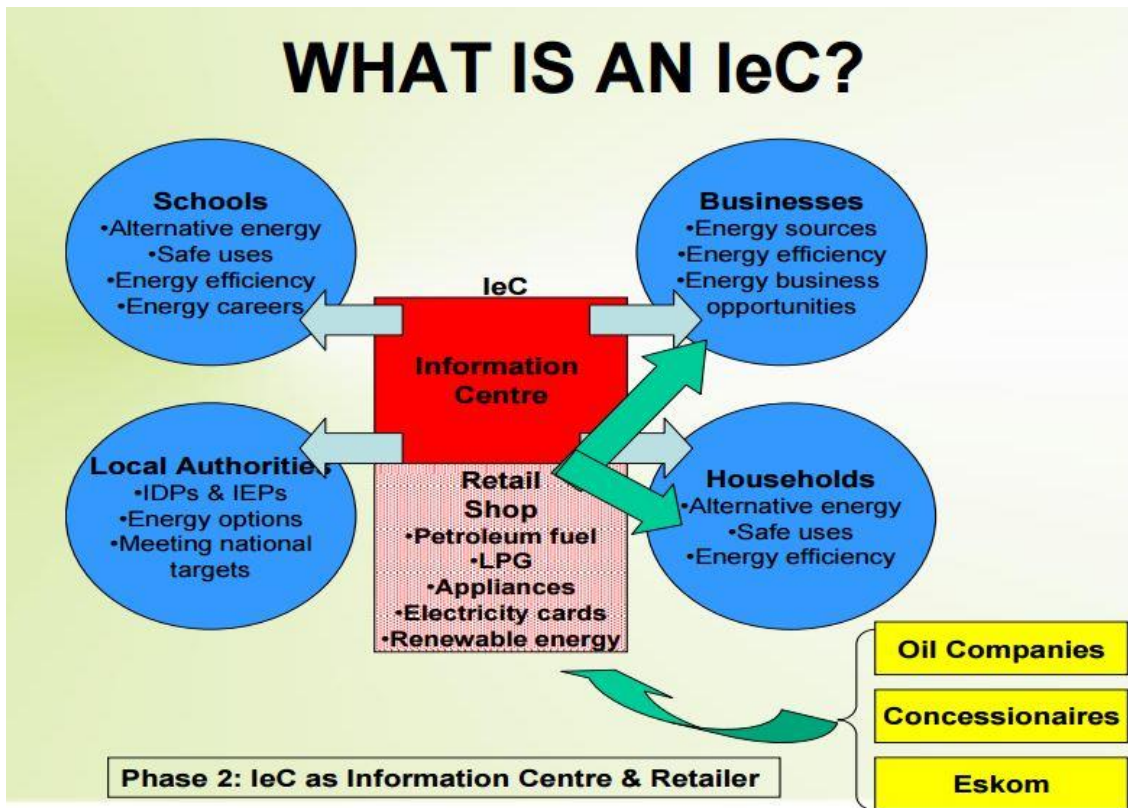


Figure 3.3: An integrated energy centre framework

Source: Department of Energy (2013)

3.2.13.2 Liquefied Petroleum Gas Roll Out and Compact Fluorescent Lamps Programmes

During 2006 South Africa, particularly the Western Cape Province was plunged into an electricity crisis in the form of widespread blackouts or electricity power cuts. O'Connor (quoted in Mohlakoana & Annecke) states, "In 2006 when the blackouts were first experienced ... government was under pressure to provide alternative energy services for households and businesses. Households in low and high income areas experienced power failures and businesses lost large amounts of money, especially those dealing with perishable products" (2009:12). In response, the government and electricity utility Eskom implemented two programmes, namely an LPG distribution and Compact Fluorescent

Lamps Programmes (Mohlakoana & Annecke, 2008:2). These programmes were designed and implemented as part of Eskom's Demand Side Management (DSM) programme "with the goal of saving electricity and reducing the need to shed customers" (Mohlakoana & Annecke, 2008:2).

The LPG Roll Out initiative entailed an exchange of two plate electricity stoves for a two burner gas stove, plus a 5kg cylinder, R90 worth of vouchers, gas stove fittings and some gas safety education in low-income households. The primary goal "of the intervention in low income households' energy use was to reduce the electricity consumed for cooking during peak periods". (Mohlakoana & Annecke, 2009:2).

Another initiative, which was spearhead by Eskom and funded by the government, was the Compact Fluorescent Lamps Distribution Programme. As part of the programme, households, at no costs to themselves, exchanged their incandescent light bulbs for compact fluorescent bulbs, which, although expensive, are energy efficient and longer lasting (Eskom, quoted in Mohlakoana & Annecke, 2009:11; REEEP & SANEDI, 2014:3).

The urgency and focus with which government and Eskom implemented these projects, illustrated what and how could be done to address household energy issues when government and its stakeholders have the political will. However, the programmes were misdirected because they were positioned as a demand-side management strategy that was about reducing the demand for electricity. The problem is that they were implemented in low-income communities, whose consumption of electricity is far lower than that of affluent communities, which use highly energy intensive appliances and equipment in their homes. In addition, although "the programme was well-received by households this was seen as a national emergency and people felt the need to play a role in conserving electricity. However, the sustainability of the programme is still in question, especially among poor households which might eventually go back to using incandescent light bulbs as they are still available on the market at a much cheaper price" (Mohlakoana & Annecke, 2009:2).

3.3 BRIEF DESCRIPTION OF THE INSTITUTIONAL ARRANGEMENTS FOR ENERGY GOVERNANCE IN SOUTH AFRICA

This section provides an overview of the government institutional arrangements of South African's energy system. Chapter 1 of this study dealt with some of these institutions from the energy governance perspective; here they are discussed on the basis of their relevance for households and from the energy policy perspective.

3.3.1 The Role of National Government

The Constitution (1996) of South African establishes or provides for a government with three spheres, namely the national, provincial and local spheres of government. It provides the legal basis for allocating powers to different spheres of government and contains a number of rights specifically relevant to energy policy (Department of Environmental Affairs and Tourism, 2005:15). The Department of Environmental Affairs and Tourism states that in terms of the constitution “government must establish a national energy policy to ensure that national energy resources are adequately tapped and delivered to cater for the needs of the nation. Energy should be made available and affordable to all citizens, irrespective of geographic location. The production and distribution of energy should be sustainable and lead to an improvement in the standard of living of citizens” (2005:16).

From a governance perspective, the departments, under the political leadership of the ministers and the administrative leadership of senior managers, have a number of functional units that are aimed at achieving the vision and mission of the department. The Energy Minister forms part of the cabinet, which has a role to oversee the implement of government programmes across all departments (see Figure 3.4 below). The president is the head of the cabinet and has overall leadership of the government.

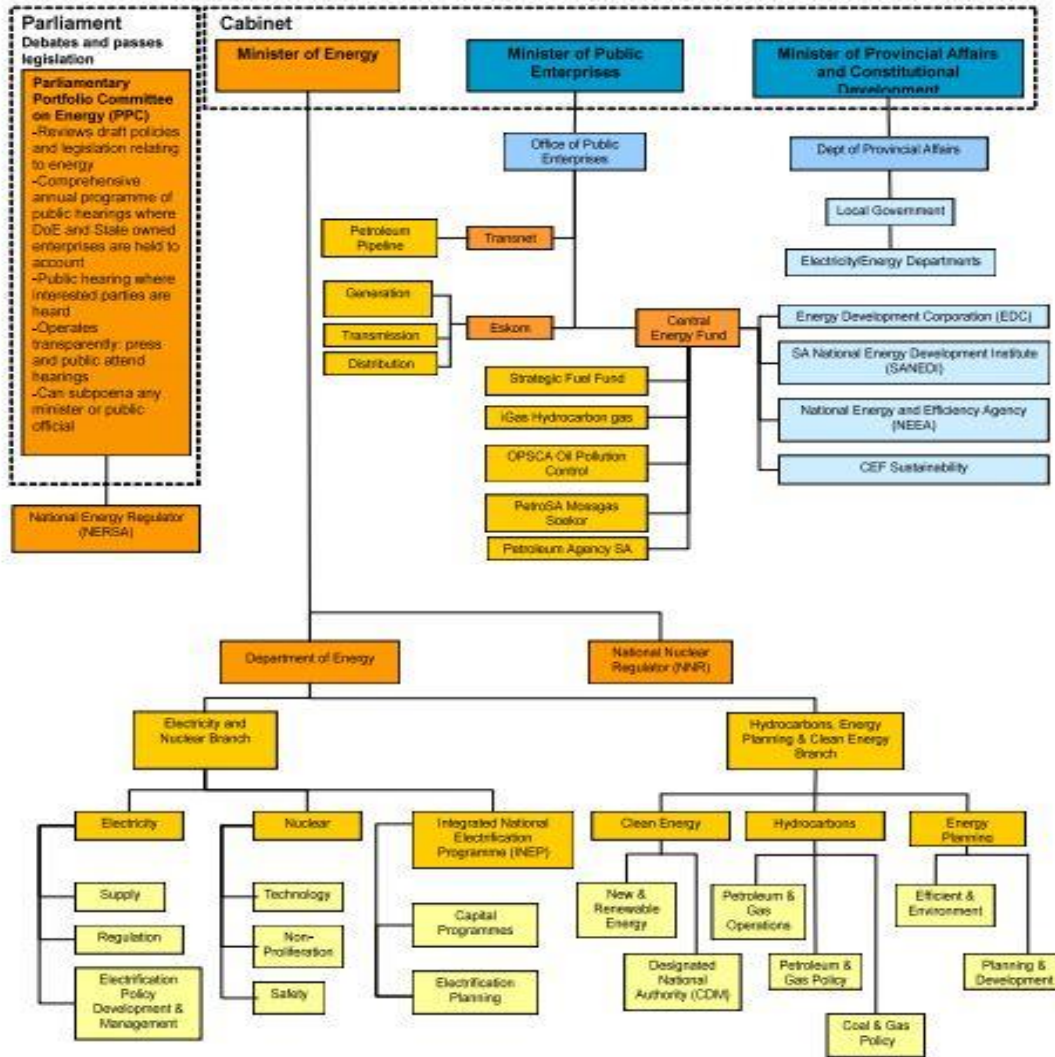


Figure 3.4: Institutional relationships in the South African energy sector (adapted from Ward, 2008)

Source: City of Cape Town (2011).

3.3.2 The Department of Energy

Domestic energy systems rely heavily on the political systems and existing institutional arrangements in a country. In South Africa, the DoE carries the role of governing the energy portfolio using legislative and other regulatory measures (DoE, 2014:34).

It is responsible for ensuring exploration, development, processing, utilisation and management of South Africa's mineral and energy resources. As the country's economy continues to grow, energy is increasingly becoming a key focus. Its main mandate is to formulate, develop and implement energy policy. It is to also ensure "the provision of various forms of energy we have to also ensure that people's right to an environment that is not harmful to their health or well-being, an environment protected for the benefit of the present and future generations through reasonable legislative and other measures, is observed. We further have to ensure that as part of 'adequate' housing we provide electricity and other means of energy" (DoE, 2011:11). Therefore it is best positioned to make a decisive impact on improving the lack household energy safety and prevalence of energy poverty in low-income communities.

3.3.3 The Portfolio Committee on Energy

In South Africa, there is a portfolio committee for each national ministry and its associated government departments. The role of the Portfolio Committee on Energy (PCE) is to exercise oversight on the DoE and hold it accountable in terms of the Constitution and other relevant policies (see Figure 3.4. above). Its specific functions are to consider energy-related bills, examine and deal with departmental budget votes, enquire and make recommendations about any aspect of the department (including its structure, functioning and policy) and, if the need arises, the PCE may investigate any matter of public interest that falls within their area of responsibility. As public representatives, members of the committee have a unique opportunity to question the DoE on what they are doing to improve the household energy situation in informal settlements and hold them accountable for lack of progress.

3.3.4 South Africa National Energy and Development Institute

Another important institution is the South Africa National Energy and Development Institute (SANEDI). According to the DoE, the entity “was established to conduct nationally focused energy research and development, while assisting the Department to achieve its strategic objectives through energy research activities as well as energy efficiency programmes as set out in the National Energy Act (No. 34 of 2008)” (2011:29). Its functions are to promote energy efficiency and stimulate innovation in energy research and development (DoE, 2010:19). In this regard, it helps to change the race and gender profile of researchers in the energy sector and enhance the country’s competitiveness and innovation in global energy research (DoE, 2010:23). It assists the country to reach its energy goals and focuses on awareness-raising and increased uptake of green energy. SANEDI is strategically positioned to conduct research, influence and formulate policy proposals or solutions on household energy problems in poor communities.

3.3.5 National Energy Regulator of South Africa

The strategic objectives of the National Energy Regulator of South Africa (NERSA) include:

- To implement relevant energy policy efficiently and effectively;
- To implement relevant energy regulations efficiently and effectively;
- To identify, develop and implement relevant energy rules efficiently and effectively;
- To establish the credibility, legitimacy and sustainability of NERSA as an independent and transparent energy regulator;
- To create an effective organisation that delivers on its mandate and purpose; and
- To evaluate the Energy Regulator’s effectiveness.

(DoE, 2010:23)

3.3.6 The Central Energy Fund

The Central Energy Fund's (CEF) task is to search for appropriate energy solutions to meet the future energy needs of the people of South Africa. This incorporates "financing and marketing the acquisition (coal), exploitation (coal deposits) and manufacturing (liquid fuels) of different energy sources other than any other objective which has been assigned and approved by the Minister with the concurrence of the Minister of Finance" (DoE, 2010:16). CEF has under it the National Energy Efficiency Agency (NEEA), which is responsible for the implementation of demand side management and energy efficiency projects in the country.

Another division under CEF is known as the Energy Development Corporation (EDC), which supports the development of renewable energy and alternative fuels through investment. These structures could invest in pilot projects to test technical solutions for household energy problems in impoverished environments.

3.3.7 Eskom

As stated before, Eskom is responsible for the generation, transmission and distribution of electricity to various stakeholders including households, farmers, industries and commercial interests (DoE, 2010:12). It does this by building and maintaining electricity power station and the electricity distribution grid that criss-crosses the breadth and length of South Africa. Their only interest in informal settlements appears to be centred on their campaign to prevent illegal electricity connections.

3.3.8 The Role of Provincial Governments

South Africa is made up of nine provinces, according to the Constitution. They are vested with provincial legislative authority in terms of Section 104 of the Constitution. According to the South African Cities Network (SACN) "the provincial legislature may

pass legislation for its province on any matter within a functional area listed in Schedule 4 and Schedule 5, the former of which it shares a concurrent power with national government ... It may also legislate for functional areas expressly assigned to it by national legislation, and any matter for which a provision of the Constitution envisages the enactment of provincial legislation” (2014:6).

The Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEA) indicate, “to date, provinces in South Africa do not have a constitutional role or mandate for energy services...” (2012:10). However, they have a clear constitutional and legislative mandate to facilitate economic growth, in which energy plays a crucial role, and to create a conducive and supportive regulatory environment for service delivery, in which energy provision is key (WCDEADP, 2007:3).

For example, the provincial authorities could be play a leading role in:

- “Promoting economic development through sustainable energy investment and rollout,
- Setting a conducive regulatory environment and creating awareness,
- Supporting efficiency in energy project permission and authorisation processes,
- Setting guidelines,
- Supporting and coordinating identified provincial and local government initiatives,
- Providing skills development,
- Promoting innovation through research and development,
- Promoting local participation in the renewable energy value chain, including local content manufacture,
- Supporting lead and pilot projects.”

(DEDEA, 2012:10) (See Figure 3.5 below).

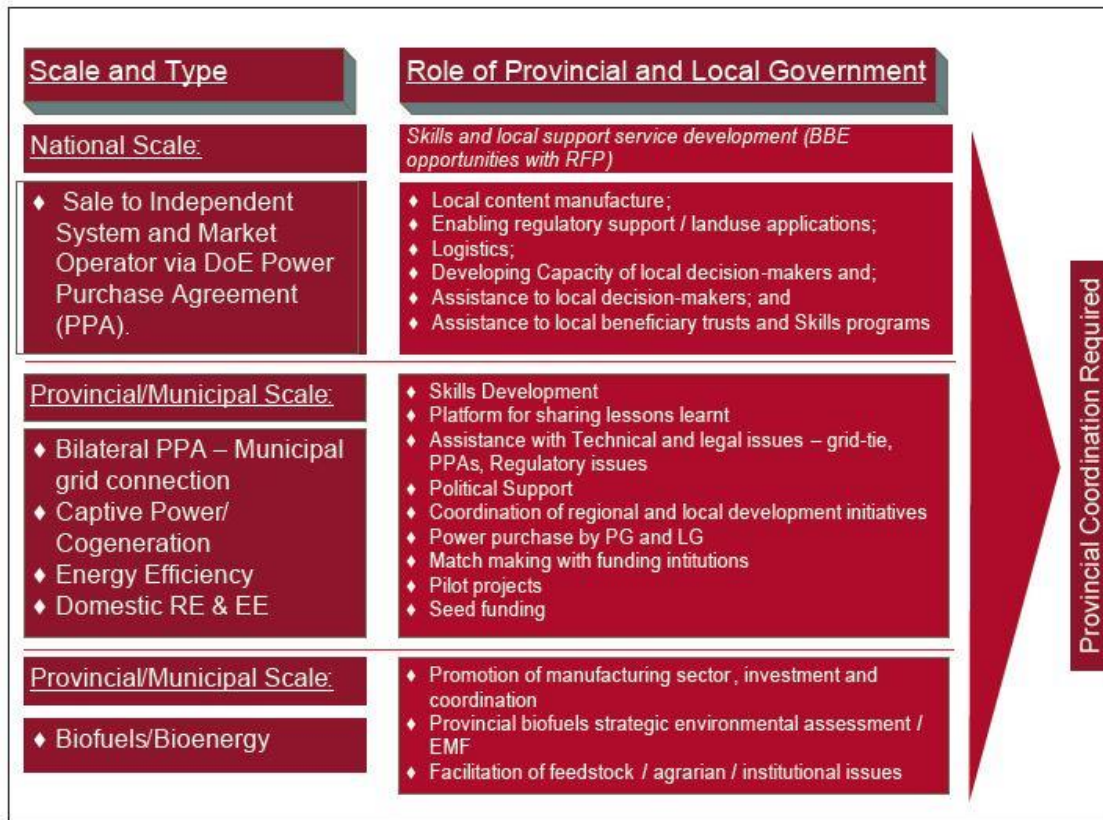


Figure 3.5: The roles and responsibilities of the Eastern Cape provincial government in energy

Source: DEDEA (2012).

As a result of this many provinces, such as the Western Cape, Eastern Cape, North West and Gauteng, have developed energy strategies (WCDEADP, 2007:3; DEDEA, 2012:10; Department of Local Government and Housing, 2010:1; Department of Economic Development, Environment, Conservation and Tourism, 2012:4). The Provincial Government of the Western Cape is perhaps representative of all provincial governments when it states in its strategy that it “is actively seeking to co-operate with other government bodies around energy concerns, and proposes to provide assistance, support, and leadership” (WCDEADP, 2007:5).

For its part, the Eastern Cape provincial government strategy aims at providing a conducive and enabling environment for investment in sustainable energy and

implementation (DEDEA, 2012:6). This is due to the fact that “Energy concerns are cross-sectoral and must be handled in an integrated manner” (2007:10). Therefore, provincial governments play a crucial role, not only in the intergovernmental relations system, but also in facilitation of energy provision.

3.3.9 The Role of Local Authorities

Energy policy implementation is not confined to one sphere of government or to government alone. All stakeholders have a role to play “including provincial government departments, municipalities...” (DEDEA, 2012:6). Municipalities or local governments, “have an important role to play in sustainable energy transitions, yet the ability within local governments to step into this role is severely inadequate” (Borchers, Euston-Brown & Ndlovu, 2015:1; United Nations Environment Programme, 2015:71). South Africa has international and constitutional obligations pertaining to energy management, including the Millennium Development Goals (MDGs) and the Johannesburg Plan of Implementation. Although “national government has not devolved specific responsibilities relating to these commitments to the city level, much of what the state can do is city-based and coordinated by local government, if not directly delivered by them” (SACN, 2014:7).

The factors above illustrate the important role played by local government. The responsibility of meeting basic needs and promoting just and equitable social and economic development lies on local governments. This is because the national and provincial government cannot always address some of the key problems facing people in communities. For example, “In aggregate across the study cities, 16% of city households do not have access to a clean, safe, affordable and reliable energy service. Within poor, rural towns, such as King Sabata municipality this is as high as 58%” (Sustainable Energy Africa, 2006: iv). In terms of the South African Constitution, the White Paper on Local Government, Municipal Structures Act and legislation such as the National Environmental Management Act (NEMA) of 1988, local authorities have an obligation

and responsibility to effectively provide access to clean, reliable, affordable and safe energy” (Sustainable Energy Africa, 2006:8).

It has been argued that, “Energy is ... a key and substantial factor in economic production. Local government provides a platform for economic development, a central component of which must be reliable energy service provision, planning and regulation” (Sustainable Energy Africa, 2006: iv). Energy provision is a critical catalyst to meeting the basic social needs of people, such as “cooking food, warming and lighting homes, providing health services and community facilities and powering domestic appliances and communication and entertainment devices” (Sustainable Energy Africa, 2015:13). When household energy-related problems such as energy poverty and fires occur, it is local governments that have to deal with them. It is therefore abundantly clear that local authorities have a crucial role to play in the South African energy governance and delivery system. This completes the brief review of the institutions that are relevant to the household energy issues affecting informal settlements.

3.4 AN OVERVIEW OF THE PROPOSED HOUSEHOLD ENERGY SAFETY POLICY FRAMEWORK FOR INFORMAL SETTLEMENTS IN SOUTH AFRICA

The aim of this section is best captured by Marquard as “to conceptualise between energy-related policy phenomena and the political sphere, which will be approached primarily through a framework for an agenda-setting and alternative-specification” (2006:23). Society is constantly besieged “by ‘conditions’ or ‘difficulties’ but these are converted from time to time into ‘problems’ which are addressed by policy change, which are differentiated from the former by their amenability to state intervention”. The literature review has discussed a number of serious household energy-related problems affecting poor people in informal settlements. Even though the above policy and legislative review shows that there is a constitutional obligation and legislative requirements for the government to act, the reality is that the energy needs of poor

households in South Africa are still inadequately met (National Planning Commission, 2012:171).

Kingdon (quoted in Marquard, 2006:24) identifies “three streams of policy related activity, namely problem recognition, policy formulation and politics”. Problem recognition has been identified by numerous experts as the absence of an integrated and comprehensive household energy policy in South Africa, which is a grave injustice for millions of poor people in informal settlements (Swart & Bredenkamp, 2012:1; Kulati, 2013:34; Tait & Merven, 2012:48). As a result, many stakeholders have called “for an integrated National Household Energy Safety Policy which does not only look at issues of energy access and affordability, but issues of supply chain safety” (Kulati, 2013:12). The problem lies in that the task of designing and formulating policies to influence household behaviour is a serious challenge for policymakers (OECD, 2011:22). The proposed framework below seeks to help with the designing of the contents or pillars of a household energy safety policy.

3.4.1 The Proposed Framework for Household Energy Safety Policy

Following a series of calls by experts and organisations for Household Energy Safety Policy targeting the poor over many years, in May 2012 PASASA convened a panel of experts to discuss the possible contents of such a policy, among other things. Other organisations represented included the Sustainable Energy Technology and Research (SeTAR) Centre, University of Johannesburg, South African National Energy Development Institute (SANEDI) of the Central Energy Fund (CEF), National Regulator for Compulsory Specifications (NRCS), Energy Research Centre (ERC), University of Cape Town and the South African Petroleum Industry Association.

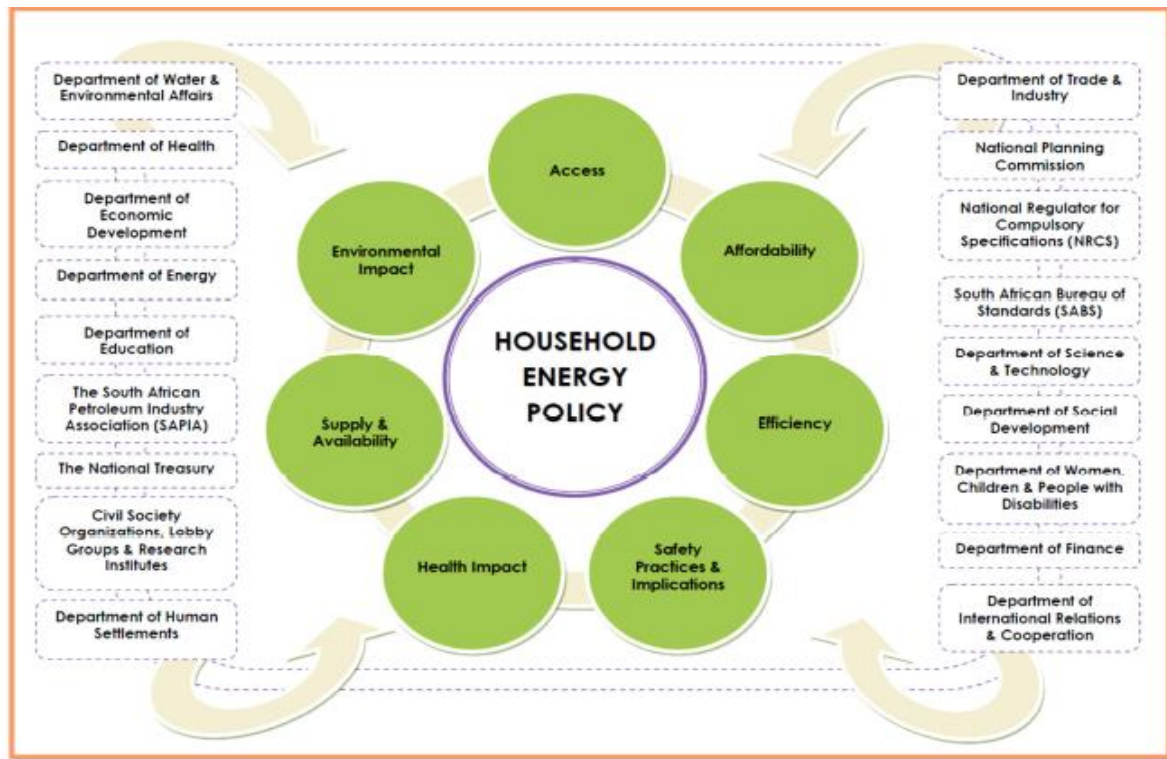
The meeting agreed that policies impacting household energy usage are disparate and have no overarching framework to deal effectively with all the needs of poor households, including safety (PASASA, 2012:1). They stated that most energy policy implementation focuses on access to electricity or subsidies to address electricity affordability. In this regard, government failed to recognise that electrification does not target all households

in terms of numbers, nor is it affordable for poor people. For example, backyard dwellers and informal settlements on unproclaimed land are not eligible for services and thus cannot benefit from this policy (Tait & Merven, 2012:40). As a result of this, issues such as energy safety are neglected.

The participants proposed the establishment of a household energy policy that would serve to provide an integrated and overarching framework to direct programmes related to household energy and tackle energy poverty (Tait & Merven, 2012:40). Figure 3.6 below depicts the proposed framework for household energy safety policy.

The framework is premised on the following key pillars or strategic objectives, namely access, affordability, efficiency, safety, health impacts, and implications, supply and availability, and environmental impacts (PASASA, 2012:5; Tait, Merven and Senatla, 2012:3; Swart & Bredenkamp, 2012:4). Below is a brief outline or overview of each of these items.

Figure 3.6: Proposed framework for a household energy safety policy: Source: PASASA, 2012



The intention below is to present and describe the framework by concentrating on the components or elements of the framework, along with its institutional arrangements. Its analysis will happen later in the research project after the presentation of the interviews with stakeholders in the following chapters. The elements are detailed in the following sections.

3.4.2 Framework Elements

3.4.2.1 Access

This report has highlighted the importance of access to energy services and the fact that access must be safe for poor households. Access should be improved not only to electricity but also to other forms of energy considering the fact that informal settlement households utilise a multiplicity of energy sources and appliances (Swart & Bredenkamp, 2012:3). The long- and medium-term access objectives and measurements thereof would need to be defined in extensive consultation with affected communities concerning how to meet their energy access needs and what fuels need to be addressed (Tait, 2012:2).

3.4.2.2 Affordability

The prices of electricity, paraffin and gas continue to rise at rates that are unsustainable for the majority of people, specifically the poor. It is questionable whether the current energy subsidies are appropriate to achieve the household energy objectives of people. Another crucial matter relates to appliance subsidies, because in the current policy appliances are not subsidised. Government should ensure that energy is affordable by prioritising other energy sources as well.

3.4.2.3 Efficiency

Energy efficiency is crucial in addressing South Africa's reliance on fossil fuels. It is about reduction of dependence on finite resources such as coal and a shift to renewable energy sources such as wind, solar and hydroelectric sources.

3.4.2.4 Safety

A key part of the policy should focus on the safety of the household energy system and the use thereof. The centrepiece of such a policy should be prevention rather than a reactionary approach. A systemic approach is required, which does not only focus on the type of fuels, but also on the housing, and household appliance technologies to prevent both fires and indoor air pollution. A coordinated safety programme that target all fuels and appliances and change behaviours is crucial.

3.4.2.5 Health impacts

The Household Energy Safety policy must focus on initiatives to reduce and prevent the negative health impacts that arise from energy use.

3.4.2.6 Security of supply and availability

It is important that the supply of energy is secure and sustainable. Security of supply for different fuel types and appliances is crucial. Equally important are the role of the private sector and the promotion of innovation to establish safe energy distribution and use of systems in informal settings.

3.4.2.7 Environmental impacts

As shown earlier in this document, South Africa's electricity generation is based on burning coal. This process leads to harmful and toxic emissions. The policy has to factor in these externality problems.

3.4.2.8 Proposed framework institutional arrangements

The framework also posits an institutional arrangement that prioritises synergy between the various national departments and stakeholders. These include the departments of Health; Economic Development; Energy, Education; Science and Technology; Social Development; Women, Children and People with Disabilities; Finance; International Relations and Cooperation; Water and Environmental Affairs; Trade and Industry; and Human Settlements. Other key players are the National Planning Commission, the National Consumer Commission; civil society organisations, lobby groups and research institutes, the South African Petroleum Industry Association (SAPIA), the National Regulator for Compulsory Specifications (NRCS) and the South African Bureau of Standards (SABS).

3.5 CONCLUSION

This chapter presented an overview of South Africa's energy policy and legislative framework and identified some gaps in these. This included programmes and projects that the government has implemented to address household energy-related problems, especially those specifically relevant for informal settlement households.

Secondly, it provided a description of South Africa's existing and relevant energy institutional arrangements because for any policy to be effective it relies heavily on the country's existing institutional arrangements and frameworks (Scorgie, Burger & Sowden, 2001:6). Thirdly, it presented a theoretical overview of public policy by defining

and describing some of the key public policy theories and concepts, such as energy transition theory, public policy problems public policy and public policy instruments. Fourthly, the study described the policy development process and focused on an integrated policy approach. It concluded by presenting and describing the household energy safety policy framework that has been proposed by the various stakeholders, as indicated above, with a view to draw lessons for the development of the proposed new and integrated household energy safety policy framework later in this study.

The development of a comprehensive HES policy will address the on-going high levels of energy-related health problems, injuries, the destruction of homes and personal assets, and fatalities. It is clear that the policy would need to outline the role of each of these and other key players. In this way, Tait and Merven suggest that, “This household energy strategy would ideally build on and bring together all programmes and objectives related to household energy, and consider demand and supply options in an integrated manner for all household fuels. Such a strategy should develop a long-term vision to bring clarity to the sector” (2012:47). How such a strategy can come about and a thorough evaluation analysis of the proposed framework still needs to be done to identify gaps and strengthen it. The next chapter will achieve this objective.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This chapter describes the research design used to investigate the possible components of a proposed Household Energy Safety policy for informal settlements in South Africa. It outlines and explains the research methodology used to accomplish the research objectives of the whole study. It also briefly explains the rationale behind the methodology employed, how the research was conducted and what steps were taken to ensure the reliability and validity of the study and its outcomes. In order to do this efficiently, it starts by discussing the definition, purpose and importance of the research and goes on to outline the different research approaches as well as the approach used in this present research.

4.2 BACKGROUND

4.2.1 Definition and Purpose of Research

Research is a process of “enquiry and investigation; it is systematic, methodical and ethical; research can help solve practical problems and increase knowledge” (University of Bradford, 2014:1). Van Zyl calls it a “systematized effort to gain new knowledge. At its best, it is a process through which new knowledge is discovered” (2014:3). In research, problems are unpacked and redefined, hypotheses are developed and solutions are sought through the collection, analysis and evaluation of data in order to make informed conclusions and recommendations (Kothari, 2004:23).

The purpose of research is to “discover answers to questions through the application of scientific procedures” (Kothari, 2004:27). It inculcates scientific and inductive thinking and promotes the development of habits of logical thinking and organisation (Kothari, 2004:27). Social scientists utilise it to study social relationships and source answers to various social problems. For policy and decision makers “research certainly facilitates the

decisions of the policy maker” and in this way it helps to inform, form and shape government policy on social issues (Ofulla, 2013:191).

This means that beyond procedural technicalities of considering causal relationships between variables, research is concerned for the betterment of society (Van Zyl, 2014:4). This research project sets out to scientifically and systematically discover fresh knowledge about how public policy can effectively address household energy-related problems in South Africa. It seeks ways to address a real social problem.

4.2.2. Types of Research and Comparisons Between Them

Research literature indicates that there are two basic types of research, namely quantitative and qualitative research. Table 4.1 below outlines some of the key comparative differences between these two types of research.

Table 4.1: Comparison between quantitative and qualitative research types

Comparison of qualitative & quantitative research		
	Qualitative	Quantitative
Definitions	a systematic subjective approach used to describe life experiences and give them meaning	a formal, objective, systematic process for obtaining information about the world. A method used to describe, test relationships, and examine cause and effect relationships.
Goals	To gain insight; explore the depth, richness, and complexity inherent in the phenomenon.	To test relationships, describe, examine cause and effect relations
Characteristics	<ul style="list-style-type: none"> • Soft science • Focus: complex & broad • Holistic • Subjective • Dialectic, inductive reasoning • Basis of knowing: meaning & discovery • Develops theory • Shared interpretation • Communication & observation • Basic element of analysis: words • Individual interpretation • Uniqueness 	<ul style="list-style-type: none"> • Hard science • Focus: concise & narrow • Reductionistic • Objective • Logistic, deductive reasoning • Basis of knowing: cause & effect, relationships • Tests theory • Control • Instruments • Basic element of analysis: numbers • Statistical analysis • Generalization

Source: Susan Lindquist (www.umsl.edu/~lindquits/qualdssgn.html, 2005)

4.2.3 The Nature of Qualitative Research

The nature of the present research study is qualitative. As stated above, research literature differentiates between quantitative and qualitative approaches, and notes that, “qualitative approaches focus on human experience and are presented in narrative form as compared to the numerical analyses of quantitative approaches” (Savage, 2009:30). Al-Busaidi defines qualitative research as an “umbrella term covering an array of interpretative techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world” (2008:11). In other words, qualitative research is preoccupied with investigating social phenomena. Its primary aim is to provide a complete, detailed description of the research topic and it is usually more exploratory in nature (Explorable.com, 2009).

Qualitative research does not deal with numerical information and its real value lies in unearthing underlying and in-depth understanding, not only of information but also factors that lie behind it (McLeod, 2008:1; Atlas.ti., 2015:1; Wyse, 2011:1). It explores the meaning of people’s experiences or perspectives on particular issues under consideration and provides insights into the problem by uncovering “trends in thought and opinions, and dives deeper into the problem” (Wyse, 2011:1). In the process it creates new ideas and hypothesis for further research.

4.2.4 The Types of Qualitative Research

Literature indicates that there are four basic types of qualitative research, namely exploratory, descriptive, analytical and predictive.

4.2.4.1 Exploratory research

Exploratory research is undertaken “when few or no previous studies exist” on the subject matter under consideration, especially from the angle the researcher is interested in (University of Bradford, 2014:4; Polit & Beck, 2005:19). Its aim is to identify patterns, verify hypotheses or test ideas in order to establish a foundation for further research. It is crucial in establishing a solid and substantial basis on which a final course of action is recommended. Example of techniques that are used in this type of research include observation and reviews of previous related studies and data (University of Bradford, 2014:4; Atlas.ti, 2015:1).

4.2.4.2 Descriptive research

According to Grove, Gray & Burns (2003:201), descriptive research “is designed to provide a picture of a situation as it naturally happens”. When using descriptive research, researchers identify, classify, analyse and summarise the elements or characteristics of the subject matter under consideration.

4.2.4.3 Analytical research

Analytical research is an extension of the descriptive approach in that it explains why or how something is happening by looking at its underlying causes or factors.

4.2.4.4 Predictive research

Predictive research aims “to speculate intelligently on future possibilities, based on close analysis of available evidence of cause and effect, e.g. predicting when and where future industrial action might take place” (University of Bradford, 2014:6). As the term suggests, it seeks to predict what will happen in the future.

4.2.4.5 Research types used in the present study

The present research study uses both exploratory and descriptive types of research. Although extensive research on energy and household energy has been done in South Africa, little research has been conducted on household energy safety and harmful incidents affecting informal settlements, for the purpose of developing a policy framework to effectively address household energy safety in low-income communities. This study explores the contents of the proposed policy framework. It describes the socio-economic conditions of informal settlements, household energy-related problems and their impacts as well as the proposed household energy safety policy framework.

4.2.5 Characteristics of Qualitative Research

Qualitative research has important characteristics. Streubert and Carpenter (2011:14) mention two broad categories or perspectives of the characteristics of qualitative research, namely the emic and holistic perspectives. In the emic perspective, the researcher is “eliciting meaning experience or perception from the participants’ point of view rather than the researcher’s perspective ... [and it] involves identifying the informant’s beliefs and values that underlie the phenomenon and does not impose the researcher’s beliefs and theoretical perspectives on the data (Streubert & Carpenter, 2011:14). The holistic perspective is the opposite of the emic in that “the phenomena of interest is considered by including the underlying values and the context as part of the phenomena” (Streubert & Carpenter, 2011:14).

Additionally, Al-Busaidi describes some of the more specific characteristics of qualitative research, namely “a belief in multiple realities, a commitment to identifying an approach to understanding that will support the phenomenon under study, commitment to the participants’ point of view, conduct of inquiry in a way that does not disturb the natural context of the phenomena of interest, acknowledged participation of the researcher in the research and conveyance of the understanding of phenomena by reporting in a literary style, rich with participants’ commentary” (2008:12).

4.2.6 The Qualitative Research Process

The research process is composed of the following five distinct yet interrelated phases: the conceptual phase, design and planning phase, empirical phase, analysis phase, and presentation of findings phase (see Figure 4.1 below).

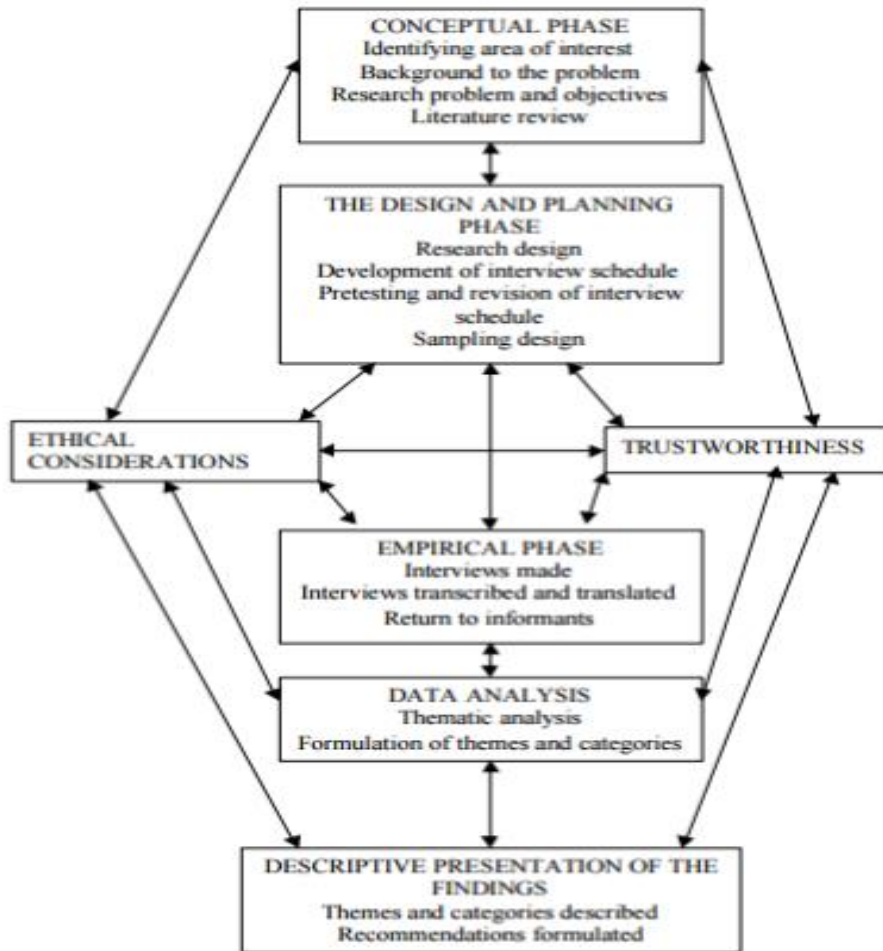


Figure 4.1: Qualitative research process

Source: Savage (2009).

4.3 CONCEPTUAL PHASE

4.3.1 Research Problem

This research project is preoccupied with the problem of the lack of an integrated household energy safety policy for low-income households in South Africa. It seeks to identify the contents of such a policy for the purpose of facilitating the eradication of energy poverty and harmful energy-related problems in South Africa’s informal settlements.

4.3.2 The Key Research Question and Aims and Objectives

The primary research question is: What would be the most effective and implementable content of the proposed integrated household energy safety policy in South Africa's informal settlements? The primary aim of the study is to explore and propose effective components or contents of an integrated household energy safety policy that could be implementable by government to prevent harmful household energy-related problems in informal settlements. The objectives of the study are:

- To provide an overview of household energy and its associated problems in informal settlements in the context of the global energy system
- To discuss the extent do these problems constitute a public policy problem
- To describe the theoretical underpinnings of public policy instruments in general and their relevance on household energy choices in informal settlements?
- To explain how current the South Africa's energy policy and legislative framework, government programmes and institutional arrangements for energy governance looks like
- To propose ideas on what could constitute key components for an integrated household energy safety policy that could be implemented in South Africa's informal settlements

4.4 RESEARCH DESIGN AND PLANNING

4.4.1 Research Design

Rajasekar, Philominathan and Chinnathambi define research as “a logical and systematic search for new and useful information on a particular topic. It is an investigation of finding solutions to scientific and social problems through objective and systematic analysis. It is a search for knowledge” (2006:1). The concept of design is “an underlying scheme that governs functioning, developing, or unfolding” and “the arrangement of elements or details in a product or work of art” (Design, quoted in Maxwell, 2013.1). Research design is defined as “the researcher's overall plan for answering the research

question or testing the research hypotheses” and “a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings¹” (Polit & Beck 2012:167; Burns & Grove, 2003:195). It is a guideline by which a researcher tests and validates the hypothetical premise of the research and helps to exclude unnecessary explanations for the social phenomenon under scrutiny (Bless, Higson-Smith & Kajee, 2006:156). In simple terms, the research design is an outline of what data will be collected and analysed and how, where and when it will be collected and analysed. It is the process by which the researcher provides answers to the research question (Bless, Higson-Smith & Kajee, 2006:156).

Its purpose is to provide a study strategy that allows for accuracy in the assessment of cause-and-effect relationships between the research variables (Jang, 1980:395). It is to plan and describe the source, the manner and the timing of the collection and analysis of the information (Parahoo, 1997:142). It begins with a formulation of a problem or question that the research will answer and then ascertains that the research question posed in the beginning is answered convincingly and with incontrovertible evidence (De Vaus, 2005:9; Harasim, 2011:16).

It is therefore crucial that the research process is designed to achieve its objectives. Maboe indicates that selecting a good research design “should be guided by an overarching consideration, namely whether the design does the best possible job of providing trustworthy answers to the research question” (2009:61). Careful selection of a good design serves as a catalyst for the efficient conducting of the research process activities in order to produce good quality and relevant information efficiently. The objective of this research design is to facilitate the understanding of the perspectives and opinions of energy experts and researchers that have been selected on the contents of the proposed Household Energy Safety policy for South Africa. In order to achieve the research objectives and to address the research problem the researcher conducted

¹ Source: <http://www.ais.utm.my/researchportal/files/2015/02/Example3-Res-Design.pdf>

qualitative research. This helped the researcher to draw on the expertise of a diverse group of people from various backgrounds in order to provide useful input to the study.

4.4.2 Qualitative Research Design Approaches

There are basically four approaches used in qualitative research design: grounded theory, phenomenology, ethnography, and case study (Al-Busaidi, 2008:5).

4.4.2.1 The grounded theory approach

Grounded theory approach is a “qualitative research design in which the enquirer generates or grounds a general explanation of a process that is shaped by the views of a large number of participants. The intention of grounded theory study is to discover a theory through the process of data collection and analysis about a particular phenomenon” (Hancock, 2002:17). This theory is also grounded in data from participants who have experienced the process or the issue under research (Tholo, 1999:32). In other words, “the theory needs to be grounded or rooted in observation”, and not in abstract formulations and it produces “genuinely new knowledge” that serves as a basis for developing new theories about the phenomenon (Trochim; Marcus and Masse, 2008:6; Hancock, 2002:17).

4.4.2.2 The phenomenological approach

Hancock states “phenomenology literally means the study of phenomena. It is a way of describing something that exists as part of the world in which we live” (1998:10). It is a science whose “purpose is to describe particular phenomena, or the appearance of things, as lived experience” and is the study of “how human beings make sense of experience and the meaning they give to these experiences” (Streubert & Carpenter, 2011:75; Al-Busaidi, 2008:9). It seeks to describe how people experience the phenomenon under

scrutiny. Its interest lies in the manner in which people configure or interpret the phenomena they experience in life and the perspectives they develop as a consequence. In other words, it assumes “commonality in human experience and focus on meaning-making as the essence of human experience. The essence is the core meaning mutually understood through a phenomenon commonly experienced” (Al-Busaidi, 2008:12).

4.4.2.3 The ethnographical approach

The term ethnography means “portrait of a people” (Hancock, 1998:14). The ethnographical approach describes the cultural characteristics of a group of people. It focuses on painting a full and inclusive picture of the group of people that is being studied in such a way that factors such as culture, political affiliations, religious background, economic status and social interactions are taken into consideration (Trochim, 2006:32; Hancock, 1998:14). The cultural parameter is that the people under investigation have something in common.

4.4.2.4 The case study approach

The case study has been described as the “in-depth analysis of a single or small number of units. Case study research is used to describe an entity that forms a single unit such as a person, an organisation or an institution” (Hancock, 1998:10).

4.4.3 Components of Qualitative Research Design

Maxwell presents an interactive research design model that has five components, namely goals, a conceptual framework, research questions, methods and validity (2013:4) (see Figure 4.2).

The researcher applies the present study to each of the components, which address specific aspects of the research. Below is a brief explanation and application of these components to the present research study.

The goal of this research project is to identify the content of a household energy safety policy for the purpose of facilitating the eradication of energy poverty and harmful energy-related problems in South Africa's informal settlements. In terms of conceptual framework, energy poverty and harmful household energy-related problems occurring in informal settlements are ignored in the South African energy policy framework. As stated above, the primary research question is: What would be the most effective and implementable content of the proposed integrated household energy safety policy in South Africa's informal settlements?

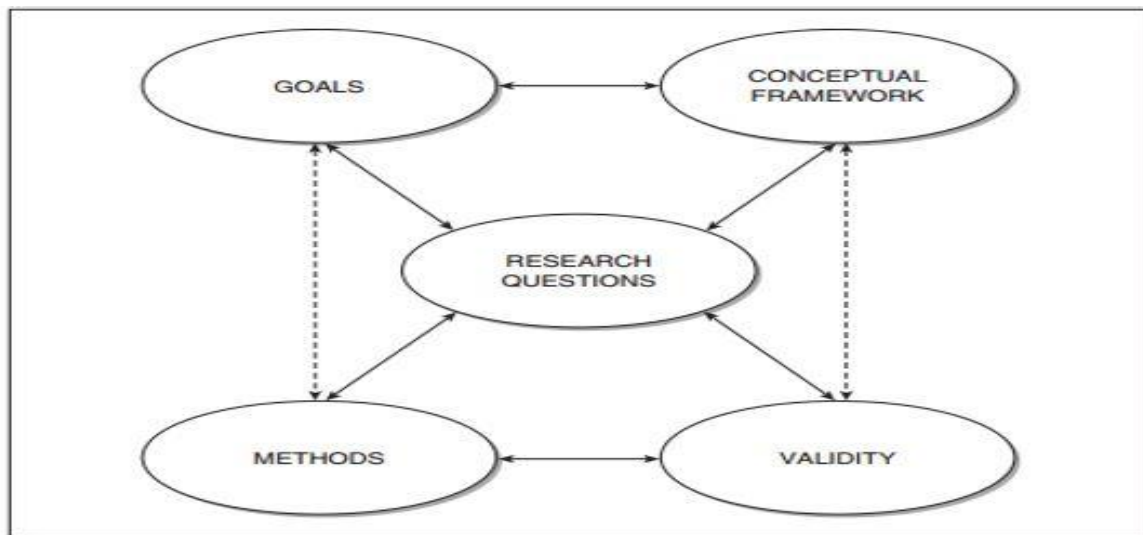


Figure 4.2: Qualitative research design: an interactive approach

Source: Maxwell (2013)

The methods relate to how the study was actually conducted. It outlines the approaches and techniques that were utilised to collect and analyse data. This is done efficiently below under the research methodology section. Validity relates to the integrity or extent of rightness of research process and outcomes.

4.5 RESEARCH METHODOLOGY

4.5.1 Research Methodology

This section outlines the methodology that was used in conducting this research, which was qualitative in nature. According to Gadbois, “qualitative researchers employ methods that ground analysis in real life and this allows them to examine how social experience is created and given meaning. Often this includes a search for underlying themes or patterns, which emerge during the research process. Qualitative research focuses on obtaining a truthful description of how a problem or situation is experienced by those who live it” (1999:1).

McGregor & Murname break down the word ‘methodology’ into two nouns, namely ‘method’ and ‘ology’, stating that “methodology is a branch of knowledge that deals with the general principles or axioms of the generation of new knowledge. It refers to the rationale and the philosophical assumptions that underlie any natural, social or human science study, whether articulated or not” (2010:2). For their part Rajasekar; Philominathan and Chinnathambi defines research methodology as “a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them” (2013:23). Methodology therefore outlines how the research study was done. Below is an outline of the process or methods that the researcher undertook in the study to collect data and find solutions to the identified problems.

4.5.2 Research Methods

The purpose of this study is to gain insight into the issues related to household energy safety in informal settlements in South Africa and the role that can be played by public policy to address them effectively. To achieve this, a range of qualitative methods was undertaken to explore the issue in greater depth. As indicated above, these methods use

real life as a platform to ground the analysis and therefore facilitate the creation of meaning from it (Gadbois, 1999:1). In contrast to the research methodology, research methods are the instruments, techniques, procedures or processes that are utilised in conducting research and collecting information to address a research question. Qualitative research methods are the most suitable for this study because of their emphasis on people's lived experience. According to Al-Busaidi "they are considered to be well suited for locating the meanings that people place on the events, processes, and structures of their lives and their perceptions, presuppositions and assumptions" (2008:3).

4.5.3 Data-Collection Methods Used in the Present Study

Polit and Beck define data collection as the gathering of information needed to address a research problem (2004:716). Qualitative approaches to data collection usually involve direct interaction with individuals on a one-on-one basis or in a group setting. The main methods of collecting qualitative data used in this study were a literature review, individual interviews and focus group interviews. The section below provides an overview of these methods.

4.5.3.1 Literature review

The first data-collection method that was utilised was an extensive literature review. It was conducted in order to gain deeper insights into the issues of informal settlements, household energy safety problems as well as the role of public policy as a solution to those problems. This included thorough and detailed reading and analysis of primary and secondary sources from which information was gathered on these issues. As pointed out by Tholo, a literature review helps the researcher to "look at the problem under investigation from different perspectives; link his/her study to existing knowledge; scrutinize what has been done in the area of study in different ... settings; define terms and concepts more clearly; and identify areas for further research" (1999:17).

The literature review of this study pursued the following broad areas: informal settlements, the lack of safety in the use of energy in the informal settlement household and the potential of public policy to address the problems in informal settlements. The unit of analysis in this study was the group of components of the proposed household energy safety policy outline. The key hypothesis of the study was that a proper household energy safety policy with well-designed and implementable components or pillars could assist the government in order to address the lack of household energy safety in informal settlements. The literature review provided an exhaustive theoretical context for the study on the three broad issues mentioned above.

4.5.3.2 Expert sampling

Expert sampling was used to access the views of specialists in the field. Expert sampling is where “the researcher is looking for individuals who have particular expertise that is most likely to be able to advance the researcher’s interests and potentially open new doors” (Paly, 2008:1). In this regard, the researcher identified individuals with particular expertise and experience in the field of household energy, public policy and informal settlements to add value to the research.

Expert sampling is used when the research requires assessment or opinions of people with an expertise or relatively high level of skill or knowledge in the areas under discussion (see Table 4.2). In this research project, expert sampling was utilised to access the views of specialists in the field of household energy safety, informal settlements and public policy. The researcher identified individuals who have academic qualifications and experience as researchers and practitioners in the field of household energy, public policy and informal settlements to add value to the research. This included energy experts, health specialists, injury prevention researchers, community leaders and policy professionals, and two community interviewees who were not included not for academic qualifications but because of their experience as community educators and activists in the area of household energy safety. It was also done to ground the study in people’s lived experiences.

4.5.3.3 Individual interviews

The second data-collection method utilised in the study was face-to-face interviews with individual experts. Some of the interviews were conducted face-to-face whilst others were done telephonically. Berry (1999:46) points out that “interviewing is the most important data collection instrument”. Valenzuela and Shrivastava highlight that the particular usefulness of interviews is to dig into details of the story behind the interviewee’s experiences (2008:2). Furthermore, they mention that there are different types of interviews: informal and conversational; standardised and open-ended; and telephone interviews.

In conversational interviews there is no prior and fixed planning of questions to be asked. In this kind of interview the interviewer ‘goes with the flow’ and embarks on general conversation (Valenzuela & Shrivastava, 2008:2). The standardised, open-ended interview is characterised by open-ended questions, which help to elicit more information from the interviewee and facilitate later analysis of that interview.

As intimated above, the interviews were undertaken with a wide range of individuals from government, the petroleum sector, and energy research and academic sectors. The following experts were interviewed as part of this project, although more were invited but could not make it.

Table 4.2: The interviewees and their organisations

INTERVIEWEE	ORGANISATION	DATE
1. Ms Mpho Ndebele	Department of Energy	21 August 2015
2. Mr Barry Bredenkamp	South African National Energy Development Institute (SANEDI)	6 August 2015
3. Ms Tshilidzi Ramuedzisi	Department of Energy	31 August 2015
4. Mr Rodney Eksteen	City of Cape Town Disaster Risk Management	31 July 2015
5. Mr Avhaphani Tshifularo	South African Petroleum Industry Association (SAPIA)	6 August 2015
6. Ms Louise Tait	Energy Research Centre, University of Cape Town	11 August 2015
7. Dr David Kimemia	Sustainable Energy Technology and Research Centre (SETAR) University of Johannesburg	28 August 2015
8. Ms Yachika Reddy	Sustainable Energy Africa.	29 September 2015
9. Prof Ashley van Niekerk	Medical Research Centre	30 August 2015
10. Mr Joe Baleka	Alexandra Community	31 August 2015
11. Ms Sarah Ward	City of Cape Town	
12. Mr Moses Khangane	National Disaster Management Centre	6 August 2015
13. Ms Sibongile Zenzile	Khayelitsha Community	20 September 2015
14. Mr Dehran Swart	School of Public Health, University of Cape Town	31 July 2015
15. Mr Glenn Truran	South African National Library and information Consortium	31 July 2015

Bernard says, “the key to successful interviewing is learning how to probe effectively ... that is, to stimulate an informant to produce more information ... without injecting yourself so much into the interaction that you only get a reflection of yourself in the data” (2011:167). So the interviews, which were held over the telephone or in person, were both structured and semi-structured, in that the questions were prepared in advance before the interview was held (see Appendix B). The interviews and the questions were designed

to allow for free and fluid discussion and to elicit new information in a conducive environment. The structured or semi-structured interviewing and questioning method used in this study provided space for the researcher to probe for clarification and for the interviewees to delve into their expertise and experience in addressing important and relevant issues. Where necessary, questions were elaborated to suit the particular participants and their backgrounds or expertise. The face-to-face interviews were very useful in enabling the researcher to read the non-verbal communication and reactions, which proved to be helpful in the analysis of data. The interviews were audio taped and later transcribed.

The value of interviews in this study is that they permitted the researcher to ask for in-depth information on the topic in dynamic ways. They also created opportunities for the researcher to ask follow-up questions on the basis of the answers provided. This is because “the qualitative research interview seeks to describe the meanings of central themes in the life world of the subjects. The main task in interviewing is to understand the meaning of what the interviewees say” (Kvale, 1996:12). Interviews were used in the study to gain independent insights from experts on informal settlements, household energy-related problems and related public policy issues. More importantly, they were crucial in exploring potential policy and other solutions to address the lack of safety in energy usage in South Africa’s informal settlements. All except one of the interviews were conducted in English. The one interview conducted in isiXhosa was done so as to facilitate free expression by the interviewee.

4.6 DATA ANALYSIS

Welman, Kruger and Mitchel indicate that “data analysis is a paramount procedure in the research process” (2005:210). Data analysis seeks to provide feedback on the tenability or attainability of the originally formulated hypothesis and, consequently, on the theory, if deduced as either provisionally refuted or confirmed. Neuman is of the view that “social researchers systematically collect and analyse empirical evidence to understand and

explain social life. He goes on to say that when data is in the form of words, sentences, and paragraphs rather than numbers, researchers need to use different research strategies and data-collection techniques. Data analysis will therefore involve examining, sorting, categorizing, evaluating, comparing, synthesizing, and contemplating the coded data as well as the raw data” (quoted in Tholo, 2007:131).

After the interview sessions, the researcher listened or viewed the recording repeatedly and had it transcribed in order to develop clear themes as they emerged from the discussion. The transcripts of the individual and focus group interviews formed the basis of the analysis. Comparative analysis was conducted to assess congruence and divergence between the individual and group interviews as well as literature review. It was also used to develop themes and key lessons emerging from the interactions. The process used in the study to create the reflective notes on the key lessons learnt from the transcribed data was called memoing (Tholo, 2007:134). Memoing is the act of recording reflective notes about what the researcher (fieldworker, data coder and/or analyst) is learning from the data ... Memos contribute substantially to the qualitative research process and its credibility” (Maxwell, 2013:48). It facilitates the process whereby the researcher transitions from raw and concrete information to those theoretical formulations and abstractions that contextualise and simultaneously addresses the research question. This method can be equally and effectively applied by both new and experienced researchers (Birks, Chapman & Francis, 2008:68).

Another related approach utilised was the thematic analysis approach. The approach “involves the creation and application of codes to data”. Comparable themes and similar ideas were grouped together under each of the issues being addressed by this research. Relationships between themes were carefully considered and documented. Those issues that were irrelevant and had no bearing on the research were filed and put aside. In order to do this effectively, the process of coding was implemented. Johnson and Christensen define coding as “marking the segments of data with symbols, descriptive words, or category names” (2014:294).

In this study data was coded using colours and descriptive words. Open and axial coding systems were used. Open coding is when the researcher does the initial coding just to tease through and make sense of the information that is emerging from the research (Johnson & Christensen, 2014:294). In this regard, key terms and concepts were identified and labelled to help with subsequent clarification and analysis. Axial coding is the process of clustering and combining related themes and ideas to also facilitate analysis (Tholo, 1999:136). According to Neuman “axial coding stimulates thinking about the linkages between concepts or themes and it also raises new questions” (quoted in Tholo, 1999:136). This approach ensured that data analysis was done in a way that was practical and understandable.

4.7 ETHICAL CONSIDERATIONS

Polit and Beck refer to ethical considerations “as a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal and sociological obligations to the study participants” (2004:156). This means that research needs to be conducted in a way that promotes and ensures its integrity and the ethical conduct. Carver, Dellva, Emmanuel and Parchure indicate that when a researcher wants to foster scientific advancement, he or she needs to adhere strictly to a set of ethical guidelines that are applicable to scientific research writing (2011:123).

One of the key guidelines is that “ethical researchers do not fabricate or falsify data in their publications” (Jain, 2010:236). Also crucial is that the researchers must avoid plagiarism at all costs. According to Carver, et al. (2011:124) plagiarism is “the most common form of scientific misconduct” and “is defined as the appropriation of another person's ideas, processes, and results or words without giving appropriate credit”. In simple terms plagiarism occurs when a researcher uses another author's ideas or writings without giving credit to the author or referencing the source document correctly.

In this research project, the researcher did all in his power to avoid plagiarism by acknowledging other people's thoughts and words as accurately as possible in the

document. The various chapters were submitted to the Stellenbosch University's plagiarism detection software to detect and prevent plagiarism. The planning and conducting of this research, was done in such a way that the participants in the study were informed about the purpose of the research project and how their information would be used. For example, their consent was secured and a letter explaining in detail the purpose of the interview and some of the key questions to be asked were sent to them (see Appendix C).

This was done to protect them and to ensure their dignity. It was also done to achieve ethical and academic acceptability by submitting each chapter of the research project to an independent reviewer and the supervisor to assess scientific, academic and linguistic rigour and scrutiny. In this regard, a research proposal was submitted and approved by a panel selected by the Stellenbosch University. The researcher also submitted a completed form that expressed his commitment to comply with the university policy on this matter. The thesis was also submitted to external examiners who carefully considered all aspects of this document to ensure that it meets all the requirements.

4.8 TRUSTWORTHINESS OF THE STUDY

Literature highlights three criteria for determining the trustworthiness of a study, namely credibility, validity and transferability of the findings of the research study (Resnik, 2011:5). Credibility is presented as referring "to how truthful particular findings are" (Smith, 1983:2). In this study credibility was achieved by both an extensive literature review and interviews with diverse experts and practitioner in the areas of household energy, informal settlements and public policies. In addition to this, the researcher has worked as a leader in this field for over ten years and therefore has extensive experience and understanding of the pertinent issues and knows who to talk to and how to get the most relevant information.

Transferability or external validity refers to "the applicability of the research" (Gliner, Morgan & Leech, 2009:14). In other words, this is about whether the information

unearthed and findings derived can be applied in real life to address the problems this study deals with. This was achieved in the study because the interviewees all expressed a need for such a policy and the desire for the government to implement it. In fact, the interviewees from the DoE and the City of Cape Town expressed a desire to receive the findings because they are in the process of developing household energy safety strategies respectively. DoE expressed more keenness for the final report because their strategy development process does not have a driver yet and has not yet received enough political support; they felt that the report could help to elevate the importance of the issue and improve its status in the priority list.

4.9 CONCLUSION

This chapter described the research methodology that was used in the study to investigate the possible components of a proposed Household Energy Safety policy for informal settlements in South Africa. It outlined and explained the research design and methodology used to accomplish the research objectives of the whole study. It also briefly explained the rationale behind the methodology employed, how the research was conducted and what steps were taken to ensure the reliability and validity of the study. In order to do this well, it started by discussing the definition, purpose and importance of research. It briefly outlined the different research approaches and identified the approach used in the research. Finally, it discussed and explained in detail the study research design, methodology and method used.

CHAPTER 5: RESEARCH DATA ANALYSIS AND DISCUSSION OF FINDINGS

5.1 INTRODUCTION

The focus of this study was to determine the contents for a household energy safety policy for informal settlements in South Africa. This chapter describes and discusses the data analysis process that was followed. This continues with a listing and discussion of findings as they emerge from the analysis of data. The researcher interprets the findings against the research question and objectives that were laid out in Chapter 1. The chapter concludes by presenting a proposed household energy framework that contains some key contents to help towards the development of a fully-fledged policy. This work is based on, or is an addition to, the household energy safety policy framework that was proposed by PASASA as outlined in Chapter 3.

5.2 THE PROCESS OF DATA ANALYSIS

5.2.1 A Description of Qualitative Data Analysis

The analysis of data has been defined as “the process of coming up with findings from your data. The complete process of analysis requires that the data be organised, scrutinised, selected, described, theorised, interpreted, discussed and presented to a readership” (Ryan, 2006:96). It entails a close scrutiny, not just of the words of people being interviewed and read, but also the nuanced meanings behind them in order to frame the upcoming process of interpretation. This is very important because, according to Ryan, as much as raw data from field notes, transcriptions and other sources is valuable, it is meaningless and does not constitute findings until it is analysed scientifically (Ryan, 2006:94).

Burnard, Gill, Stewart, Treasure and Chadwick posit that “There are two fundamental approaches to analysing qualitative data (although each can be handled in a variety of different ways): the deductive approach and the inductive approach” (2008:2). In the deductive approach, the researcher predetermines and “imposes their own structure or theories on the data and then uses these to analyse the interview transcripts” (Burnard, et al., 2008:2). The inductive approach “involves analysing data with little or no predetermined theory, structure or framework and uses the actual data itself to derive the structure of analysis” (Burnard, et al., 2008:2). The latter analysis approach, namely an inductive approach, was used in this study.

5.2.2 The Process of Content Analysis

Within the inductive approach, the process of content analysis was used, which “is a procedure for the categorisation of verbal and non-verbal behaviour, for purposes of classification, summarisation and tabulation” (Hancock, 2002:17). Similarly to the inductive and deductive approaches above, content analysis can be done at two levels: lower and higher levels of analysis. The lower level gives “a descriptive account of the data, this is what was actually said [with] nothing read into it and nothing assumed about it” whilst “the higher level of analysis is interpretive: it is concerned with what was meant by the response, what was inferred or implied. It is sometimes called the latent level of analysis” (Hancock, 2002:17). In this study, the higher level of analysis was used. It involved “analysing transcripts, identifying themes within those data and gathering together examples of those themes from the text” (Burnard, et al., 2008:2). In the words of Ryan, the information was “organised, scrutinised, selected, described, theorised, interpreted, discussed and presented to a readership” (2006:96).

5.2.3 Interviews and Selection of Interviewees

At this juncture it is important to reiterate that the researcher conducted interviews with experts and community activists in the areas of energy policy, household energy use, energy-related problems and informal settlements. The following sections provide a brief

outline of the participant selection, the interview process, and some characteristics of interviewees. The analysis of the interviews will be included in the discussion of findings later in the chapter.

5.2.3.1 The characteristics and selection of interviewees

As stated in Chapter 3, expert sampling was conducted to select the interviewees. This means that they were selected for their expertise, experience and contribution in the fields of energy, informal settlement, housing, fire safety, injury prevention and treatment, as well as energy poverty alleviation, to name but a few. The process started with the researcher drawing a list of characteristics of people that can add value to the research according to certain categories. Categories included government or public sector, energy policy experience, community experience, academic fraternity and practitioners. This was followed by a brainstorming of names in those different categories (see Table 5:1).

The researcher then crafted a letter that introduced the objectives of the study, some of the key questions to be discussed during the interview and the project timeframe. Before the researcher sent the letter to the identified people, he contacted them either by telephone, email or WhatsApp message service to create a personal engagement, assess their availability and pave the way for the letter. He got their contacts through his networks and by word of mouth. In the letter, the researcher gave the people two options of participation, namely face-to-face or telephone interviews. He encouraged them to also send written or additional responses to the questions after the interviews.

All those selected for interviews were academically trained and experienced in their field, except for two: Ms Sibongile Zenzile and Mr Johannes Baleka. Although the two have no tertiary level academic credentials, they have extensive experience in living and working in informal settlements to alleviate poverty and energy-related incidents. They are community leaders in their own right. As such, their participation added tremendous value to the study. Out of the 17 people who agreed to participate, only two were unavailable namely; Professor Phillip Lloyd of the Cape Peninsula University of

Technology and Professor Heinz Rode of Red Cross Hospital. The reasons for unavailability included a hectic travel schedule by one participant, and an inability to find conducive time from the other. Another important issue to mention is that out of the 15 interviews conducted, 9 were face-to-face while 6 were telephonic. Fortunately, none of these factors derailed the study nor diminished its credibility.

5.2.3.2 Description of the interview process

The interviews were carried out either in the offices of interviewees or by telephone from the researcher's office or home. Each commenced with a brief introduction and overview of the research project. The researcher then asked the interviewees for permission to record the interview and explained that the interviews would be transcribed and analysed. All participants were informed that the transcripts were available to them if they so requested.

Moving to the substance of the interview, the researcher asked the interviewees to share their views of the key problems that people in informal settlements experienced with regard to the lack of household energy safety. This was done to get the interviewees to share their personal experiences, talk freely and to assess their attitude towards the topic at hand. From there, the researcher followed the questions as outlined (See Appendix A) It is important to mention, however, that some of the questions and even their sequence were modified slightly to accommodate and build on each interviewee's responses. This provided the researcher with an opportunity to explore issues in-depth and to gain more perspectives from the participants.

5.2.3.3 Transcription of the interviews

All the interviews were transcribed, except two, which were tape-analysed. Transcription is the process of writing the contents of an interview, which was recorded either in audio or video form, onto paper. Hancock calls it "... a 'full' script of the interview" (2002:14).

Tape analysis involves “replaying of the tape recording of an interview and making notes of relevant and interesting data rather than full transcripts” (Hancock, 2002:21).

With the exception of the two tape-analysed interviews, the researcher employed two professional transcribers to transcribe the interviews. The researcher ensured that the transcribers did not focus just on words, but also on the manner in which, and the emotion with which, people expressed themselves during the interviews. To assist with the accuracy of this process, the researcher compared all transcribed notes with those he had recorded in his own note taking – including the tone and inflection of the interviewees. The main goal was to ensure that the emotional expressions of the interviewees were captured accurately. The transcription process produced a meaningful and useful body of information that was invaluable to the research study.

5.2.3.4 Steps followed in the analysis process

The aim of the content analysis process was to achieve three objectives, namely delving into the data to discern themes, coding, and interpreting the data within its context. As part of the process, data analysis was conducted throughout the study process. In other words, while the data was being collected and collated, the researcher was making notes and thinking about emerging linkages and patterns. In conducting this content analysis, the researcher followed the process or steps outlined below, drawn from Hancock (2002:17).

i. The thorough reading of the transcript

After data from the interviews was transcribed word for word, the researcher embarked on a process “known as open coding” which included reading each transcript and making detailed notes on the edges of the transcript (Burnard, et al., 2008:2). This means that the researcher spent a tremendous amount of time thinking through, reflecting on, and immersed in the interview transcripts and field notes on an on-going basis by writing new

notes and doing audio-recordings of observations. This served as a solid basis for drawing out the findings that are discussed later.

ii. Listing different types of information

From the notes written in the margins of the transcripts, the researcher developed a list of key words, topics and sub-topics. Time was also spent identifying overlapping and recurring issues. Simple observation was conducted “to see in which context the words were used in order to understand the concepts in the text” (Welman, Kruger & Mitchell, 2005:212).

iii. Categorising the items and describing what they are about

Ryan states that “...you need to arrange your data under different themes or headings, and you need to select and present certain pieces to your readers” (2006: 94). Based on the literature review and after reading through the lists identified above, the researcher developed four broad themes to facilitate efficient data collection and analysis. These are informal settlements, household energy safety-related problems in informal settlements, the government response to the problems, and public policy as a potential solution. Under these broad themes, a major category of findings was further demarcated for clarity and emphasis. The researcher described all these in writing in terms of what they were about and identified the relationships and linkages between them.

iv. The colour coding of data categories

The data was indexed and organised into manageable themes, patterns, trends and relationships, after which the researcher used colour coding to identify the themes and linkages and relationships between them (Mouton, 2001:108). The purpose of coding “is to analyse and make sense of the data that have been collected” (Welman, Kruger &

Mitchell, 2005:212). After the data was broken down, colour-coded and categorised, the categories were given names or labels. This was done using highlighter pens of different colours for easy identification, classification and recognition of data. This is important because “codes are tags or labels that attach meaning to the raw data” (Welman, Kruger & Mitchell, 2005:212). The next step entailed the coded information being cut and pasted onto clean A4 sheets for easy comparative analysis (Burnard, et al., 2008:2).

v. Continuous examination and fine-tuning of information

This is the process of re-visiting and re-examining the extracted information, identification of new relationships and interpretation of data (Ryan, 2006:94). It includes identifying issues that were not categorised and deciding how they will be used in the report. In this regard, the researcher returned to the original notes in the margins of various transcripts, as well as written observations elsewhere and listened again to the audiotapes that were not fully transcribed. This process facilitated the development of the findings and ensured that they were “a truthful and accurate reflection of the data” (Hancock, 2002:18).

5.3 PRESENTATION OF RESEARCH FINDINGS

According to Ryan “...raw data do not constitute the findings of the research. When we talk about findings, we refer to what has emerged from the data, after the process of analysis” and that “the complete process of analysis requires that the data be organised, scrutinised, selected, described, theorised, interpreted, discussed and presented to a readership” (2006:92). The purpose of this section is to present the findings that emerged from the analysis of data. Findings are defined as the principal outcomes of a research project; what the project suggested, revealed or indicated (Association for Qualitative Research, 2013-2015:1).

Burnard, et al. (2008) identifies “two main approaches to writing up the findings of qualitative research. The first is to simply report key findings under each main theme or category, using appropriate verbatim quotes to illustrate those findings. This is then accompanied by a linking, separate discussion chapter in which the findings are discussed in relation to existing research (as in quantitative studies). The second is to do the same, but to incorporate the discussion into the findings chapter” (2008:2). In this study, the second approach was selected.

The findings were linked to the key objectives of the study. Some of the key objectives relevant to this study were to describe the nature and magnitude of household energy problems in South Africa’s informal settlements, to explain the extent to which these problems constitute a public policy problem, to define public policy and discuss how effectively it could reduce household energy problems and to propose how effective components of an integrated household energy policy targeting informal settlements could be implemented. The categorisation of the themes below also intertwines or interlinks with these objectives. In other words, the themes and the discussion thereof incorporate the key and most relevant objectives of the study.

5.4 THE PRESENTATION AND DISCUSSION OF FINDINGS

The research study has extracted certain thematic patterns and categories that crystallise into findings. This sub-section discusses some of the key findings that emerged from the literature review and the interviews that were conducted. It is broken down into four broad themes, which are then broken down further into major categories of issues. This is done to ensure thoroughness and to catalyse closer scrutiny of the most important aspects of the research project.

5.4.1 Structure of Themes and Categories that Emerged from the Research

The diagram below outlines the themes and categories that have emerged. The major category represent the findings that fall under each of the main themes. They are used to structure the results or findings section of this report (Hancock, 2002:22). For example, under broad theme one, there are two major category findings, under broad theme two , there are two major findings, under broad theme three, there are five major category findings and under broad theme 4, there are three major category findings. Below the diagram each of the themes and major category findings are thoroughly discussed.

Table 5.1: Themes and categories of findings

BROAD THEMES	MAJOR CATEGORIES OF FINDINGS
1. Informal settlements	1.1. Informal settlements are a growing and permanent phenomenon in South Africa
	1.2. The lack of planning of informal settlements provides a conducive context for energy-related problems
2. Household Energy-Related Problems in Informal Settlements	2.1. The demand for household energy is increasing
	2.2. Informal settlements experience a multitude of serious household energy-related problems
3. A Need for a Household Energy Safety Policy in South Africa	3.1. The energy needs of poor households are still inadequately met
	3.2. The household energy-related problems constitute a public policy problem
	3.3. The problem of siloism, and the existing lack of coherence and integration in policy approach
	3.4. The government's policy of singular focus on electricity provision and exclusion of alternative energy sources is a serious mistake
	3.5. The government is failing to fulfil their legislative mandate

	for energy safety usage at home
4. The Proposed Household Energy Safety Framework as a Possible Solution	4.1. There was widespread support and validation for the policy model proposed by PASASA and SANEDI, with some additions
	4.2. In order to implement the policy effectively, all the necessary policy instruments must be used
	4.3. Proposed institutional arrangements for the HES policy were validated and supported by experts with some additions

5.4.2 Theme 1: Informal Settlements

Informal settlements in South Africa serve as the backdrop for this research study. This is because the poor people living in the, experience the harsh reality of the absence of a safe household energy system. They are affected by high levels of energy poverty and household energy-related incidents. Therefore, informal settlements form the first and the foundational thematic pillar in this analysis and discussion of findings. Under this theme, there are two findings, namely informal settlements are a growing and permanent problem in South Africa, and the fact that they are unplanned creates conducive conditions for household energy-related problems. The government also uses this as an excuse not to deliver safe and efficient energy sources to the informal settlements.

5.4.2.1 Finding 1: Informal settlements are a growing and permanent phenomenon in South Africa

Wolpe and Reddy state that, “trends indicate that informality is here to stay and is growing at an unprecedented rate not only in South Africa but across the developing world” and “Informality represents the largest residential growth within cities in the next 20 years (2010:2, 19). Mr Tokyo Sexwale, the former Minister of Human Settlements points out, “The number of informal settlements is growing uncontrollably. Likewise, the populations inside these ghettos are increasing rapidly” (News24.2013 a: 1).

Approximately 10% of the people of South Africa, comprising an estimated 1.6 million households which works out to about 4.7 million people, live in roughly 2 700 informal settlements (Misselhorn, 2010:16; Wolpe, Reddy & Euston-Brown, 2012:18). This translates to one in six households living in shack environments in South Africa (Birkinshaw, 2008:1). During our interview, Ms Y Reddy (29 September 2015, pers.com) revealed that after years of denial, the South African government has finally recognised that informal settlements are not just growing, “but they are here to stay and therefore a permanent feature in South Africa”. Mr B Bredenkamp (6 August 2015, pers.com) also agreed with this sentiment saying, “They remain informal, but they become permanent”. This because a 2001 survey found that over half of the household heads within informal dwellings have lived in their homes for between five and ten years and a quarter have lived in them for over eleven years (Birkinshaw, 2008:1).

A number of factors fuel the growth and permanence of informal settlements including increasing immigration, urban migration and burgeoning population growth particularly in cities. Another reason is that the government’s national housing delivery and electrification programmes for poor people are lagging far behind the growth of informal areas. These factors create a raft of serious problems for municipalities. Key among the problems is that it “...imposes increased service delivery pressure upon resources like electricity, water, sanitation, health services and housing, all of which were never budgeted for by the perceived affluent municipalities” (News24, 2013 b:1).

5.4.2.2 Finding 2: The lack of planning of informal settlements provides a conducive context for energy-related problems

A myriad of problems develop as a result of the fact that the overwhelming number of informal settlements is unplanned, takes place on private or state-owned land, and is found in areas that not suitable for human habitation. Key among these problems is illegality, congestion and combustibility. One of the interviewees, Mr R Eksteen (31 July 2015, pers.com) of the Western Cape Disaster Management Centre, emphasised that “The

nature of the environment is informal and it's illegal". Due to the illegal nature of the settlements, a huge number of people occupy these areas because no permits are expected, no regulations are applied and, as Mr M Khangane (6 August 2015, pers.com), of the National Disaster Management Centre put it during our interview, "it's a free for all". Add to this the combustible materials used to build the dwellings such as cardboard, plastics, paper, clothes and other heat conducting equipment, such as iron sheeting and wood, there is a conducive environment for serious energy-related incidents such as fire. When these occur in such congested conditions, many people are affected.

5.4.3 Theme 2: Household Energy-Related Problems in Informal Settlements

The two findings mentioned above create a picture of informal settlements as environments that are conducive to household energy-related problems. The second theme emerging out of the study concerns household energy-related problems in informal settlements. Therefore this section outlines the other two findings under this theme. These findings describe the growth of household energy in general and its implications in terms of household energy-related problems in informal settlements. Some key problems will be discussed in sufficient detail in order to make the point that something needs to be done about them.

5.4.3.1 Finding 3: The demand for household energy is increasing

The demand for energy is growing exponentially around the world to meet basic human needs and improve living standards for all people, especially informal settlement dwellers (Wolpe, Reddy & Euston-Brown, 2012:3). This situation that "seemed unimaginable two decades ago has become reality: energy is again on the top of the political agenda in many countries ... now becoming a priority for prime ministers and presidents" (World Energy Council (WEC), 2013:2). In this configuration, household energy consumption grew around the world "by 20% between 1990 and 2006" [and] "accounting for almost 30% of total final consumption" (OECD, 2011:59). This positions the residential sector

as “currently the main energy-consuming sector in many developing regions” (Van Ruijvens, et al., 2009:3). Behind this global energy demand are “the inevitable consequence of global population growth, global economic growth, continued urbanisation, as well as the resulting increased demand on mobility and other energy dependent services” (WEC, 2013:2).

This demand means that governments will not be in a position to address all the energy needs of people, especially the poor in the foreseeable future. It is therefore likely that the numbers of people using unsafe energy sources and appliances are likely to increase. The WEC has predicted that the global energy sector will need to invest half of current world GDP over the next two decades in order to address these challenges and expand, transform and adapt energy infrastructure (WEC, 2013:2). With unpredictable economic conditions, high levels of poverty, rampant disasters and many issues that countries face, it is difficult to be certain that those kinds of investments will be made, especially in countries with as low economic growth and high levels of unemployment as South Africa.

5.4.3.2 Finding 4: Informal settlements experience a multitude of serious household energy-related problems

With the increase in the numbers and permanence of informal settlements, along with the increase in the demand and utilisation of energy in such households, informal settlements experience a multitude of serious problems. Professor A van Niekerk (30 August 2015, pers.com) sets out the causes to variable three when he says, “it’s the heat sources, it’s the appliances, and it’s the construction around it”. The effects of these causes include energy poverty, lack of safety, impact on people’s health, impact on socio-economic status of people, environmental degradation and impact on women. Ms M Ndebele (21 August 2015, pers.com) a director in the DoE emphasised the historical political conditions that gave rise to these problem when she said “as the country we have inherited a lot of problems from the previous regime and because of that, we’ve been trying to catch up”.

Against this backdrop, below are some of the key problems that emerged from the interviews and literature reviews.

5.4.3.3.1 The problem of energy poverty

One of the most prominent problems facing informal settlement dwellers is energy poverty. Current figures suggest that over 1.3 billion people have no access to energy, exposing the extent of energy poverty in the world (WEC, 2013:2). In Africa, “energy poverty, in particular, has been an immediate priority ... as the population with access to electricity is no more than 30% in Sub-Saharan Africa” (WEC, 2013:10). In South Africa, the situation is such that at least 10% of the population (4.7 million people), reside in approximately 27 000 urban informal settlements comprising more than 1.2 million households (Misselhorn, 2010; SACN, 2011, as quoted in Wolpe, Reddy & Euston-Brown, 2012:25). Reddy (29 September 2015, pers.com) stated that, “Energy poverty is particularly prevalent in informal settlements and includes those households living in backyard shacks of formal properties (serviced plots) in overcrowded conditions”. This limits the ability of people to meet their basic needs such as cooking, lighting and heating. It also constrains their capacity for economic productivity and growth.

5.4.3.3.2 The problem of unsafe energy sources and appliances

Experts are of the view that the combination of unsafe and unstable energy sources and appliances is a dangerous proposition in informal settlements. The sources of energy often used include paraffin, candles, coal, wood, gas and electricity or combinations thereof. These energy sources are often used in unsafe stoves, heaters and candleholders. These appliances are often badly designed, unstable, old, faulty, unsafe and some illegal (as in the case of paraffin appliances). Van Niekerk (30 August 2015, pers.com) posited that the appliances are often designed and constructed with respect to meeting an

economic entry point that is quite low. He suggested that the costs of the appliances are meant to be as cost-effective as possible, but this is often at the cost of safety measures, the durability of the appliance and ultimately people's lives and properties.

Because this system is inherently unsafe, it is often the cause of fires and other incidents that regularly occur in informal settlements. For example, according to Lloyd (2012:5), "the problems caused by the appliances are even more severe. The wick stoves in particular suffer from numerous design deficiencies. They can heat the fuel in the fuel tank to above the flash point, and if that occurs there is a risk of a very severe fire, in which the hot paraffin burns at a rate sufficient to give over 1MW. At that heat rate, the temperature inside a typical home will exceed 400 degrees Celsius within 40 seconds, and the home will be destroyed within 15 minutes. The radiant heat from such a fire will ignite nearby structures, so that it is not uncommon for 'shack fires' to involve several hundred dwellings at a time". In addition there is the serious problem of unsafe and illegal electricity connections that are implemented without the help of professional electricians. As if that is not enough, paraffin is also often sold in cold drink containers, without child-resistant enclosures. As studies show, children under five years of age often drink paraffin thinking it is water. There is clearly a serious problem with the unsafe energy system currently used in the informal settlements.

5.4.3.3 Negative impacts on people's health and quality of life

According to the WHO, the lack of safety in the use of "household energy ... pose[s] a substantial threat to the health of the world poor" (2002:5). For example, the burning of coal and wood in unventilated homes causes indoor air pollution, which sometimes leads to asphyxiation and chest and lung problems. Panday and Mafu (quoted in Wolpe, Reddy & Euston-Brown, 2012:13) break the problems down when they say that, "Shack fires and deaths or severe burns are a regular occurrence from ... accidents in informal households. In densely populated areas one fire leads to a domino effect with many shacks (constructed from highly flammable materials such as cardboard and bits of wood)

razed to the ground”. These and many other problems compromise the quality of people’s lives and health.

5.4.3.3.4 Impact on the socio-economic status of people

Energy poverty and harmful household energy-related incidents have a negative impact of people’s socio-economic status. Birkinshaw posits that, “Shack dwellers’ livelihoods are often precarious. When fires burn peoples’ homes and belongings they are less able to earn a living. Time at work will be lost. Tools or stock are destroyed. Informal businesses are lost. Matric, diplomas and training certificates, as well as ID books (needed to access state healthcare and grants) are also burnt, requiring a lengthy and expensive process of replacement. Students’ books and uniforms have also been destroyed – affecting attendance and grades” (2008:3). To make matters worse, some people lose their employment because of long stays in hospital. They are often forced into debt because of extended treatment and other recovery-related expenses.

5.4.3.3.5 Negative impact on women

Household energy-related incidents and energy poverty predominantly affect women and children. This is because “In almost all developing countries it is women who provide fuel for the family and carry out cooking and many other tasks that require energy use in the home ... Carrying heavy loads of wood exposes women to injury from falls (bruises and fractures) and the risk of miscarriage ... Because of their work in the kitchen, often close to the fire, women have more exposure to pollution than other family members” (WHO, 2006:32).

The issue of the negative impacts of household energy on women is best illustrated through the story of one of the interviewees, Ms Sibongile Zenzile of Khayelitsha. She experienced a terrible accident in 2005 when she was busy cooking for her eight-month old baby. She said, “During the process, I was busy lifting the pot and the stove just

exploded. Within seconds, my house was engulfed by flames and my child's clothes caught on fire" (20 September, pers.com). As she doused the fire on her baby with a bucket of water and managed to extricate the child from danger, her own clothes caught fire and she sustained deep wounds on her face and body. She spent over eight months in hospital, enduring costly and painful treatment that continued well after her hospital stay. Afterwards, she experienced discrimination and insults from the community because of her looks (PASASA, 2009:5). It is clear that any solution to the problem must address it from a gender perspective.

5.4.3.3.6 The problem of environmental concerns

The use of unsafe energy sources has serious environmental ramifications both at the household level, and also globally. At the household level, for example, the lack of efficient lighting "restricts activities in the home, including children's homework, reading and opportunities for income generating activities. Lack of access to energy restricts the use of a wide range of appliances that can contribute to food safety (refrigerators), communication/education, leisure (radio, TV), and economic activity" (Bates, 2002:4). In terms of the global situation, Van Niekerk (30 August 2015, pers.com) states that, "... the affordable sources tend to be fuel-based sources and appliances that have been built to use fossil fuel. So, there is a massive reliance of fossil fuel sources to be cheaper or more accessible for sources such as electricity". For example, reliance of fossil fuels increases air pollution into the atmosphere, which affects global warming and therefore climate change.

5.4.4 Theme 3: There is a Need for a Household Energy Safety Policy in South Africa

Brownson, Chriqui and Stamatakis say that "Policy has had, and will continue to have, a vast impact on our daily lives" (2009:5). Experts consulted in the interviews agree that a policy of this nature is required urgently. This sub-section therefore argues along those

lines and seeks to answer the question: Why is there such a need? It seeks to identify gaps within the current legislative framework in preparation for the discussion that will ensue later.

5.4.4.1 Finding 5: The energy needs of poor households are still inadequately met

According to the National Planning Commission, “The energy needs of poor households are still inadequately met” (2012:171). The premise of this thesis is that public policy can facilitate the meeting of the needs of the poor in a safe and sustainable way. There is an unanimous and incontrovertible view, in literature and among the interviewees, that South Africa needs a new, comprehensive and integrated household energy policy, premised on safety, and suited for informal settlements. According to the International Institute for Applied Systems Analysis (IIASA), “major changes in current trends are required if future energy systems are to be affordable, safe, secure, and environmentally sound. There is an urgent need for a sustained and comprehensive strategy to help resolve the following challenges:

- Providing affordable energy services for the well-being of the existing seven billion people and the nine billion people projected by 2050;
- Improving living conditions and enhancing economic opportunities, particularly for the three billion people who currently cook with solid fuels and the 1.4 billion people without access to electricity;
- Increasing energy security for all nations, regions, and communities;
- Reducing global energy systems’ greenhouse gas emissions to limit global warming to less than 2°C above pre-industrial levels;
- Reducing indoor and outdoor air pollution from fuel combustion and its impacts on human health; and
- Reducing the adverse effects and ancillary risks associated with some energy systems and to increase prosperity”.

(IIASA, 2012:16).

Whilst experts agree that the South African electrification programme has been a sterling success in its own right, they expressed disappointment with the fact that other energy sources remain unsafe, and that energy poverty, household energy-related incidents and inequality in the energy system persist. Proceeding “on a business as usual trajectory will result in a deepening of the problems associated with energy poverty contrary to government’s intention to tackle our developmental challenges” (Wolpe, Reddy & Euston-Brown 2012:18; Anderson, 2013:1). It is for this reason that Brian Statham, chairman of the South African National Energy Association stated that “We cannot have 25% of our population sitting in energy poverty. We have to make changes and quickly”.

Mr G Truran (31 July 2015, pers.com) argued that “A new political choice needs to be made to address the lack of safety in the use of energy in informal households and there is adequate stakeholder support for it”. This political investment must be in the form of public policy because “... the main policy decisions remain in the hands of national and sub-national policy makers” (WEC, 2013:5). Hence, Bast and Krishnaswamy believe that, in order to address the dire problems, steps must be taken to change policies, approaches and actions on household energy for informal settlements (2011:3). Tait, Merven and Senatla (2012: 41) report that, in the research they did, “There was broad support from many stakeholders for the idea of a household energy strategy that integrates the approach to household energy in South Africa. Stakeholders felt that the current political discourse on household energy is not reflective of the underlying objectives of improving the welfare of poor households through health and safety, poverty alleviation and improved economic wellbeing”.

Although this view was prevalent in the interviews and literature review, there was a minor divergent view. This view presented the idea of a single, coherent, policy strategy as ‘unrealistic’ (Cairney, 2015:2). Having said that, the researcher still believes that the magnitude and implications of energy poverty and household energy-related problems on society, and the failure of the current incoherent and dispersed policy framework, presents an overwhelming argument for a comprehensive single policy.

5.4.4.2 Finding 6: The household energy-related problems constitute a public policy problem

A public policy problem is a condition or set of conditions that a sufficient number of people in society perceive or experience as undesirable (Hanberger, 2001:45). A policy problem definition “has three main components: description of influential conditions and interests, history of prior governmental action or inaction, and persuasive argument” (Hanberger, 2001:5). Chapter 2 of this thesis described the informal settlement conditions and the impact of unsafe use of energy in those conditions. The energy policy and legislative framework was also described. It is clear that household energy-related problems do constitute a public policy issue that requires intervention. This sub-section puts forward a number of arguments as to why household energy is a public policy problem. Some of these arguments have resonance with the problems discussed above.

5.4.4.2.1 Cost to the economy and public purse argument

Research shows that the costs of household energy-related incidents are astronomical. For example the externality costs to the economy arising from unsafe use of paraffin fuel and appliances (not to mention other energy sources and appliances) have been estimated to be R104 billion per annum (Palmer Development Cooperation, 2003:86). Add to this the incidents that occur as a result of gas explosions, electrocutions, and smoke inhalations, and the costs are obviously much higher every year. Both employers and workers incur unplanned and unforeseen losses due to absenteeism from work and loss of employment opportunities.

The public health system also experiences an impact, as it tends to absorb and pay for the long-term hospitalisation and treatment costs of the majority of informal settlement dwellers who have no choice but to go to public health facilities. Van Niekerk et al indicate that the average stay in hospital is four months, depending on the severity of the injury (2012:5). More often than not, the public health system cannot recover these costs

because the patients are poor and cannot afford to repay. The state absorbs the costs of keeping the victims in its facilities for this length of time.

At the municipal level, state resources, such as emergency services, water, rebuilding material starter packs, blankets, food, fire trucks, and community halls to temporarily house the displaced are required and used to care for people, put out fires as well as rebuild people's homes. These all have significant economic and financial ramifications for the economy and the state.

5.4.4.2.2 The political imperative argument

There is a political explanation for the problems that are experienced in informal settlements. Mark Birkinshaw makes the point that "Shack fires ... are not acts of God. They are the result of political choices, often at municipal level" (Sacks, 2013:1). For his part Richard Pithouse of Rhodes University states that, "Shack fires are routinely presented as natural disasters, as tragedies, when in fact they are a direct result of political decisions" (Sacks, 2013:1). The point made here is that, because the problems have arisen due to bad political decisions and government is doing not nearly enough to address them, there is therefore a political argument to address the problem through a political instrument, which is public policy.

Another part of the political imperative argument is the gender dynamic. Since women and girls are traditionally the ones dealing more regularly with energy, their exposure to energy poverty and household energy-related problems is increased, especially in informal settlements. As stated before, they are vulnerable to burns, indoor air pollution, respiratory diseases and many other problems. They also tend to be the ones who take care of burn victims and survivors, thus experience the trauma of it all. Often they walk long distances to collect wood and work long hours to prepare meals for their families, thus compromising their quality of life. As such, the gender dynamic presents a potent political argument for the government to implement a holistic household energy safety policy.

5.4.4.2.3 The environmental and climate change argument

The reliance of our energy system on coal and the depletion of biomass has tremendous environmental ramifications. The most serious is the contribution to increasing greenhouse gas emissions that lead to climate changes. The majority of South Africa's electricity is generated from coal, which is among the highest emitters of greenhouse gases. The IEA (quoted in AGECC, 2010:9) estimates that by 2030, reliance on traditional fuels for cooking “would lead to 1.5 million deaths per year from household air pollution – more than the estimates of deaths from malaria, tuberculosis, or HIV/AIDS by 2030.” This renders these types of energy sources unsafe and serves as an argument for a Household Energy Safety policy.

5.4.4.2.3 The Millennium Development Goals (MDGs) argument

The MDGs were intended by the United Nations to drive a global agenda for “nations to effectively and systematically address poverty worldwide by 2015” (Statistics South Africa, 2013:3). It has been shown conclusively that energy facilitates the realisation of the majority of the MDGs. For example the United Nations Millennium Development Goal of eradicating extreme poverty by 2015 will not be achieved unless substantial progress is made on improving energy access. Statistics South Africa pointed out that the lack of access to modern energy services is a serious hindrance to social and economic development as access to modern forms of energy is essential for the provision of clean water, sanitation and healthcare (2013:3). This illustrates the importance of household energy safety in addressing poverty because, if poor people do not achieve access to energy, the MDGs will not be realised fast and effectively enough, especially at the household level. This argument therefore suggests strongly that public policies addressing the MDGs need to be supported by an integrated household energy safety policy in South Africa.

5.4.4.3 Finding 7: The problem of siloism, and the existing lack of coherence and integration in policy approach

Swart and Bredenkamp point out that “the absence of an integrated, household energy strategy and policy in South Africa is a major concern” (2012:1). This betrays the underlying absence of a unified and progressive approach to energy safety coupled with a lack of deep concern for the poor. As a result of this, each department or unit that is affected by the household energy-related problems deals with them in a siloistic manner, devoid of any central synchronisation. Almost all the interviewees agreed that there is a dire need for government to have a mechanism to integrate government’s approach to household energy-related problems. The reason is that the issues of energy and household energy-related problems permeate into many other areas of service delivery, such as housing, health, social development, and local government.

Ndebele (21 August 2015, pers.com) and Bredenkamp (6 August 2015, pers.com) each shared that the lack of integration had manifested itself when the DoE made a decision to initiate a process towards the establishment of a Household Energy Strategy. In the process, the DoE worked with SANEDI. Commenting on the response or attitude of some of the departments that were invited to participate, Ndebele (21 August 2015, pers.com) said that this “became a bit of a problem as individual departments focus on individual issues and therefore the household energy strategy was then put on hold because we needed all these partners to come on board and also to contribute their input”.

Emphasising the seriousness of this problem, Eksteen (31 July 2015, pers.com) stated this problem is “not only between government and the private sector, but within government itself, within a single department there is contradiction. In my view, it’s a mess”. This undermines the tremendous amount of work and impact that could be achieved if there was collaboration, communication and integration across the spheres of government, departments, and units and within departments. As Eksteen states (31 July 2015, pers.com), the strength of those stakeholders in influencing and implementing such a policy is vitally important.

5.4.4.4 Finding 8: The government's policy of singular focus on electricity provision and exclusion of alternative energy sources is a serious mistake

One of the distinguishing features of South Africa's existing energy policy is its singular focus on electrification as the only solution to the energy problems in the country, to the exclusion of other energy sources and technologies. Tait, Merven and Senatla point out that, "The DoE's policy approach to energy has been dominated by a focus on promoting access to grid-based electrification" (2012:23). This means that there have been comparatively fewer programmes to address access to other household fuels (2013:6). In this policy approach "Issues and challenges relating to the access of other fuels are almost completely absent in government documents. As a result many households are, for example, still exposed to the harmful effects of smoke from wood and coal fires and use unsafe appliances (e.g. paraffin stoves and candles) which pose significant safety risks" (Swart & Bredenkamp, 2012:3). The attitude undergirding this approach seems to be a mistaken view held by many in government that electricity is synonymous with energy. Ndebele (21 August 2015, pers.com) illustrates this point well when she says "the manner in which energy policy was implemented in South Africa suggested that ... energy ... is being defined in terms of access to energy and in this context, electricity. That why you find people like municipality providing fee basic electricity".

There are a number of reasons why this problem of excluding other sources of energy is a big mistake. One of the reasons is what van Niekerk (2015: pers.com) calls "a fragile access to electricity". This fragility is determined by the fact that many poor people cannot afford it. Van Niekerk (2015:pers.com) says that even the "basic equipment is prohibitive and I think this is very difficult because the economy is tighter and it's getting worse". Although Dr D Kimemia (28 August 2015, pers.com), a researcher at the Medical Research Council (MRC) expressed appreciation of the electrification programme as a positive contribution to the alleviation of energy poverty and people empowerment, he highlights some problems with it. For example, he points out that electricity was "not available to everybody in ... informal settlements that are not planned and therefore don't have electric infrastructure. Secondly, where that electricity is

available, the Free Basic Electricity programme, it has very low power rating and that's a problem. Once they connect, even machines to do fabrication, to do things around their households, they find that the electricity trips off. It's in very low current, so they are not able to do any meaningful trading or economic activity with it. Another problem related to that is the issue of the bill. Once they utilise the Free Basic Electricity, which is not even enough for their own household uses, the extra units are quite expensive, and so it might not make economic sense using it. Maybe somehow it has been benefited by and been effective in bringing hair salons, barbers and other small things, but it has not brought meaningful transformation in an economic way”.

Eksteen (31 July 2015, pers.com) identified yet another important problem with electricity as the only source of energy. He said, “... even the provision of electricity doesn't necessarily remove the risk of fire or injury related to energy, there's definitely an increase of incidents because of electricity. Again, unsafe appliances that are being used or left on – many heat producing appliances, some appliances that are left on to produce some kind of heat, so heaters obviously and stoves that are left to heat the environment and people fall asleep. Then there are things like electrocution, children putting their fingers in electric sockets and other lethal connections such as over loading of plugs. So those types of incidents will set off from electricity”. This shows that basically any energy source that is used to produce some of form of heat – whether it is for warmth, or cooking or bathing, during the process of heating or generating the heat, contains a risk of injuries or fires that can occur. An equally important issue is that some of the burn injuries, especially on children, are caused by hot liquids.

The problem with the government's energy trajectory of prioritising electricity is the policy's failure to recognise that poor people use a multiplicity of energy sources. As a result of this “Our energy services trajectory and systems have a serious problem that policy fails to address adequately and comprehensively” (Statistics South Africa, 2013.iii). This is due to the fact that households without adequate access and/or affordability of electrical energy often utilise multiple sources of energy such as wood and paraffin. It therefore makes sense to install an energy system that recognises the role

played by these fuels and that progressively improves their safety (Statistics South Africa, 2012:10).

5.4.4.5 Finding 9: The government is failing to fulfil their legislative mandate for energy safety usage at home

During the interview process the energy experts presented a view that South Africa has a basic policy and legislative framework that is at least supportive to, and can facilitate, household energy safety in informal settlements. However, government has not used this to address the problem. According to Mr F Tshifularo (6 August 2015, pers.com), an interviewee who is the Chief Executive Officer of the South African Petroleum Industry Association (SAPIA), as a country “we have policies that are already in place”. The DoE “has a clear mandate to address household energy safety and consumer protection as laid out in the Energy Act of 2008. However, this has been largely neglected to date” (Tait & Merven, 2012:56). During the interview, Ms L Tait (11 August 2015, pers.com), Energy Researcher at the Energy Research Centre at the University of Cape Town, reiterated this point when she stated: “I think there’s definitely the policy and legislative framework in place, that affects the mandate for the DoE to look at energy safety, but there’s many more steps in the road to implementation than just having the policy in place”. When quizzed on this, she explained further that there were different pieces of policy aspects that could form a framework, but they are currently dispersed, disjointed and disintegrated, emphasising a need for a single household energy policy premised on safety for informal settlements.

Considering the years since these policies were promulgated, it is clear that government is failing dismally to leverage this legislative framework to prevent household energy-related incidents. Mrubata puts it well when she says, “Low-income households in South Africa have borne the brunt of inadequate attention to their basic constitutional right to live in an environment that is not harmful to their health and well-being” (Kulati, 2014:35). For their part, Tait and Merven, referring to the DoE said that their “general

reticence to engage is indicative of ... political apathy...” (2012:32). Elsewhere, they state, “The lack of interest from the DoE in this regard is a major impediment to addressing these safety issues” (Tait, Merven & Senatla, 2012:39). Tshifularo (2015:pers.com) was categorical when he said “well, there is no evidence of any role played by the Department of Energy as far as the safe use of energy in the household. If I would look at it, it has to do with history: there is a tendency to outsource responsibility in an unstructured way to the private sector”. To illustrate his point further, Tshifularo (6 August 2015, pers.com) gave the example of Liquefied Petroleum Gas (LPG) where the Department of Labour gave the responsibility to ensure the safe use of LPG in South Africa to the LPG Safety Association of SA (LPGASA) including the safety “of cylinders, stoves appliances and everything else even the installation of your gas and pipeline in a household you get it basically from LPGASA”. Clearly there is a serious problem and all these factors point to the fact that the existing framework does not have the contents that directly address household energy safety in an enforceable way. As such South Africa needs an energy policy on household energy.

5.4.5 Theme 4: The Proposed Household Energy Safety Framework as a Possible Solution (see Figure 5.1)

This research project seeks to find contents for a comprehensive and integrated household energy safety policy that could be implemented in informal settlements to effectively alleviate energy poverty and the lack of household energy safety in South Africa. According to Brownson, Chriqui and Stamatakis “policy content focuses on identifying the specific policy elements that are likely to be effective” (2009:10). In order to do this well, Tait, Merven and Senatla suggest that, “a household energy strategy would ideally build on and bring together all programmes and objectives related to household energy, and consider demand and supply options in an integrated manner for all household fuels. Such a strategy should develop a long-term vision to bring clarity to the sector. This vision needs to clearly articulate what the objectives around household energy transitions are and what they should look like in the short, medium and longer terms. This is critical

to give clarity to key role-players, both private and public” (2012:23). This section seeks to discuss some of the proposals that have emerged during the research toward achieving this goal. It is important to mention that the study never intended to develop a fully-fledged policy proposal, but rather some key pillars that could form the framework. Below is a discussion of findings from the study.

5.4.5.1 Finding 10: Public policy can be a catalyst for social transformation

There was an overwhelming sense from the literature review and interviews conducted by the researcher that public policy on household energy for informal settlements would be the most effective facilitating mechanism to engender social transformation for poor people in South Africa. By way of recapping Mackay and Shaxton define public policy simply as “a decision made by government to either act, or not act in order to resolve a problem” (2007: 1). Perhaps Mr Glenn Truran (20 July 2015, pers.comm) captured and summarised the sentiment very well when he said “in South Africa, public policy that is adequately funded, politically championed, enforceable and appropriately positioned within the government system is the best and the last hope for poor informal settlement dwellers who are daily blighted by fires and other household energy related problems. If the government is serious about the plight of shack dwellers and their dire conditions, an effective public policy is what they must urgently prioritise”.

This is due to the fact that public policies “offer valuable insights into the functioning of political systems” (Halpern, quoted in Kulati, 2014:24). Therefore, if the SA political and governance system functions to benefit the poor and since “energy policy is fundamental to the overall direction of development” it is clear that the household energy safety policy must be implemented for informal settlements (Hallowes, 2005: 19). Otherwise, “there are clear costs for development, health and the environment in continuing the status quo” and that these will be exacerbated “without additional dedicated policies” (Bast and Krishnaswamy, 2011:3).

5.4.5.2 Finding 11: There was widespread support and validation for the policy model proposed by PASASA and SANEDI, with some additions

Tait, Merven and Senatla report that, “A meeting of household energy stakeholders was organised by PASASA and SANEDI in May 2012 to discuss the challenges around the low-income sector” (2012:24). The primary outcome of the meeting was a proposed policy framework on household energy (see Figure 3.6). As stated before, the framework is premised on the following key pillars or strategic objectives, namely access, affordability, efficiency, safety, health impacts, and implications, supply and availability, and environmental impacts (PASASA, 2012:5; Tait, 2012:3; Swart & Bredenkamp, 2012:4). It is important to insert at this point that when the participants in the interviews were asked to comment on that proposed framework, all of them validated it, albeit with minor additions or suggested changes. The discussion below presents a revised model of the household energy policy framework for informal settlements based on the one proposed by PASASA and SANEDI by either expanding on the issues mentioned in the model or changing some of its aspects. It is important to point out that the model presented here is therefore new and more elaborate than the one developed by PASASA and SANEDI (see Figure 5.1).

5.4.5.2.1 Access

Access to energy by the poor in informal settlements is a foundational cornerstone of this model. According to Petrie (2013.1), “The correlation between improved energy access and improvements in lives at a household level is well established”. In South Africa, energy is available, but many people, particularly the poor in informal settlements and rural areas cannot access it. There are a number of reasons for this, including the lack of infrastructure, unavailability of safe appliances, high prices and unreliability of energy supply systems or services. Equally important is that the access itself must be safe for people and that people must be able to access a multiplicity of energy sources.

The government's Integrated Energy Centres programme is inadequate because the centres are few and far between. One of the interviewees called them "the good old glorified garages that masquerade as mechanisms for energy service delivery, yet they focus on delivering petroleum products and profit for the petroleum companies involved". But access to safe and efficient energy services is a fundamental aspect of the proposed policy framework. Glemarec (2013:7) points out that, "Improving energy access through sustainable energy choices will create jobs, not emissions, in the South African economy". Opportunities exist in installing, maintaining, logistics and delivery of equipment and poor people can be trained and supported to carry out these tasks, thus reducing poverty (Glemarec, 2013:7).

5.4.5.2.2 Affordability

The energy experts that were consulted supported the view that energy services must be made affordable to informal settlements. Qase and Annecke (quoted in Statistics South Africa) state that "Studies ... show that many households that get connected to the grid are not necessarily able to afford the use of electricity for thermal applications such as cooking and heating and that these households will continue to use other sources of fuel such as paraffin or wood for these activities" (Statistics South Africa, 2013:16). Research indicates that energy prices continue to grow beyond the ability of people to pay. Poor households "often spend a larger percentage of their household income on household energy needs" (Statistics South Africa, 2013:16). For example, in a South African study conducted by Swart and Bredenkamp (2012:3), households that earned up to R1 500 per month on average spent 26% of their income on energy compared to 4% for households that earned more than R5 500 per month" (Statistics South Africa, 2013:16). In Africa, Glemarec estimates that "poor households in Africa face recurring expenditures on fuels ranging between 10% and 25% of their monthly household budgets. The price of kerosene [paraffin] has tripled in Africa during the last decade and is expected to continue rising in the coming decade. Oil price volatility is also expected to increase. Poor households commonly devote around 60% of their income to food ... A doubling of

the oil price could therefore wipe out the remaining income available to be spent on other goods and services” (2013:6).

It is therefore imperative that the government puts in place mechanisms, as part of the proposed policy, to protect the indigent informal settlement householders from the vagaries of oil price fluctuations and the energy price increases. This will ensure affordability. Later in the thesis, policy instruments by which this can be done, such as subsidies, are discussed.

5.4.5.2.3 Diversifying energy generation capacity and sources

This aspect was not in the original framework. It came after analysing the interviews of the experts. South Africa desperately needs more energy sources than a single electricity stream. Diversifying means that the country’s energy policy needs to provide for energy to be sourced and generated from the existing coal (in the meantime, whilst investing in clean technologies), but also other sources, such as renewable energy. This can be achieved by reducing “our dependence on finite resources such as coal and shifting to renewable energy sources such as wind, solar and hydro-electric energy sources” (Glemarec, 2013:8). Renewable energy sources need to be dramatically promoted and meaningfully supported by all sectors of society in order to meet those needs satisfactorily and affordably.

5.4.5.2.4 Safety

A key part of the policy should focus on the safety of the household energy system and the use thereof. The centrepiece of such a policy should be prevention rather than a reactionary approach. A systemic approach should be used, which does not only focus on the type of fuels, but also on the housing, fire proof building materials, and household appliance technologies to prevent both fires and indoor air pollution. Coordinated safety programmes that target all fuels and appliances and change behaviours are crucial.

5.4.5.2.5 Health impacts mitigation

The research project has convincingly shown the impacts of the unsafe energy sources and appliances on people, communities and the nation at large. For our country to develop sustainably, the proposed Household Energy Safety policy must mitigate the health impacts and establish initiatives to reduce and prevent all of the negative health impacts that arise out of energy use.

5.4.5.2.6 Security of supply and availability

It is important that the supply of energy is secure and sustainable. Security of supply for different fuel types and appliances is crucial. Equally important are the role of the private sector and the promotion of innovation to establish safe energy distribution and use systems in informal settings.

5.4.5.2.7 Environmental impacts mitigation

Environmental degradation has a devastating impact on human life, natural systems, social development and even the economic processes of a country. As shown earlier in this document, South Africa's electricity generation is based on burning coal. This process leads to harmful and toxic emissions affecting land quality, air quality, water quality and the quality of all else that relies on those systems. The policy has to factor in these externality problems, and put in place mechanisms that will mitigate the environmental impacts.

5.4.5.2.8 Technology

Technology has been raised in interviews and the literature as one of the most important focus areas for any policy to succeed. In the area of energy, technology is applicable from

a wide variety of angles. These include as energy appliances, energy supply systems, energy distribution systems, energy purchase systems, and so on. Technological solutions can improve safety in, and unlock a lot of value for, informal settlements, especially when they are safe, user-friendly, affordable and effective. In this regard, Glemarec (2013:8) made comparison with the rapid and spectacular uptake of cell phone technologies and applications in Africa, where a few years ago, very few people had access to a telephone. This illustrates the power of technology, not only to solve immediate problems, but also to influence social development. Hence, the proposed policy must embrace and prioritise technology.

5.4.5.2.9 Further additions to the proposed policy framework

During the interviews new thoughts and ideas emerged about other issues that were not originally part of the PASASA and SANEDI document. For example, ideas were shared about possible policy objectives and principles on which the policy could be premised. Below, those items are fleshed out a bit more with additional factors that emerged from the data analysis.

5.4.5.2.10 Proposed objectives

After engaging with the interviewees and the literature review, it was possible to identify at least four objectives. These emerged from a combination of objectives that were mentioned. The researcher combined these on the basis of their similarity or connectivity.

i. To establish secure, safe, plentiful, diverse energy supply

Considering South Africa's recent history of electricity supply problems, such as load shedding and blackouts, it is crucial that "sources of primary energy need to be secure from interruption, adequate to meet short- and long-term needs, and diverse enough so

that a natural or political interruption of one source of supply will not cripple the ... economy” of the country and the communities’ functioning (Pew Center on Global Climate Change, 2002:8).

ii. To create an efficient and reliable energy infrastructure.

The Pew Center on Global Climate Change posits that, “The infrastructure for energy delivery and conversion (e.g. pipelines; refineries; and electricity transmission, generation and distribution facilities) needs to have adequate capacity (including a margin for unforeseen events), be reliable in normal operation, and be secure” (2002:8). This phraseology resonated and accurately captured the thoughts and expressions of the interviewees.

iii. To ensure affordable and stable energy prices

The price of energy services should be affordable to poor consumers and support South Africa’s overall developmental trajectory. The energy prices’ structuring should facilitate and encourage the gradual migration of poor consumers from unsafe energy sources and appliances to the new, safe and efficient ones. Ms Zenzile’s view (2015:pers.com) on this was “A pricing model must take into consideration the poverty levels of the country if they are to be meaningful to us as informal settlement people”.

iv. To promote and support environmentally sustainable energy production and use

Energy production processes and utilisation must factor in environmental considerations in order to prevent environmental damage, such as pollution, greenhouse gas emissions and climate change. It must also mitigate public health problems.

5.4.5.2.11 Proposed policy principles

Adherence to principles is generally recognised as indispensable for the effectiveness of public policy and its implementation (WHO, 1999:23). Below are some of the key principles that seek to support the proposed policy framework.

i. Concern for people

Reed states that, “sound policy requires that we consider long-run effects and all people, not simply short-run effects and a few people” (2001:3). In a democracy, premised on human rights, as South Africa’s constitution states, people are the foundational cornerstone for policy making. The apartheid system and its successive energy policy regimes systematically excluded and marginalised the majority of people who were black and poor. There was no concern for the people and the long-term effects of the energy policies on them. The democratic dispensation, which was installed in 1994, has failed to adequately and comprehensively address the energy needs of poor people particularly in informal settlements. Hence, for this policy to be effective at the centre of its orientation must be concern for people.

ii. Safety focus

Ms T Ramuedzisi (31 August 2015, pers.com), Chief Director in the DoE pointed out that safety should be at the heart of this policy framework. Therefore, the policy must ensure that resources are driven toward ensuring that safety in the use of energy in informal settlements is achieved. Embedded in the safety focus is a prevention approach. In other words, the policy must prioritise the prevention of problems rather than merely dealing with their consequences.

iii. Equity of access to meet people's energy needs

Equity of access to energy services was mentioned by many interviewees as imperative to be included in the policy. For example, Mr J Baleka (31 August 2015, pers.com) of Alexandra Township captured the general sentiment when he said, "For many years now, there has not been equity in terms of poor people's access to energy. They have been marginalised and excluded for too long, even during the democratic era. It is time that equal access to energy service must not only be included but enforced". This principle highlights the importance of ensuring the well-being, not just between the different existing economic classes, but also between current and future generations. Included in it is the need for the improvement of all the energy sources and appliances that people are using at the moment and to gradually migrate them over time to clean energy sources in the energy ladder.

The following principles have been developed by the World Health Organization, but are very applicable and could add tremendous value to the proposed framework.

i. Importance (or relevance)

A policy should address issues that are important enough to merit a written policy. A number of administrative issues might not be worth the work of developing and disseminating a formal policy to address them.

ii. Effectiveness

There must be a good reason to believe that a policy will be effective or useful in addressing a problem. It must have a realistic chance of having a tangible benefit.

iii. Balance

This principle refers to the need to have some balance between the good that the policy will bring and the difficulty of implementing it. This means that, in addition to being effective, the additional work resulting from a policy, or the imposition it places on individuals, must be worth the benefits derived.

iv. Technical feasibility

This principle recognises that public policies must be able to be implemented within the 'real world' context, taking into account economic and technical constraints encountered in a particular setting. Policies must also be technologically practical.

v. Social acceptability

Policies, to be useful, must be socially and culturally acceptable to the communities wherein they will be implemented. "A policy that is theoretically sound and that works effectively in some cultural settings may not be acceptable or effective, in others" (World Health Organization, 1999:12).

vi. Principle of integration

Integration is crucial in policy in order to avoid what Cairney calls "a regular feature of fragmented policymaking, in which different government departments may be responsible for individual aspects of policy and have different ideas about how to solve the problem" (2015:2).

5.4.5.3 Finding 11: In order to implement the policy effectively, all the necessary policy instruments must be used

To recap, “a policy instrument”, according to the Van Nispen “refers [to] the means of government intervention in markets or, in broader perspective, society in order to accomplish goals or to solve problems. The behavioral assumption underlying a policy instrument is that it attempts to get people do things that they might not otherwise have done” (2011:3). Carney, describes them as “tools used by governments to pursue a desired outcome” (2015:1). They help the governmental authorities to bridge the gap between the ‘as-is-now’ and the ‘ought-to-be’ scenarios by being the means through which the policy objectives can be achieved.

5.4.5.3.1 Regulatory instruments

Geurts points out that governments all over the world “are investing in better regulation” because “regulation is a tool for delivering policies and meeting the expectations of citizens. By designing policies, laws and regulations, governments are looking to do better, to make sure that they are using the right tools to get the job done; to make sure that benefits are maximised while negative effects are minimised; and that the voices of those affected are being heard. Furthermore, governments want to reduce red tape and get rid of unnecessary bureaucracy (2014:16). In terms of household energy safety, the whole supply chain of household energy sources from manufacture to use in the home must be regulated. This means that there must be a single central regulation that addresses the use of all energy sources, appliances and technologies for cooking, lighting and heating the home. All the standards relating to all the appliances used in the home, across all energy sources, must be revised and consolidated to ensure that new technologies are taken care of in order to facilitate the entry of improved and safe appliances from other countries into the South Africa market.

Eksteen (31 July 2015, pers.com) argued that the policy “must put in place stringent and enforceable mandatory mechanisms such as standards for appliances, fuels, housing and

appliance labelling”. From the interviews and the literature three examples of regulatory instruments were mentioned to give “teeth” and effectiveness to the proposed policy. These were legislation, regulations and standards. To understand how these work, it is important to define and distinguish between them. The WHO defines legislation and regulations in the following way: “Legislation is passed by the legislative body of a country, and establishes the general framework of principles within which the government is expected to act and within which regulations are issued. Regulations are issued by the government, by an individual minister, or by a designated authority within, or under the supervision of, a ministry. While the process of preparing or reviewing legislation is usually long and complex, the preparation and updating of regulations is a more dynamic process. Therefore, legislation does not need – and in fact should not – include detailed indications and prescriptions, but should only state general principles that do not require regular updating. Details of application of such general principles are included in regulations” (1998:26). World-At-Work states that standards are used voluntarily, “established by consensus of all parties concerned, based on consolidated results of science, technology and experience [and] approved and published by recognised standardisation body” (undated:1).

What has become clear is that the (Household Energy Safety) HES policy must be legislated to have the desired effect and resources it needs. Embedded in it should be all-encompassing regulations and standards that pertain to all energy sources and appliances. Participants were against putting in standards and enforcement measures for some energy sources and appliances whilst others did not receive the same attention. The view was that the fragmentation, which saw some energy sources and appliances heavily regulated and enforced whilst others were left alone, must be removed. It goes without saying that regulation without enforcement is a waste of time and resources. Therefore, the policy must include resource allocation for proper enforcement, which would be closely monitored and regularly evaluated.

There are voices in the literature that believe that self-regulation might be the best way forward. However, this is not supported by many authors and interviewees consulted

during this research. For example, “Self-regulatory politics often takes place outside of public scrutiny and can lead to charges of policies developed exclusively in the interest of the regulated, rather than in the public interest” (Cengage Learning, 2009:4). Baleka (2015:pers.com) pointed out that “in SA self-regulation failed in the paraffin appliance market. For many years, the paraffin appliance industry was left to regulate itself. However, they did not and as a result, SA was flooded with unsafe and illegal appliances. The government decided to implement the SANS 1243, which is a mandatory regulation to arrest the situation”.

5.4.5.3.2 Financial instruments

The European Commission states that, “Financial instruments represent a resource-efficient way of deploying cohesion policy resources in pursuit of ... strategy objectives” (2014:1). They assist in mobilising additional resources through public-private co-investments. Glemarec (2013:86) has conducted extensive studies on financing off-grid sustainable energy access for the poor. Although he seems to overemphasise the role of a liberalised private sector, some of his views are applicable to this study and resonate with the findings of the researcher. Therefore this section will draw heavily from his views.

Participants highlighted subsidies and taxes as funding models for safe energy systems either to support poor people or to incentivise investment into them. The purpose of the financial instruments under this policy should be to ensure that clean and safe energy is affordable and accessible to the poor in informal settlements; the poor have access to financial state support or low interest financing and that all barriers are demolished. They felt that government should use taxes as incentives to mobilise businesses to invest in the development of safe and efficient energy sources and appliances, whilst subsidies could be used to support the poor to acquire and use safe energy sources and appliances.

The fact of the matter is that people who live in informal settlements may not be able to pay for advanced and more expensive, but safe and clean energy sources and appliances. This means that government needs to support them. Glemarec suggests that

“Governments can take four decisive actions to lower upfront costs: (i) reduce balance of system (BOS) costs; (ii) eliminate taxes and tariffs on clean energy devices; (iii) reduce subsidies on fossil fuels and subsidize part of the upfront and operation costs; and (iv) promote entrepreneurship and income-generating activities by the new end-users of these energy service” (2013:89). The flip side of this can also be explored, such as dramatically raising taxes and fines for that manufacture unsafe and dirty energy sources and appliances.

Besides the tax option, there is a strong need for government to reform its subsidy scheme. According to Glemarec, “Subsidy reforms hold the promise of freeing up resources for energy access in many developing countries. Such reforms focus on reducing, eliminating or redesigning subsidies that promote inefficient and often harmful use of resources in a number of economic sectors, including energy, agriculture, fisheries, forests and water. Conventional energy subsidies are the single most important barrier to the growth of clean energy technologies today” (2013: 90). For example currently the SA government subsidises electricity consumption through the Free Basic Electricity policy. Nominally, they also subsidise the consumption of alternative energy sources. It has already been stated that this provision is not successful because municipalities that are supposed to be delivering it either have neither capacity nor resources to do it. So it is not clear the extent to which this policy is successful. This calls for a revision and reform of the subsidy policy into a central and user-friendly policy through which safe and clean energy sources and appliances are made available to informal settlements. The subsidies do not have to be permanent or complete. They could, for example, be sufficient to cover the initial costs of appliances and fuel whilst all the unsafe ones are completely eliminated from the market to avoid a situation where people buy the new improved solutions with the subsidy and then revert back to the old unsafe ones once the fuel is finished.

5.4.5.3.3 Communications instruments

The lack of information and education on household energy safety was identified as a serious problem by many of the experts. Khangane (6 August 2015, pers.com) said

“Because we work on these issues daily, we often assume that people are aware of dangers in using domestic energy sources and appliances. The truth of the matter is that many often don’t. These messages must be communicated relentlessly”. This illustrates the need and importance of communications instruments in our policy. These are “...suasive approaches and policy tools that encourage changes in behaviour through the provision of information, such as via general education programs, guidelines and codes of practice, training programs, extension services and research and development” (Collins & Scoccimarro, 2008:6).

Almost all the interviewees identified these as easy to do and as the most cost effective way to raise awareness. For example, when asked about what the government can prioritise as a key strategy for this policy, Ramuedzisi (31 August 2015, pers.com) enthusiastically said, “I think a key one is education, education, education. Basically informing people and making sure that people and the communities are aware”. Ndebele (21 August 2015, pers.com) was also very supportive of this instrument when she said “I believe in awareness and advocacy because people will have a choice and they can take proper decisions, of what type of energy they will use ... I feel that’s it’s one of the things that is working in the country currently and I think if we could equip it or motivate it could be an option and people will look as if they cannot have an option so I think when you are aware at least you have a choice and when you have a choice you can take better decision from what you know of which type of energy will you use into your house”.

According to the WHO, public education and awareness raising campaigns have proven effective in promoting causes and prevention of injuries globally (2004:12). These activities provide people with the knowledge and training they need to inform, empower, persuade and motivate other people about key messages of household energy safety (WHO, 2004:10). When analysing the views of experts, it became clear that education and awareness-raising activities could be targeted at three levels, namely individuals or communities, social and environmental change, and education of professionals. These are discussed briefly below.

5.4.5.3.4 Raising awareness of individuals and communities

According to PASASA, the “modern approach to education is to help people explore their values and attitudes to see the possible options” (PASASA, 2008:6). The ideas that follow could serve as the basis for communication messages:

- Raising awareness of the household energy safety.
- Education about the dangers of using unsafe and illegal energy sources and technologies or appliances.
- Ways to prevent harmful household energy-related incidents, such as fires, indoor air pollution, and injuries.
- How to get and use safety devices such as smoke and heat alarms, and child-resistant containers for fuels such as paraffin.
- Emergency contact details.
- What to do when a child or a person has been burnt or injured.
- Targeting of school children from pre-school right up to high school level through the education system or curriculum.
- Product labelling and packaging: Labelling and packaging are essential in communicating messages, not only about the product but also about safe usage of the product or equipment. WHO says that “designers of packaging for products which children are likely to come into contact with, need to be aware of these dangers so that they can ensure that the appearance will not increase the risk” (2004:11).

5.4.5.3.5 Education intended to effect social and environmental changes

The activities that fall within this category are targeted at policymakers, the public and decision makers at national, provincial and local levels about household energy safety.

They include:

- Policy briefs with the most relevant and up-to-date information on a regular basis.
- Information about the applicable laws and regulations to influence decision making and facilitate enforcement and monitoring.

5.4.5.3.6 Education of professionals

There is a case to be made for professionals in relevant areas of work to be trained with thorough knowledge of household energy safety. When interviewed on 31 July 2015, Mr Truran was of the view that “teachers and nurses are some the key professionals that need to be trained”. He indicated that, “When PASASA was working in hospitals and clinics, we heard a lot of stories of nurses who forced children who ingested paraffin to drink it, which of course, was wrong from a health perspective”. It is clear that they need awareness of the scientific background and implications of what they are doing.

5.4.5.4. Finding 12: Proposed institutional arrangements for the HES policy were validated and supported by experts with some additions

For any policy to be effective, it requires an institutional setting and arrangements designed to support its objectives (Auzins, 2004:1). According to Sörvik, “Institutions are social structures that enable interaction, through means such as language and financial systems, and constrain and focus social behaviour by providing rewards and punishments that give actors incentives to participate in exchange processes and to stick to previous commitments” (2010:39). The United Nations Economic and Social Council (UNESCO) defines institutional arrangements as “the policies, systems, and processes that organisations use to legislate, plan and manage their activities efficiently and to effectively coordinate with others in order to fulfil their mandate” (2014:6).

In other words, they refer to formalised organisations or structures of government along with normative systems concerned with policy formulation and implementation processes that exist in the country. They provide a unified and coherent platform on which various spheres or levels of government can synergistically formulate and implement relevant policies, for instance national, provincial and local, with the support of non-state players such as Non-Governmental Organisations (NGOs) and private companies, (UNESCO, 2014:07).

Therefore, the institutional system serves as the mechanism to coordinate transactions between entities and to ensure policy coherence to catalyse efficient decision-making and strong coordination. The experts interviewed were unanimous in their support for the establishment of proper and efficient institutional arrangements in the process of formulating the HES policy. Asked about this, Eksteen (31 July 2015, pers.com) responded that “Yes, I think looking at the three spheres of government; it must be a national level or focus, so that there’s an over-arching framework of institutional arrangements that is also clear and talks to the problem at hand throughout the country”.

The proposed framework by PASASA and SANEDI highlights the following departments and the synergy between them as important for the implementation of this policy:

- Department of Health
- Department of Economic Development
- Department of Energy
- Department of Education
- Department of Science and Technology
- Department of Social Development
- Department of Women, Children and People with Disabilities
- Department of People with Disabilities
- National Treasury
- Department of International Relations and Cooperation;
- Department of Water Affairs and Sanitation
- Department of Environmental Affairs
- Department of Trade and Industry
- Department of Human Settlements
- The National Planning Commission
- The National Consumer Commission
- Civil society Organisations

- Research institutes
- The South African Petroleum Industry Association (SAPIA)
- The National Regulator for Compulsory Specifications (NRCS)
- The South African Bureau of Standards (SABS)
- South African National Energy Development Institute (SANEDI)

From the interviewees the following other organisations were mentioned as critical and as such need to be included:

- Eskom
- Central Energy Fund (CEF)
- South African Cities Network (SACN)
- South African Local Government Association (SALGA)

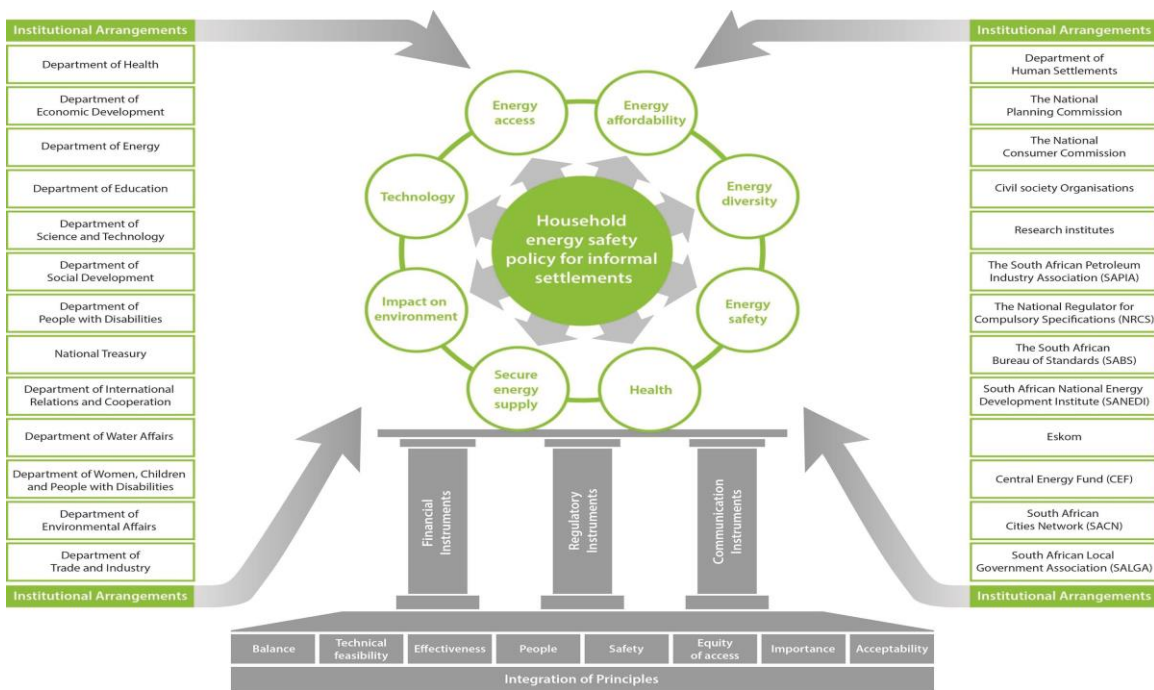


Figure 5.1. Proposed household energy policy framework and institutional arrangements

Although there was recognition of the importance of all these stakeholders, experts also felt that for a policy framework such as this a political champion was needed. Van Niekerk (30 August 2015, pers.com) felt that “The lack of a political champion is quite a serious barrier to progress in this area”. Bredenkamp (6 August 2015, pers.com) agreed saying, “As I said, a policy of this nature needs a single good champion. A credible figure that can really stand up and say, ‘We’ve got an energy crisis, let’s create a war room and put the deputy president in charge of the war room, because we’re having load shedding’.”

When pressed to mention a specific entity or location from which this policy can be driven, interviewees had divergent views. For example, Bredenkamp (2015:pers.com) said “you do need a champion that’s probably above the line department, you know, like the National Planning Commission ... It could, in an ideal world, warrant a ministry of its own”. Kimemia (28 August 2015, pers.com) felt that the “... Department of Housing and Human Settlements, I think they are quite relevant here, because they are not only settling people but making sure they are settled safely, they can survive”. For her part, Ramuedzisi (31 August 2015, pers.com) said, “I definitely think that within national government it would be the Department of Health. They’d be able to understand or be able to quantify the impact that this has, just to drive the point home.” Although there were diverse views, the underlying sense is that this is a very important issue that requires the highest level of attention by government and appropriate structures should be set in place to achieve that goal. The point that emerges is that participants felt that the issue of the household energy safety policy needs to be located at the most strategic and influential position. There was a view that it needs to be resourced very well to carry out its functions. If these institutional arrangements and elements of the policy framework were to be implemented in a participative way, the household energy safety problems and energy poverty would be eliminated in South Africa.

5.5 CONCLUSION

The focus of this study was to determine the contents for a proposed household energy safety policy for informal settlements in South Africa. This chapter described and discussed the data analysis process that was followed. It listed and discussed some findings that emerged from the analysis of data. The researcher interpreted the findings against the research question and objectives that were laid out in Chapter 1. The chapter concluded by presenting a proposed household energy framework that contains some key contents that can help towards the development of a fully-fledged policy. This work is based on, or is an addition to, the household energy safety strategy framework that was proposed by PASASA and SANEDI, as outlined in Chapter 3. It is clear that if the solutions proposed in this chapter were implemented in a consultative way with community support and resources were allocated to it not only for implementation, but also for enforcement and constant monitoring, harmful energy-related incidents and energy poverty would be the thing of the past in South Africa. The next chapter will draw conclusions from the whole study and make recommendations of what could be done by various stakeholders.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

In Chapter 5, the analysis and findings of the study were discussed in detail. The purpose of this final chapter is to “tie together, or integrate the various issues, research, covered in the body of the thesis, and to make comments upon the meaning of all of it” (Assan, 2011:1). The chapter provides an overview of the study, together with the conclusions drawn and the resulting recommendations. It describes the limitations encountered in the process of conducting the study and concludes with a summary of the value that this research study has added to scholarship in general, and the researcher in particular.

6.2 OVERVIEW OF THE STUDY

The hypothetic premise of the research project is that if effective contents for an integrated household energy policy were designed, and this policy was implemented for low-income households, then household energy-related problems in South Africa’s informal settlements would be reduced or prevented. This sub-section provides an overview of the study to assess the extent to which the premise was tested and proven.

6.2.1 Research Questions of the Study

The primary research question is: What could be the most effective and implementable content of a proposed integrated household energy safety policy in South Africa’s informal settlements?

The secondary research questions include:

- What is the overview of household energy and its associated problems in informal settlements in the context of the global energy system?
- To what extent do these problems constitute a public policy problem?
- What are the theoretical underpinnings of public policy instruments in general and their relevance on household energy choices in informal settlements?
- How do current the South Africa's energy policy and legislative framework, government programmes and institutional arrangements for energy governance look like?
- What could constitute key components for an integrated household energy safety policy that could be implemented in South Africa's informal settlements

6.2.2 Aims and Objectives of the Study

Structured on the basis of, and in order to answer, the research questions, the primary aim of the study was to explore and propose effective components or contents of an integrated household energy safety policy that could be implemented by government to prevent harmful household energy-related problems in informal settlements.

The objectives of the study were:

- To provide an overview of household energy and its associated problems in informal settlements in the context of the global energy system
- To discuss the extent do these problems constitute a public policy problem
- To describe the theoretical underpinnings of public policy instruments in general and their relevance on household energy choices in informal settlements?
- To explain how current the South Africa's energy policy and legislative framework, government programmes and institutional arrangements for energy governance looks like

- To propose ideas on what could constitute key components for an integrated household energy safety policy that could be implemented in South Africa's informal settlements

6.2.3 Summary of Issues Discussed in the Study

This project embarked on the following process in order to conduct the research:

Chapter 1 provided a background to the study by tracing the history of attempts by various players to draw the South African government's attention to harmful energy-related problems. It discussed the factors that motivated the study, outlined the research approach by looking at the research problem, and identified research questions. After outlining the hypothesis and objectives of the study, it briefly explained the research methodology and design, as well as the techniques to be followed during the study. It concluded by stating the significance of the study.

Chapter 2 illuminated the scope of the research question by conducting an extensive literature review. This literature review framed an in-depth theoretical exploration of three broad and overarching issues: informal settlements, household energy, and public policy. These issues form the three pillars or sections around which the review pivots. The review provided an extensive description of informal settlement conditions and household energy problems. It concluded with a comprehensive overview of the importance of public policy as a tool to effect social transformation.

Chapter 3 presented an overview of South Africa's energy policy and legislative framework and identified some gaps in them. This included programmes and projects that the government has implemented to address household energy-related problems, especially those specifically relevant to informal settlement households. It also provided a description of South Africa's existing and relevant energy institutional arrangements and presented a theoretical overview of public policy. It concluded by describing the policy development process focussing on an integrated policy approach and presenting and

describing the household energy safety policy framework that has been proposed by various stakeholders.

Chapter 4 described the research design used to investigate the possible components of a proposed household energy safety policy for informal settlements in South Africa. It outlined and explained the research methodology used to accomplish the research objectives of the whole study. It also briefly explained the rationale behind the methodology, how the research was conducted and what steps were taken to ensure the reliability and validity of the study and its outcomes.

Chapter 5 described and discussed the data analysis process that was followed in the research study. Emerging from the analysis were thirteen findings that were listed and discussed in the context of the research question and objectives presented in Chapter 1. The chapter concluded by presenting a proposed household energy framework that contains key contents that can aid in the development of a fully-fledged policy. It became clear that, if the solutions proposed in this chapter were implemented in a consultative way with community support and resources being allocated to it – not only for implementation, but also for enforcement and constant monitoring – harmful energy-related incidents and energy poverty would be effectively addressed in South Africa.

Chapter 6, in addition to giving an overview of the study, consolidated all aspects of the study, presented conclusions and made some recommendations.

6.2.4 Development of Themes and Categories in the Study

As the study unfolded, certain thematic patterns and categories emerged. In essence, four broad themes developed, which were further broken down into major and minor categories of issues. The four themes were:

- Informal settlements
- Household energy-related problems
- A need for a household energy safety policy

- Proposed contents for a new framework

The categories constituted the findings and issues relating to them. The following subsection covers those aspects.

6.2.5 Findings of the Study

Divided by themes, thirteen findings were made and discussed. These are listed below as they have been discussed extensively in Chapter 5.

- Informal settlements are a growing and permanent phenomenon in South Africa.
- Lack of planning regarding informal settlements provides a conducive context for energy-related problems.
- The demand for household energy is increasing.
- Informal settlements experience a multitude of serious household energy-related problems.
- The energy needs of poor households are still inadequately met.
- Household energy-related problems constitute a public policy problem.
- The problem of the existing lack of coherence and integration in policy approach.
- The government's policy of singular focus on electricity provision and exclusion of alternative energy sources is a serious mistake.
- The government is failing to fulfil its legislative mandate for the use of safe energy in households.
- Public policy can be a catalyst for social transformation.
- There was widespread support and validation for the policy model proposed by PASASA and SANEDI – with some additions.
- In order to implement the policy effectively, all of the necessary policy instruments must be used.
- Proposed institutional arrangements for the HES policy were validated and supported by experts – with some additions.

6.3 CONCLUSIONS

Many factors arose in the study, which demonstrates that the issue of household energy and problems around it are serious development issues for developing countries. The growth and permanence of informal settlements spurred by global issues, such as urban migration, immigration and population explosion, and the concomitant growth in household energy demand and consumption, have drawn the attention of world leaders. For example, the Secretary-General of the United Nations established a global plan and campaign called Sustainable Energy for All and positioned energy, and household energy in particular, at the centre of global development. Strong moves are afoot to highlight and elevate the role of energy as an enabler for the delivery of the Millennium Development Goals, as they are being reviewed and projected into the future. This comes at a time when energy poverty and use of unsafe and dangerous energy sources and appliances in Africa is seriously undermining people's health and thus undercutting the countries' development agenda.

Informal settlements are extremely dangerous places in which to live from an energy use perspective. Every day, and throughout the day, people in informal settlements are at risk of death or injury due to household energy-related incidents. The picture painted in this research shows that the nexus of household energy use and informal settlements represents an extremely serious and dangerous national crisis. The regularity and intensity with which this crisis occurs and affects the poorest of the poor exacerbates the already dangerous situation, not only for the individuals concerned, but also the community, the nation and the economy at large. This means that the problem moves beyond just the energy sector and informal settlements. Employers, local businesses, public services, schools, libraries, the public health system and the economic system are all affected.

As a result of these and other issues, a strong view clearly emerged that the identified problems constituted a public policy problem. In this regard, the participants felt that a new comprehensive and integrated household energy safety policy was needed. There was overwhelming agreement with the hypothesis of this study that if proper and

carefully crafted contents of a household energy safety policy with proper institutional arrangements were to be developed, then the lack of household energy in informal settlements would be effectively addressed. To this end, they made some comments on the household energy safety policy framework that was proposed by PASASA and its partners. Those comments and information gleaned from the literature review helped the researcher to modify the proposed framework and come up with a new revised framework, as reflected in Chapter 5.

The study has conclusively shown that the government's lack of a comprehensive, integrated and sustainable public policy and programmatic action is to blame for the perpetuation of the problem. The reason for singling out government is that they have a moral, political and constitutional obligation to act decisively in this regard. During one of the interviews undertaken during this study the interviewee, Dehran Swart (21 July, pers.comm) illustrated that it is the government's moral obligation to act when something affects the nation negatively. For example, he said "The government is contemplating introducing legislation to address the death of young men during circumcision because they realise that a lot of young men are dying". The baffling factor is that, according to media reports, deaths linked to circumcisions are far and few between, they occur mostly in the Pondoland area in the former Transkei, Eastern Cape; they happen mostly during June and December school break and, without trivialising the issue, their numbers are far fewer compared to household energy-related incidents. This raises the question: What criteria is government using to place and prioritise issues on its public policy agenda in South Africa?" Whilst this is an area that possibly requires further research, the point being made is that the government should take a leadership position in driving the process to find policy solutions to societal problems.

From the analysis, three scenarios emerged, namely the 'as-is-now' scenario, the 'in-the-meantime' scenario, and the 'ought-to-be' scenario. The 'as-is-now' scenario reflects the status quo; the 'in-the-meantime' scenario, is a stop-gap incremental measure that can be implemented, whilst the 'ought-to-be' scenario is being developed, and the 'ought-to-be' scenario is a radical policy change, driven centrally by a powerful governmental structure

or agency in the bureaucracy with enough clout and resources to ensure comprehensive implementation and enforcement. The policy framework should represent the ‘ought-to-be’ scenario.

Although the government should take leadership in pursuing the preferred scenario, it is clear that they cannot do this alone. To address the problem of energy poverty and the lack of safety in the use of energy for thermal applications at home requires the efforts of all stakeholders, including the government, private sector, civil society, communities and individuals. The private sector can participate in the policy formulation processes. At a practical level they, in partnership with government, can come up with market-based solutions, which include safe and efficient energy technologies, such as appliances that comply with relevant legislation, regulations and standards put in place by government. Civil society, especially energy NGOs could also participate in policy processes, conduct research, bring ideas from elsewhere and educate communities on energy safety and efficiency. Communities can take responsibility for ensuring that citizens are educated and held accountable to avoid behaviour that can put them in danger, such as buying cheap but illegal appliances, cooking whilst under the influence of alcohol, and leaving children alone with lit appliances, such as stoves, and candles.

What has become categorically clear in this study is that lack of access to modern energy sources and appliances and the absence of safety in the use of energy in informal settlements can no longer be ignored without serious service delivery concerns and consequences in South Africa. For example, in recent years and months there has been a perceptible rise in spontaneous and widespread service protests across the country, many of which have occurred after a serious fire in which households have been destroyed and people injured. Anecdotal evidence shows that this issue is increasingly being seen as a service delivery issue on par with issues such as water, housing and electrification. Research conducted by PASASA shows that people recognise that electricity is not the only energy solution, although it is their most valuable and preferred option. However, for as long as the electrification programme is stalling and electricity prices increase,

millions of people will continue to use other sources of energy and related appliances, so it is vital that these are made safe.

Therefore, if the policy content or framework discussed and proposed in this research report were to be implemented it would drastically reduce and effectively address the lack of household energy safety and energy poverty in informal settlements. The policy focus would position the issue as one in need of urgent attention, thereby elevating it on the political prioritisation scale. In government, political priorities often receive financial attention and, as such, budgetary allocations would be facilitated.

Once the government focuses its attention and resources on an issue such as this, there is enormous potential to change the status quo. For example, when the government changed its attitude towards antiretroviral treatment by making it widely available at reasonable prices, Acquire Immune Deficiency Syndrome (AIDS)-related deaths were drastically reduced. If government were to put in place a household energy policy, appoint an energetic but senior champion within the government to spearhead it, effectively use the public policy instruments mentioned in this report, and allocate resources and achieve focus alignment and cooperation within the most important stakeholders to avoid a silo approach, the researcher sees no reason as to why harmful energy-related incidents and energy poverty cannot be effectively addressed in informal settlements.

6.4 RECOMMENDATIONS

The discussion above shows that there needs to be a consolidation of efforts to enhance household energy safety in South Africa. The majority of recommendations detailed below refer to government, as it was made clear in the study that the problems require a multi-sectoral approach to address them effectively,.

6.4.1 Government Should Accept the Need to Address Issues of Energy Safety in Informal Settlements as a Constitutional Imperative

It is crucial that government understands and seriously acknowledges that household energy safety in informal settlements is a constitutional and human right, and legislative issue. They should therefore adopt a human rights approach to addressing household energy-related problems in informal settlements by taking the constitution and the existing legislative framework seriously, as well as their implications on this matter. A process toward the establishment of HES policy also needs to be implemented.

6.4.2 Government Should Take Decisive Leadership and Show Commitment to Addressing the Lack of Household Energy Safety in Informal Settlements through Public Policy

This research has shown beyond doubt that there is a need to develop a national household energy safety policy framework “to provide overall strategic planning for this sector in terms of delineating clear objectives and goals, roles for different stakeholders and programmes for implementation” (Tait, Merven & Senatla, 2012:43). Glenn Truran (21 July, pers.comm) puts it well when he states: “It is my view that a more structured, concerted and holistic approach is necessary. It is an approach that would have required a far greater level of commitment and intervention from the state that seemed rather disinterested in solving the problem on the whole”. Moving ahead, improving household energy safety at home and increasing household renewable energy use should be a policy goal of the South African government. However, the issues of energy poverty and household energy-related problems will never be effectively and comprehensively addressed without the active, supportive participation and cooperation of the South African government in general, and the DoE in particular. Although they currently appear reluctant to get involved, it is recommended that government take leadership and exercise commitment by providing, for instance, budgetary allocations for this process.

6.4.3 Government Must End the Policy of Singular Focus on Electricity and Embrace the Multiplicity of all Energy Sources and Work Hard to Improve their Safety

A change in attitude, which appears to be taking root within the DoE, albeit slowly, is that all energy sources are important and require equal policy attention needs to be supported and strengthened. The political and administrative leadership of the DoE have an obligation to engender the new paradigm by educating their staff members on this matter on an on-going basis. It will be difficult to change long-held attitudes, but internal leadership within the DoE should put time, effort and resources into the matter.

6.4.4 Government Should Initiate a Consultative Structure and Process to Develop a National Household Energy Safety Policy for Informal Settlements

As stated previously, this study has convincingly and compellingly exhibited the need for a household energy safety policy. As recommended by Tait, Merven and Senatla, a task team or institution should be formed that could take the lead in addressing household energy safety issues (2012:46). However, for such a task team or structure to be taken seriously and achieve results, communication or instructions should come from the presidency, encouraging the identified structures to prioritise participation in such as structure. With that backing, the DoE and SANEDI could be the initiators and coordinators of such as task team. The DoE minister would also need to participate and actively push for the task team to succeed.

One of the first key steps in the process is for the DoE to convene a consultative national summit on HES policy for informal settlements, which should be attended by civil society, private sector and government stakeholders. The aim of such a meeting would be to begin a national consultative process, and to agree on the parameters and timeframes for the process as well as on the policy vision, principles, aims and objectives. This should be followed by provincial processes or summits whereby stakeholders can comment on and add value to the documentation. The final step should be another

national event to agree on and consolidate the final report, which the government would then use to begin a legislative process in parliament to pave the way for the document to become an act of parliament signed by the president.

6.4.5 Collaboration and Integration Must be Fostered amongst the Departments Of Government to Formulate and Implement the Policy

The research has made the point that, siloism has thus far characterised government's approach to household energy safety. This policy process provides ample opportunity for the national government to facilitate and foster collaboration and integration among the departments identified in the institutional arrangements proposal. Silos must be broken for progress to occur. Again, political and administrative leadership at the highest levels of government are called upon to ensure that this happens.

6.4.6 A National Champion Should be Identified to Lobby and Advocate for HES Within Government

For such a programme to succeed, a national champion is necessary. Someone such as Dr Aaron Motsoaledi, the current Minister of Health, would be best positioned for this role due to his clear focus, vibrancy, seniority in cabinet and the ruling party, effectiveness and ability to persuade. He could work with the other ministers to drive the process, but serve as the face and voice of the process.

6.4.7 Parliament Must Hold Government Accountable for HES in South Africa

The relevant parliamentary oversight committees, such as the respective Portfolio Committees on Energy and Health, should take up the issue of household energy safety

and hold departments to account by asking them relevant questions and demanding updates about the elimination of harmful household energy-related incidents.

6.4.8 Civil Society Organisations Should Continue to Increase their Lobbying and Advocacy Efforts to Ensure that Household Energy Safety is Taken Seriously in South Africa

Civil society is best suited and positioned to raise the need for government to act in this matter by continuously lobbying for development and implementation of a household energy safety policy. Supporting this point, Tait, Merven and Senatla say, “There should be lobbying activities by non-governmental sector stakeholders. There is a wide range of issues and concerns that could be better publicised to key governmental stakeholders, either through more targeted research outputs or other active lobbying activities. Ideally, efforts should be coordinated amongst different stakeholders (such as NGOs, universities, etc.) to be able to present widely canvassed sectoral concerns and issues” (2012:46). This is because of their direct links with communities as well as their research capacity and experience. This places them in a better position to play an educational role whereby they educate and train communities on the relevant laws, regulations, standards and behaviours that can promote their safety at home. They can also advocate for resources to be directed at enforcing the laws and regulations on the relevant private sector stakeholders.

6.4.9 A Partnership Between Government and Private Sector to Implement Energy Safety Projects Should be Promoted

The government and private sector should work together to create a local energy safety industry in South Africa; similar to the way it was done within the energy efficiency industry. In this example, the government created a space for the private sector, known as Independent Power Producers (IPPs) to contribute electricity to the Eskom grid by

drawing electricity from alternative sources, such as the sun or wind. Growth and competition should be facilitated in the household energy fuel and appliance manufacturing industries. Government could also support this through a roll out campaign similar in approach to the gas replacement campaign that was implemented by Eskom in 2007 to save on electricity.

Another project that could be jointly implemented in informal settlements throughout the country is a fire and heat alarms distribution project. The fire and heat alarms could prevent a lot of harm by warning people when heat or smoke occurs. The last project could be the production, promotion and selling of proper and fireproof building materials for informal settlements. Municipalities could introduce these as part of the fire response starter pack programme that is issued to homeowners whose homes are destroyed in fires. These examples show that public-private partnerships could assist in addressing the problems in informal settlements.

6.4.10 Government Should Implement a National Household Energy Safety Education and Awareness Programme

There is an immediate need for government to focus on education and awareness-raising efforts through the DoE. Panday and Mafu suggest that policy level interventions “need to be supported by a comprehensive education campaign at the individual, family, school, organizational and community levels. Community education and community mobilization, supported by traditional forms of awareness raising, may be the most appropriate strategy to encourage intrapersonal and interpersonal learning and for the community to take ownership of the challenges associated with [household energy] use” (2007:54). This can be done directly by the DoE as they embark on planned community or national events, home visits, schools safety campaigns, media campaigns, and other mass-based programmes targeting the relevant stakeholders to make the maximum impact. To achieve this, DoE could collaborate with the state broadcaster, the South

Africa Broadcasting Corporation (SABC), to run a number of media programmes on television, radio and social media.

On the other hand, the government can also support and collaborate with organisations to implement community-based projects, such as the Household Energy Safety Association of Southern Africa (HESASA), which replaced PASASA. This can be done by making direct funding and other resources available, and also conducting joint projects on the ground. Through these projects and partnerships, communities can be reached, government professionals such as nurses and emergency services personnel can be capacitated, and other government departments can be trained and enabled to grow their own energy safety programmes. Panday and Mafu's advice in this regard is pivotal where they say "at the treatment end of the continuum of care, a rigorous programme of action is required to correct misinformation on the benefits of some home remedies, to provide practical first aid that can be implemented in the home before patients can reach a health care facility, and to reinforce the need for help-seeking behaviour" (2007:55). All of these ideas need government to demonstrate leadership and commitment to decisively address the problems dealt with in this report. This leadership should also include coordination with the diverse government stakeholders at national, provincial and local spheres to achieve maximum impact. The longer-term objective is for the Department of Education, in partnership with the Department of Energy, to educate the public on energy safety by including it in school curriculums for all grades.

6.4.11 Appropriate Packaging and Labelling Needs to be Urgently Implemented

Government should immediately implement a policy that will ensure that household energy sources, such as paraffin, are sold in pre-packaged containers that are clearly labelled with product information and safety warnings and symbols, and are sealed with child-resistant closures (CRCs). This is crucial given that the study has shown that when it comes to paraffin ingestions, very young children under five years of age are most

affected because they put anything into their mouths and they cannot yet distinguish between smells.

6.4.12 Household Energy-Related Standards, Regulations and Legislations Should be Enforced

This research has shown that one of the biggest problems is the lack of enforcement of standards and regulations, which undermines all other efforts to put the policy in place. It undercuts the very reason for the existence of that policy. Government should provide funding for enforcement agencies to do their work and monitoring should be done continuously and transparently to ensure compliance. Oversight authorities, such as parliamentary committees and boards of directors to which these entities account, must demand regular reporting on compliance.

6.4.13 The Private Sector Should Ensure Affordable Energy Sources and Equipment

The research has indicated that all sectors including the private sector have a role to play in energy safety. It is understood that the private sector has a profit motive. However, it is recommended that the private sector prioritise investments that ensure increased, yet affordable energy sources and equipment for the poor, “focusing on technologies that are both cost effective and have positive social and environmental impacts” (World Bank, 2000:12). This issue may entail government subsidising of safe energy technologies for people to use. For example, Van Niekerk suggests, “The subsidisation of hot stoves, I mean paraffin stoves and possibly even gas stoves”. Government would be using financial public policy instruments, including tax breaks to encourage the private sector to innovate, and yet keep the prices affordable.

6.5 THE LIMITATIONS ENCOUNTERED IN CONDUCTING THE STUDY

One of the key limitations to this study was the absence of examples of household energy safety policies specifically targeting informal settlements. Energy policy examples that exist are general energy policies with no specific focus on households and informal settlements. Related to it is the dearth of research on household energy from a public policy perspective in ways that are relevant for a developing world social architecture framework for poverty and other social problems. Another serious limitation was the lack of response from the head of policy at the DoE, even after numerous attempts. His contribution could have added tremendously to the texture and substance of the study. An equally important limitation was the researcher's inability to convene a group interview session as planned. This was due to constant unavailability of the required minimum number of participants at any one time, after numerous attempts. The group interview would have added value to the study. However, the credibility of findings, conclusions and the whole study have not been compromised by these factors, because the people who the researcher interviewed, both at the DoE and other organisations, were senior enough to have in-depth understanding of the policy trajectory, energy and informal settlement issues. In addition, the researcher had access to the wealth of government's policies and other experts' documents of interest.

6.6 SUMMARY OF THE VALUE OF THIS RESEARCH STUDY

There a couple of areas in which the study was of value. At the beginning of the study, the researcher stated that, although research on household energy has been growing, there has been little research on this issue from a policy perspective, and its implications specifically on informal settlements. Therefore this study contributes to the growth of information in that regard. Another important issue to mention is that it transpired during the research that the DoE and SANEDI attempted to develop a household energy safety strategy. Although their attempt appeared to be tentative and plans small scale, they expressed serious interest and eagerness to read this research report in order to give

shape, substance and energy to their stalled process. The study also helped successfully address the research question, achieved the research aims and objectives, and tested the hypothetical premise of the study. It has proven conclusively that, if South Africa were to implement an integrated and comprehensive HES policy with proper institutional arrangements in a consultative way, harmful household energy-related incidents and energy poverty would be effectively addressed. For the researcher, the process of conducting the study has expanded his understanding of household energy, informal settlement energy-related problems and issues around public policy.

6.7 CONCLUSION

This chapter provided an overview of how the study was conducted. It briefly discussed some conclusions that were drawn from the study and presented thirteen resulting recommendations. It concluded by describing some of the limitations encountered in the process of conducting the study and provided a summary of the value of this research study.

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APPENDICES

APPENDIX A



Paraffin Safety Association
Southern Africa



Paraffin Users Household Energy Summit

Final Declaration concluded at Kopanong Conference Centre – Johannesburg, 28th June 2007

We, the participants attending the Paraffin Users Household Energy Summit hosted by the Paraffin Safety Association of Southern Africa in Durban on 29th May 2007, Port Elizabeth on the 5th June 2007 and in Rustenburg on 12 June 2007, have had the opportunity to deliberate on a number of issues related to our energy needs.

WE ARE ALARMED BY:

1. the many energy related incidents, injuries and deaths that take place in the home on a regular basis;
2. the many paraffin-related fires, burns, ingestions, asphyxiation, and respiratory complications due to indoor air pollution;
3. the unacceptable burden borne by children, especially those under the age of five years old who are most at risk of drinking paraffin thinking that it is water;
4. the unacceptable burden borne by women, especially in rural areas and informal settlements;
5. the number of injuries by hot liquids or foods irrespective of the energy source used;
6. the costs to households and to the economy due to paraffin related incidents which is estimated to be in the region of R100 billion a year;
7. the emotional effects and financial implications that low income households experience; and
8. the lack of counselling services provided to survivors of paraffin related incidents and injuries.

WE NOTE WITH REGRET:

1. the limited household energy options of many households due to economic hardship and poverty;
2. the unsafe housing options available to poverty stricken people and that the housing provision does not cater for other energy carriers;
3. the unsafe energy behaviour and practices of energy consumers and appliance users;
4. the link between harmful energy-related incidents and poverty;
5. that inconsistent and insufficient electricity supply is adding to household energy incidents;
6. the poor quality and unsuitability of available paraffin appliances;
7. the absence of a dedicated safe packaging solution for paraffin and apparent lack of will to establish it;
8. the weaknesses and lack of regulation in the whole paraffin system (how paraffin is distributed, sold, stored, burnt or used); and
9. the lack of a comprehensive integrated, household energy strategy and sufficient action to deal with these problems.

WE DEMAND URGENT GOVERNMENT ACTION ON THE FOLLOWING:

1. Delivery on our rights as consumers and our constitutional right to an environment that is not harmful to our health or well being by giving urgent attention to our household energy needs.
2. Concrete follow up on the NATIONAL CONFERENCE ON CHALLENGES OF FIRE AND FLOODS IN HUMAN SETTLEMENTS, 19-20 APRIL 2005, hosted by the Parliamentary Portfolio Committees on Minerals & Energy and on Health by holding Public Hearings for Survivors of energy (paraffin) related harmful incidents.

3. Establish an energy injury/accident compensation fund (disability grants) similar to the road incident fund to provide financial support for paraffin related incident victims and survivors.

4. Recognition and planning for the multiplicity of household energy use in South Africa.

5. The Department of Minerals and Energy must take leadership and accelerate interdepartmental, intersectoral and stakeholder collaboration to address household energy safety problems. It must also:
 - a. accelerate the establishment of paraffin policy within the broader context of other energy options for low-income households. The policy must clearly outline the stand of government on whether paraffin will be phased out or not;
 - b. ensure the prevention and reduction of the negative health, economic and environmental damage through long-term risk reduction strategies, in particular the regulation of the paraffin industry, including wholesale and retail sectors which are a key portal for safety;
 - c. register all sellers of paraffin and related appliances;
 - d. as a matter of urgency, subsidise appliances that are safe to use;
 - e. ensure that our communities (including children) are empowered to recognise energy hazards and are educated about best practices through the interaction of local authorities and other government departments that have jurisdiction;
 - f. strengthen partnerships between all sectors of related departments, non-governmental organisations and communities to alleviate the problems associated with paraffin usage;
 - g. mobilise other departments to act decisively;

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- g. mobilise other departments to act decisively;

- i. The Department of Education should take a lead role in educating the public on energy safety by including it in their schools curriculum for all grades.

- ii. The Department of Health should:
 1. increase funding for public hospital burns units to treat survivors more effectively, and
 2. take over and expand the Surveillance System that the Paraffin Safety Association is implementing to monitor energy related incidents.

- iii. The Department of Housing must revise housing policy to take into account the reality of household energy usage.

- iv. The South African Bureau of Standards should make sure that the set safety standards are widely publicised and enforced.

- h. conduct research and collect user friendly data to monitor the impact of energy provision and the implementation of improved energy programmes. This research and data must remain current and accessible and be fed back to communities;

- i. monitor and evaluate actual implementation of all energy safety programmes; and

- j. respond to this declaration in an appropriate manner within this year.

6. Price increases for paraffin must be regulated and the indigent household free basic energy policy must also apply to the informal settlement paraffin users.

FURTHERMORE, PENDING REGULATION, WE STRONGLY URGE THAT:

1. government leads a national energy safety media campaign

2. the media (and relevant stakeholders) join forces with communities and the Paraffin Safety Association to highlight the issues related to household energy provision and safety.

3. the single national emergency number 10177 is widely publicised.

4. the petrochemical industry:
 - a. implements a pre-packaged solution for paraffin;
 - b. take responsibilities in educating "Spaza" shops and the "Spaza" shops can then educate the end-users; and
 - c. contributes to the 3rd party insurance for contamination accidents.

5. manufacturers of paraffin appliances produce safe appliances compliant with government regulations;

6. retailers and wholesalers take responsible steps to increase and improve safety;

7. dedicated counselling support be provided for survivors;

8. provision is made by local authorities to supply fire victims with temporary shelter in addition to existing provisions such as food and blankets;

9. consumer rights groups join the struggle for the provision and safety of household energy; and

10. communities engage with their suppliers and ensure they are receiving clean paraffin and report problems.

WE RESOLVE TO:

1. mobilise all communities to act until all domestic energy is safer, affordable and sustainable;

2. support the Paraffin Safety Association in its initiatives to establish a safe paraffin system;

3. commit ourselves to take specific action in our communities such as door-to-door campaigns, awareness campaigns, forming forums to promote safety;

4. facilitate community participation in national disaster management advisory forums set up through the national disaster management act and the fire services act;

5. accelerate consumer safety education; and

6. strive for energy safety to be entrenched in all households.

WE HEREBY MANDATE THE PARAFFIN SAFETY ASSOCIATION TO:

1. speak on our behalf to all relevant government departments; and

2. take the deliberations of this summit and ensure they are included in the Department of Minerals and Energy's Integrated Household Energy plan.

PARAFFIN SAFETY INFORMATION LINE:

0861-22-44-22

OFFICE HOURS WEEKDAYS ONLY

www.paraffinsafety.org

APPENDIX B

MPA 2015 Research Interview Questions

By Patrick Kulati

Introduction

I want to start by thanking you for allowing me to come and conduct this interview. The purpose of this interview is to get your views on basically three broad, but interrelated issues that are key to my research, namely:

1. Informal settlements
 2. Household Energy and its related problems
 3. Public policy as a possible solution
- Please paint the socio-economic picture of informal settlements as far as the use of energy is concerned in South Africa
 - What in your view is the future of informal settlements and what are the issues that drive it.
 - How can you characterise the way government addresses the issue of informal settlements from both the housing and energy services points of view.
 - Please share with me, in as much detail as possible, your understanding of the depth of household energy related problems specifically in informal settlements in South Africa.
 - Please mention in specific terms the most critical problems you see and explain why you see them that way.
 - What are the driving forces behind these problems? Are some of these policy related?
 - In your view, how or to what extent do these constitute a public policy problem in SA?
 - What is the energy legislative framework looking like? In other words what are the key pieces of legislation or policies that are relevant on household energy?
 - To what extent is the policy and legislative architecture supportive or not to addressing household energy related problems?
 - Where do solutions lie for household energy related problems in informal settlements? And what is the role of the various spheres of government?
 - What do you think is the role of public policy in effecting social change?
 - What has the department of energy done both in terms of policy and also programmes to address the household energy safety related problems in informal settlements so far?

- Certain stakeholders have proposed a Household Energy safety policy for informal settlements and you have seen and read the proposal. What is your view on this? Any specific issues you would like to add, combine and remove
- Let's say, you were invited by the President of South Africa to be part of a team that drafts and develop this Household Energy Safety Policy Framework, how do you think it should look like?
 - What key components or priority areas would it have? Why is that?
 - How would you frame the objectives of such a policy?
 - What outcomes would you hope to achieve with such a policy?
 - What institutional arrangements would best achieve the outcomes?
 - What could be the your top 4 for such as policy

Any other issues you would like to share with me?

After this interview, should you have any other thoughts or pieces of information or people that you think would add value to this research, please contact me or send it to me.

I wish to thank you for your time and helpful insight.

APPENDIX C

18 Pierneef Street

Goodwood

7460

21 July 2015

Dear Sir/Madam

Re: Request for an interview with you

My name is Patrick Kulati. This letter serves as my request to a research interview with you for my research paper. I am in the process of writing my Master's dissertation at Stellenbosch University and collecting data for that purpose. My research topic is: **An exploration of the contents of an integrated household energy safety policy for South Africa's informal settlements**

This research project is preoccupied with the problem of the lack of an integrated household energy safety policy for low income households in South Africa. It seeks to identify the contents of such a policy for the purpose of facilitating the eradication of energy poverty and harmful energy related problems in South Africa's informal settlements.

The primary research question is: What could be the most effective and implementable contents of the proposed integrated household energy safety policy in South Africa's informal settlements?

I am now in the process of conducting interviews with experts in this field of household energy, energy poverty, and energy use and/or energy safety. As an expert and authority in this area, I thought you would add value to this research study, help provide clarity and improve my understanding of the issues. Therefore I request an opportunity to conduct an interview with which would take about 45 – 60 minutes of your time.

Some of the questions I would like to discuss with you include:

- What is your view on the role of public policy in addressing the harmful energy-related problems and energy poverty in South Africa's informal settlements?

- What is the role of the Department of Energy in addressing household energy related incidents
- What are your thoughts on the idea of a Household Energy Safety policy for informal settlements in South Africa
- How do you think such as policy should look like? Or
- If you were to design it or be part of a team that designs it, what key components would you include and why?
- What purpose or outcomes would you want to achieve through the policy?

The interview will be recorded digitally and you will be provided with paper copies of the final transcripts if you so wish. If possible I would like to conduct the interviews between now and 15 August 2015. Although, I would prefer a face to face interview, a skype or telephone interview would also work. I would really appreciate it if you could indicate your availability as soon as possible. Should you need to contact me, here are contact details: email: patrickkulati@gmail.com and cell number: 0823007108

I am looking forward to hearing from you.

Best regards

Patrick Kulati