Energy consumption patterns in rural Zimbabwe with special reference to the role of electricity as a development incentive

by

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DECLARATION

I, Davidzo Muchawaya, declare that the dissertation which I hereby submit for the degree of Master of Social Science (Community Development) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution. Where secondary material is used, this has been carefully acknowledged and referenced in accordance with university requirements.

Signature:……. Date:……

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The production of a work of this magnitude cannot be entirely attributed to myself. I acknowledge the hand of the Almighty God without whose assistance, guidance and mercy, this whole project would have been impossible. I am also greatly indebted to my supervisor, Professor J.D. Kriel for his continued support, patience and selfless sharing of knowledge. My sincere appreciation also goes to my family and friends for their constant support, encouragement and prayers.

ABBREVIATIONS AND ACRONYMS

ADB:	African Development Bank
AFREPREN:	African Energy Policy Research Network
BUN:	Biomass Users Network
CHBC:	Community Home Based Care
CIA:	Central Intelligence Agency
CSO:	Central Statistics Office
DDC:	District Development Committee
DFID:	Department For International Development
ENERGIA:	Network on Gender and Sustainable Energy
ERI:	Energy Research Institute
ESAP:	Economic Structural Adjustment Programme
ESMAP:	Energy Sector Management Assistance Programme
FAO:	Food and Agriculture Organization
GoZ:	Government of Zimbabwe
HDI:	Human Development Index
HIV/AIDS:	Human Immuno Deficiency Syndrome
IEA:	International Energy Agency
ITDG:	Intermediate Technology Development Group
LAMA:	Legal Age of Majority Act
MDC:	Movement for Democratic Change
MDGs:	Millennium Development Goals
MERP:	Millennium Economic Recovery Programme
NERP:	National Economic Revival Programme
NGO:	Non Governmental Organisation
NOCZIM:	National Oil Company of Zimbabwe
PRSP:	Poverty Reduction Strategy Papers
REA:	Rural Electrification Agency
SADC:	Southern African Development Community
SME:	Small and Medium Enterprise
SWOT:	Strength, Weaknesses, Opportunities and Threats
UN:	United Nations
UNDP:	United Nations Development Programme
ZAPU:	Zimbabwe African People's Union
ZERO:	Zimbabwe Regional Environmental Organization
ZESA:	Zimbabwe Electricity Supply Authority
ZIMPREST:	Zimbabwe Programme for Economic Transformation
ZUNU:	Zimbabwe African National Union
UNDP:	United Nations Development Fund
USAID:	United States Agency for International Development
WHO:	World Health Organisation
ZANU-PF:	Zimbabwe African National Union–Patriotic Front

Excerpt from the *Song of Lawino*

'…I really hate the charcoal stove
Your hand is always dirty
And anything you touch is blackened
I am terribly afraid
Of the white men's stove
And I don't like using it
Because you stand up
When you are cooking
Who ever cooked standing up?
You use a saucepan and the frying pan
And other flat-bottomed things
Because the stoves are flat
Like the face of the drum
The earthen pot cannot sit on it
There are no stones
On which to place
The pot for making millet bread…'

Source: Okot p'Bitek[1] 1984:37-39

[1] Okot p'Bitek (1931-1982): Ugandan Poet, studied law at Aberystwyth, Wales, and Social Anthropology at Oxford.

ABSTRACT

This dissertation presents an analysis of electrification and energy consumption patterns in rural areas arguing that the socio-economic aspects of electrification and energy consumption in rural areas have not received adequate attention. Against this background, the study investigates the energy consumption patterns of rural households in Zimbabwe with special reference to the role of electricity as a development incentive. The qualitative design was used in this research because the relevant phenomena had to be studied in the natural and context-specific settings. Field research methods that were utilised include interviews, participant observation, life histories, case studies as well as focus group discussions. The main energy consumption theories are elucidated and the current energy consumption patterns are discussed in detail. It was found that very little has been done to encourage rural electrification beneficiaries to use electricity for more than lighting purposes. Much is still to be done to educate the rural populace on the importance of energy and the detrimental effects of indoor air pollution. The issue of gender inequalities is also addressed. Women still remain under-represented and marginalised despite the fact that they have to bear the brunt of indoor air pollution and are sexually harassed when they gather firewood in areas far away from their homes. The study concludes that energy is an important aspect of development and recommends that rural electrification be viewed as an effective incentive for development.

Key words: **consumption, development, deforestation, electricity, energy, environment, firewood, gender, poverty, rural, Zimbabwe.**

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INTRODUCTION

1.1 PROBLEM STATEMENT

In the development field, energy is increasingly being recognised as a development incentive and a tool for rural development (Banda & Tinto 2004:1; Kotze 1996:40; Leach 1999:2; Lennon & Du Toit 1995:43). The mentioned scholars strongly assert that energy is indeed a stimulus for development. However, very few scholars have written extensively about electrification and energy consumption patterns and how they affect the development process in rural areas. A very small number of researchers and academics seem to be interested in exploring the role of energy consumption patterns and the relationship between electricity and development.

In Southern Africa as a whole the major contributions come from a handful of researchers and academics such as Annecke (1998, 2003); Ardayfio-Schandorf (1992); Bank (1999); De Lange and Wentzel (2003); Eberhard (1986, 1992); Hancock, Katerere and Moyo (1988); Madubansi (2003); Mapako and Mbewe (2004). In the case of rural Zimbabwe, very little has been documented on energy consumption patterns apart from the studies done by Foley, Moss and Timberlake (1984); Hancock *et al*.(1988); Hosier (1988); Katerere and Moyo (1988); Leach and Mearns (1988) and Mapako and Mbewe (2004). The available data about energy consumption and electrification in Southern Africa and especially in Zimbabwe[2] can therefore at best be described as educated guesses.

However, some of these contributions leave quite a lot to be desired (see *inter alia* Barnes 1996; Barnett & Hoffman 1982). Foley and Moss (1985:2) and Madubansi (2003:3) argue that many planners and policy makers have misinterpreted, misrepresented and

[2] Derived from *dzimba dzemabwe, which* means *'houses of stone'* in the local Shona language

oversimplified data and have homogenised the energy consumption patterns of rural households. Thus, they ignore intra-household activities and the gendered nature of energy consumption, as well as the power struggles that shape consumption patterns. Although it is believed that rural energy consumption patterns are identical, it is arguable that they vary from village to village and even between and within households in the same village (Madubansi 2003:103). This, to a large extent, questions the orthodox assumption that energy consumption patterns are homogeneous.

One of the major sins that have been committed in energy circles is the failure to recognise energy consumption patterns as central to the whole energy and development discourse. This has led to an inability to understand the energy survival and conservation strategies of rural people. Secondly, the gathered data have in most instances, been obtained by way of **quantitative** research (surveys) conducted by so-called '*experts*' who '*parachute*' into rural areas for a few days and who then conjure up a number of make-belief scenarios, make unsubstantiated assumptions about rural survival strategies and come to disputable conclusions about the energy consumption patterns of rural households (Annecke 1992; Crewe & Harrison 2000:103; Foley *et al.* 1984:11-13; Foley & Moss 1985:10). The end result is often incomprehensive, and unreliable conclusions are made on energy and development. One of the popular statements in these studies is, for instance, that '*the three-stone fire wastes fuel wood*' (see Crew & Harrison 2000:103; Foley & Moss 1985:10). For anyone who is familiar with the energy consumption practices of rural households this statement clearly reflects gross ignorance (Crew & Harrison 2000:102; Foley & Moss 1985:12). Energy programmes such as the '*improved wood stoves programme'* that have been based on such survey reports have often failed to achieve their objectives. In some instances, they have even exacerbated the confusion surrounding the subject of energy consumption and development.

According to Crewe and Harrison (2000:103) rural energy issues are complex and dynamic so that fly-by-night researchers easily miss not only the continuities but also the salient changes of this phenomenon. This is because energy consumption patterns go beyond rural peoples' use of energy; they encompass perceptions, attitudes and beliefs that are not easily exposed through surveys (Leach & Mearns 1988:16). The mentioned authors further

emphasise that it is very difficult, if not impossible, to obtain information on rural energy consumption patterns and the role of electricity in development without careful monitoring and observant participation over a period of time. Many researchers are not prepared to spend long periods in rural areas to study the finer details of energy consumption and the role of rural electrification in development (Foley 1990:28). Ideally, one needs to live in the community and to observe directly how individuals and households consume energy, i.e. to get an '*emic*' view of energy consumption patterns (Foley & Moss 1985:12, 57; Leach & Mearns 1988:16-18).

Foley, Moss and Timberlake (1984:13) and Mapako and Mbewe (2004:203) point out that no real research aimed at a qualitative exploration of energy consumption patterns has been conducted in rural Zimbabwe. Studies that have been done were mainly concerned with the adoption levels of rural energy technologies and did not go much beyond providing statistics; they were not informative with regard to the sustainability of programmes, local perceptions and attitudes, continuities and changes in consumption patterns, and the power and gender related nature of such consumptions patterns (see Madubansi 2003:104). This dissertation advances the argument that a thorough understanding of energy consumption patterns is imperative for one to appreciate the role of electricity in development. This challenges the conventional wisdom that prevails in the energy transition theory (see 2.5.3.1 and 6.5). It is argued here that the energy transition theory is inadequate in explaining energy consumption patterns in developing countries. This is precisely because of its inability to conceptualise the subject within the cultural context. The gist of my critique therefore falls outside the scope of the mainstream energy transition debate, which exalts income as a common denominator in analysing energy consumption patterns.

It is important to note that there is a strong relationship between a mere understanding of energy consumption patterns and the success of rural electrification. Nevertheless, the role of electricity in sustainable rural development is rehearsed like a chorus in development agendas (Foley 1990:2; Gaunt 2003:49; Zomers 2001:15). In fact rural electrification and development are seen in terms of a mutual relationship where one is considered to be the cause as well as the effect of the other. Such contentions open a huge area of debate and controversy

within the energy and development paradigm. It should be emphasised that although electrification has emerged as a global choice for developing rural areas and may even be the first choice in developing countries, it is not immune to failure and remains part of the modernisation paradigm (Anton–Louis 1999:7-8). The technologies that are part of this paradigm have failed to reduce poverty in the Third World Countries, and rural electrification with its roots in the modernisation paradigm, may also add to the statistics of technology failure (see Ferguson 1990:16-17). Therefore, it should be remembered that technology is not a neutral phenomenon─it has known as well as unknown social, economic and political consequences (see Bank 1999:130-131; Crew & Harrison 2002:31-33). It is not deemed necessary to provide yet another critique of the modernisation paradigm in this dissertation but to expose the knowledge gap that exist in so far as rural electrification and development is concerned.

According to Zomers (2001:12), lack of reliable energy sources such as electricity, is a major impediment to sustainable development. Rural electrification is therefore viewed as a panacea for the development of rural areas. This has however been based on analogies and make belief scenarios (Zomers 2001:17-23). Moreover, the existing literature on rural electrification in the developing world is based on the analysis of technical and financial aspects of electrification, which ignore the socio-economic development implications of rural electrification (Zomers 2001:17-23). Gaunt (2003:5) concurs that electrification is mainly seen as an engineering activity and its link with social development has rarely been explored.

In recent times, rural electrification has become a topical issue in development circles. Given the potential of rural electrification as a partner in development, this study seeks to interrogate issues surrounding rural electrification programmes, particularly arguments on the reason(s) and motivation for governments and donors to partake in energy programmes. Critical to the study is to find out whether rural electrification in Zimbabwe is being done because it is now the current fashion in international development or whether it is being done as a genuine realisation by the government and its development partners that rural electrification is indeed a development incentive.

It is espoused in this dissertation that the socio-cultural and economic aspects of electrification and energy consumption in rural areas have not received adequate attention in studies that have hitherto been conducted in Zimbabwe. There is, consequently, a conspicuous dearth in the literature on energy consumption patterns and the role of electricity as a development incentive. It is argued that energy consumption patterns should be a core component of the rural energy debate and that there is a dire need to explore such patterns and the role of electricity as a development incentive.

1.2 AIM AND OBJECTIVES

Against the backdrop of the foregoing problem statement the general aim of this study is to investigate the energy consumption patterns of rural households in Zimbabwe with special reference to the role of electricity as a development incentive. This research intends to answer the following questions:

- What are the energy sources that are currently utilised in rural Zimbabwe?
- What are the current energy consumption patterns in rural Zimbabwe?
- How do gender and power relations affect energy consumption patterns?
- What is the potential and actual role of rural electrification in the development of rural Zimbabwe?
- What factors have led to rural electrification in Zimbabwe?
- To what extend has rural electrification contributed to development?

The more specific objectives following from the above are summarised below. They do not, however, reflect the chapter divisions of the dissertation:

- To identify and describe the energy resources that are currently utilized by rural households in Zimbabwe.
- To identify and analyse the current energy consumption patterns in rural communities in Zimbabwe as part of the survival strategies of rural households (including child-headed households) as well as the changes that occurred in these patterns and

strategies.

- To expose the dynamics and the gender and power related nature of energy consumption in rural communities in Zimbabwe.
- To determine the potential and actual role of electricity in the development of rural communities in Zimbabwe and to examine the relevance of the different theories that are currently linked to energy consumption.

1.3 PROFILE OF THE RESEARCH AREA

1.3.1 NOTES ABOUT ZIMBABWE IN GENERAL

Zimbabwe is a land-locked country in Southern Africa. It borders South Africa to the south, Zambia to the northwest, Botswana to the west, and Mozambique to the east and the Caprivi Strip extend eastwards from Namibia to Zimbabwe (see Hancock *et al*. 1988:13). Zimbabwe covers about 390 757 km^2 and has 10 provinces (CSO (Central Statistics Office) 2002:10).

Broadly speaking, there are three broad relief regions, which are based on elevation: the Lowveld (below 900m), the Middleveld (900–1200m), and the Highveld (1200–2000m). A narrow belt of undulating mountains (2000–2400m) in the Eastern Highlands stretches from north to south along the eastern border with Mozambique; and the deep cleft of the Zambezi River Valley delineates the boundary with Zambia in the northwest (CSO 2002:10). Relatively infertile sandy soils cover about two-thirds of rural Zimbabwe. There are, however, isolated areas of heavier more fertile soils in the country, the largest pockets being on the Highveld. Fertile irrigable basaltic soils occur extensively in the southern Lowveld.

The mean annual rainfall varies from below 400mm in the far south of the Lowveld to above 2000mm in the Eastern Districts. In the Middleveld rainfall varies from 500mm to 700mm and on the Highveld from 800mm to 1000mm. The rainfall pattern is largely seasonal and about 90% of rain falls in the six months from October to March. There are three distinct seasons: a hot and dry summer season, a rainy season, and a dry winter season (CSO 2002:10).

Zimbabwe has a total population of 11 631 657 people (CSO 2002:3). The population

is predominantly rural; people who reside in rural areas constitute 65% of the total population (Central Statistics Office (CSO) 2002:3; 2000:24; Moyo 2005:3). The majority of the population (75%) is Shona speaking while the Ndebele speakers constitute 20% of the total population. The remaining 5% accounts for people of Asiatic, European and mixed ethnic origin. The rate of natural increase was 2.25 in 1997 changing from 2.9 in 1981 (CIA 2006).

The main energy sources are biomass, imported petroleum, paraffin, solar energy, coal and electricity. The total biomass consumption as a percentage of total energy is 62.78%. Wood and biomass (including agricultural residues) are the principal sources of energy in rural Zimbabwe (CSO 2002:133). According to the CSO (2002:133) 94% of rural people use biomass as an energy source. It was noted that due to firewood shortages, the use of dung as an energy source is growing popular. However, the use of paraffin and gas is insignificant because of prohibitive costs. Firewood is also used for income generating activities such as pottery, weaving, beer brewing and brick burning (Mapako & Mbewe 2004:45).

In view of the fact that all energy-related activities in Zimbabwe are coordinated by the Ministry of Energy and Power Development and since repeated reference will be made to this ministry, a brief overview of its operational framework, objectives and activities is deemed necessary in this introductory chapter (see Table 1 below). The Ministry of Energy and Power Development received ministry status in 2002 when it was upgraded from the Department of Energy and Power Development that operated under the Ministry of Minerals and Energy.

The smooth operation of the Ministry has unfortunately been hampered by a lack of financial resources. Compared to other ministries it receives insufficient funds from the national budget and it is not decentralised to the district or provincial level. Henceforth, employees of the department do not have a clear understanding of what is happening at the grass roots level in rural areas. This is exacerbated by the fact that since its inception in 2002, the Ministry did not have a published energy policy─the formulation of the policy '*has taken longer than expected*'. The researcher was unable to review the draft policy since it was regarded as '*a highly confidential document'*. Table 1 below clearly outlines the mission statements of the Ministry of Energy and its various departments.

Table 1:
Mission statements of the Ministry of Energy and Power Development and its departments

Ministry of Energy and Power Development	To promote and facilitate sustainable development through increased power infrastructure development and efficient utilisation of energy.
Department of Power Development	To promote and facilitate sustainable development through the provision of safe, reliable and cost-effective electricity to urban, farming and rural communities.
Department of Petroleum	To facilitate effective participation of the public and private sectors in the development of the petroleum industry in order to adequately supply petroleum fuels and lubricants at economic prices.
Department of Energy Conservation and Renewable energy	To promote and facilitate sustainable development in the energy sector through efficient use of energy and increased use of new and renewable sources in an environmentally friendly manner.

Source: Ministry of energy and Power Development 2005

The absence of a clear energy policy has been one of the reasons why the Ministry has failed to accomplish its objectives. Activities are run without frameworks and employees are uncertain about the course of action. Moreover, because the international community has isolated Zimbabwe for a considerable number of years, the Ministry of Energy and Power Development has not been able to pursue any technology transfer with the developed northern countries. The ministry itself does not, of course, have funds to undertake such activities and almost all the donors/partners that were active in funding energy activities in the past, terminated their activities in the past five years.

1.3.1.1 SOCIO–ECONOMIC AND POLITICAL CONTEXT OF ZIMBABWE

While the current socio-economic and political events in Zimbabwe call for a rigorous analysis, it is beyond the scope of this dissertation to analyse these events in detail. As noted before, a sound judgement of the current socio- economic situation in Zimbabwe shall be used. This is done so as to pre-empt getting ensnared in the circular arguments presently preoccupying the discourse about the Zimbabwean situation. The preceding statements should however not be interpreted as a deliberate ploy to trivialise, endorse or legitimise the state of affairs in Zimbabwe, neither should they be taken to mean that this study is belittling scholars who have written about the situation in Zimbabwe. However, it is the intention of this work to provide objective lenses through which the researcher views the Zimbabwean situation especially as it relates to energy consumption patterns and the role of electricity in development.

According to Win (2004:19) and Moyo (2005:7) the political situation in Zimbabwe is divided along party political lines. Such a political situation has of course attracted the attention of the international community. Political parties in Zimbabwe (among themselves) and the international community (against the ruling party) have been fighting a cold war, with ordinary citizens becoming pawns in the battle. Unfortunately this has resulted in people suffering from economic and political repercussions including political and economic sanctions.

1.3.1.2 SOCIO–ECONOMIC DEVELOPMENT FRAMEWORK OF ZIMBABWE

The profile of the economy of Zimbabwe can be put into three major categories. The post independence era (1980-1990), the phase of structural economic adjustment (1990-1999), and the current phase of land reform (1999 to present) (Government of Zimbabwe & UNDP 2004:11; Kadenge 1992:168; Moyo 2005:4-5; Paradzayi 2007). When Zimbabwe gained independence from the British in April 1980, it inherited from the colonial administration a dual economy which comprised of a fairly developed urban sector dominated by the white minority and an extremely poor rural sector consisting of the black majority (Government of

Zimbabwe & UNDP 2004:11; Kadenge 1992:168; Moyo 2005:4-5). Due to the extreme economic imbalance that existed between the black and the white community the Government of Zimbabwe embarked on strategies to correct these socio-economic imbalances (Government of Zimbabwe & UNDP 2004:11; Kadenge 1992:168; Moyo 2005:4-5).

The government adopted a 'Growth with Equity' programme in 1981, the Zimbabwean Transitional National Development Plan (1982-1985) and the Zimbabwe First Five-year National Development Plan in an effort to redress the inequalities. The focus and commitment of the government was on reducing poverty, rural development and on redressing social ills and inequalities especially on land and natural resources (Government of Zimbabwe & UNDP 2004:11). By the late 1980s the country had recorded remarkable progress in the development sector in Zimbabwe especially in the health and education sector (CIA 2006:1; Kadenge 1992:170).

From the 1990s, according to Government of Zimbabwe and UNDP (2004:1) Zimbabwe started going through economic misfortunes that eroded all the gains that had been registered in the 1980s. The economy started to sink and poverty increased. This was worsened by persistent droughts. The major cause of the economic decline in the 1990s was poor macro economic policies especially Economic Structural Adjustment Programme (ESAP) which was introduced by the Government of Zimbabwe under the influence of the economic rescue mission of the International Monetary Fund (IMF) in 1990 (Government of Zimbabwe & UNDP 2004:1). ESAP had a negative socio-economic impact on the wider economy and was instrumental in destroying the economy of Zimbabwe. The replacement of ESAP with the so-called 'home grown' Zimbabwe Programme for Economic and Social Transformation (ZIMPREST) did not help either in turning around the economic fortunes of the country (Government of Zimbabwe & UNDP 2004:1). The country witnessed a sharp decline in key social indicators such as health and education. This was further exacerbated by HIV/AIDS, which severely handicapped the health system. Taking the human development index (HDI) as an example to illustrate the above, it is clear that development has declined; HDI dropped sharply from 0.621 in 1985 to 0.496 in 2001 (Government of Zimbabwe & UNDP 2004:1). This example is an irrefutable testimony that the quality of life and the

standard of living in Zimbabwe dropped sharply. According to Moyo (2005:6):

> 'The period between 1997 and 2004 saw gradual return to a dirigiste and heterodox macro-economic policy framework, alongside the execution of extensive land reforms, in a context of increasing economic decline and international isolation…. But government contradicted the International Financial Institution (IFI) demands in 1997, by making unbudgeted pension disbursement to disaffected war veterans, and by designating 40% of large-scale farms for compulsory acquisition. Zimbabwe Programme for Economic and Social Transformation (ZIMPREST) collapsed, as the currency crashed (loosing 74% of its value) on the 14th November 1997'.

As the health of the economy continued to be paralysed, the government tried fire-fighting economic strategies to save it. Meanwhile, relations between Harare and London and the international community at large continued to sour because of the controversial land reform actions (Paradzayi 2007). From 2000, the government embarked on some *ad hoc* economic policies including the Millennium Economic Recovery Programme (MERP). This economic programme came into being in 2001 only to be abandoned after 18 months. In 2003 the government embarked on yet another economic stablisation programme called the National Economic Revival Programme (NERP). This programme like its predecessors, failed dismally to redeem the economy. The controversial land reform that resulted in Zimbabwe being isolated from the international scene also worsened the economic situation (Moyo 2005:5-8).

The gains of development that Zimbabwe had accrued from the 1980s started to decline in the 1990s because of the problems mentioned above (Government of Zimbabwe & UNDP 2004:1). Currently Zimbabwe is characterised by sky rocketing year on year inflation which was pegged at 700% (as in January 2005) and depleted foreign currency reserves. The Government of Zimbabwe and UNDP (2004:57) pointed out that:

> 'Zimbabwe is facing serious -economic and development challenges. These have been compounded by the general international isolation and changing political landscape… Furthermore, the negative perceptions by international community on issues of political and economic governance have dented the country's image. Confidence in the economy is at its lowest ebb as a result … Rekindling relations with the international community is important in addressing the issues of

finance, trade, investment debt and aid flows which are critical for economic revival.'

The above statements spell out precisely the situation in Zimbabwe and it is important to note that the Government of Zimbabwe itself has acknowledged that the economy is going down. As indicated before, the events of the 1990s marked the birth pangs of the problems in the economy of Zimbabwe. To date, the economy has not recovered from this blow. Coupled with unrealistic economic policies, freezing investor confidence and the shortage of foreign exchange, the economy has continued to decline

To this end high levels of poverty characterise Zimbabwe. In 2004, more than 80% of the population lived below the poverty datum line (World Bank 2005:1). Rural areas are bearing the brunt of the ills of poverty (Moyo 2005:3). The economic and political problems that are experienced in the country perpetuate and fuels these extreme levels of poverty. Rural communities in Zimbabwe are characterised *inter alia* by large population densities, lack of basic amenities and high levels of poverty. Poverty in these communities even reaches levels of, '*denial to opportunities and choices most basic to human development for them to lead a decent standard of living'* (DFID 2003:13).

The harsh economic climate in Zimbabwe has provided a breeding ground for the growth of a dual economy, i.e. the formal economy that utilises the inter bank rate and the black market economy. It should be noted that, in this dissertation the terms inter bank rate and black market rate will be used whenever referring to prices. This is because it is very difficult to talk about the Zimbabwean economy and fail to refer to these two terms. The rate of the black market against major currencies is very unstable. However, the inter bank rate is artificially stable because it is controlled by the Reserve Bank. In January 2006, the black market rate was US$ 1 as to Z$ 200 000.00, while the inter bank rate was US$1: Z$60 000.00. These rates have since changed because of the fluctuations in the economy, however they are used to indicate the US equivalent of prices in this dissertation.

1.3.1.3 NON-GOVERNMENTAL ORGANISATIONS (NGOS) IN ZIMBABWE

It is important to articulate the role and status of NGOs in Zimbabwe, as these are the major government development partners. Win (2004: 20-21) argues that the history of NGOs in Zimbabwe can be traced from 1979 and can be divided into five distinctive stages. The first stage is from 1979-1981, during which NGOs were characterised by welfare-oriented hegemony. The second stage was from 1981-1986 and was dominated by a focus on the delivery on health care, education, road construction, water and sanitation and increased agriculture. Energy oriented NGOs also mushroomed during this period and they mainly concentrated on the improved wood stove programme. The third stage dates from 1987 to 1990, during this phase NGOs focused more on human rights law and sustainable development. The fourth stage coincided with ESAP, and as a result NGOs turned their attention to advocacy issues especially poverty, governance and participation. The current stage dates from 1995 to the present (2006) and has been dubbed the '*era of constitutionalism'*. In this stage attention is devoted to governance, corruption and democratization. It coincided with the controversial fast track land reform and therefore issues to do with governance and human rights became very prominent. This period has been marked by alarming donor fatigue (Win 2004:24). According to Moyo (2005:18), '*donors went as far as to discriminatorily apply humanitarian aid for food and social services against land beneficiaries as well as from the Global Fund for HIV/AIDS, on grounds that they were on stolen land*'.

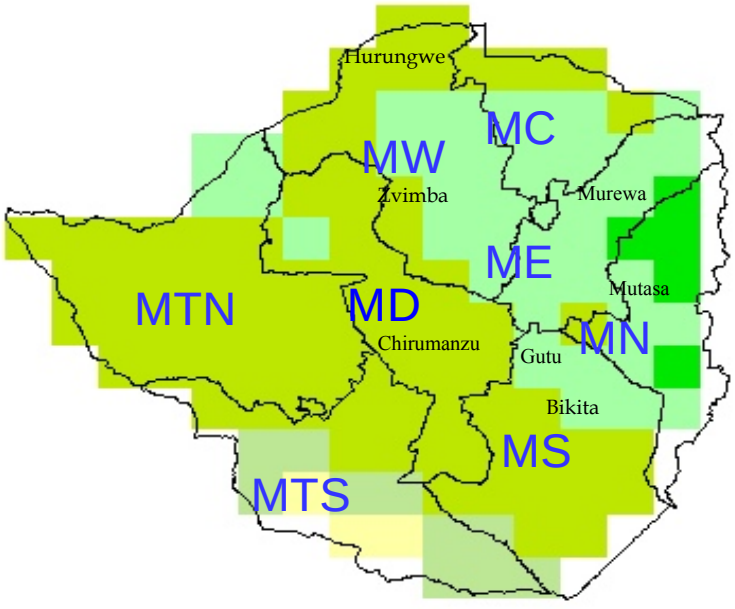
Donors categorically withdrew their attention from the main line development preferring to fund governance and human rights programmes only. NGOs had no choice but to dance to the tune of their masters, thus following the human rights and governance mania. This led to the paralysis and reduction of NGOs that focus on energy. Currently, there are an insignificant number of NGOs in the energy sector. ITDG is the only international NGO that is still operating earnestly in the area of energy. While GTZ still has offices in Zimbabwe it has down-scaled all its energy programmes preferring to focus on neighbouring countries like Zambia who uphold the '*rule of law'*. The UNDP has also phased out all the energy programmes such as the home solar systems citing reasons of feasibility in running such

programmes in a country like Zimbabwe. The World Bank withdrew its support for energy programmes due to the fact the government had defaulted and failed to honor its debt obligations. Local NGOs like BAN and ZERO are still operating in the energy sector. They are however operating below capacity because of lack of funding.

1.3.2 THE RESEARCH AREA

The research, on which this dissertation is based, was conducted over a period of seven months (beginning of September 2005 to beginning of March 2006) mainly in the Gutu District of the Masvingo Province in the south-eastern part of Zimbabwe (see Figure 1 below). However, the results from Gutu District were verified in seven other districts indicated in table 2 below.

Figure1:
Administrative Provinces of Zimbabwe



PROVINCES	
MS	Masvingo
ME	Mashonaland East
MC	Mashonaland Central
MW	Mashonaland West
MN	Manicaland
MTN	Matebeleand North
MTS	Matebeland South
MD	Midlands

Table 2:
Researched districts

PROVINCE	DISTRICTS RESEARCHED	
Masvingo	1. **Gutu**	**PRIMARY RESEARCH AREA**
	2. Bikita	DISTRICTS IN WHICH CORE DATA WERE VERIFIED
Mashonaland East	3. Murewa	
Mashonaland Central	4. Bindura	
Mashonaland West	5. Hurungwe	
	6. Zvimba	
Manicaland	7. Mutasa	
Midlands	8. Chirumhanzu	

Gutu District was chosen as the primary research area for logistical reasons and also because of the researcher's familiarity with the district, its people, and the local language (mainly Chikaranga). It is, moreover, one of the districts in which the electrification process has reached an advanced stage and in which the improved stoves programme has been implemented. The research findings from Gutu District were, however, verified in seven other districts, (see Table 2) to facilitate a higher degree of generalisation for Zimbabwe in general. In this regard, it should be noted that, all districts in Zimbabwe benefited and are still benefiting form rural electrification; the difference lies simply in the extent of electrification. The seven districts were therefore selected in such a way that they are representative of areas in all phases of electrification (limited, advanced and extensive).

Gutu District is located in the Northern part of Masvingo Province. It has a population of about 198 000, a population density of approximately 28 people/km^2, and it covers 12.5%

(707 942km^2) of the total surface area of this province. Topographically the district is characterised by plains with occasional broken hills and valleys (Hamandawana, Nkambwe, Chanda & Eckardt 2005:249; Masvingo Provincial Plan 1985:8). The district is 1200m above sea level and has an annual rainfall of between 650mm and 800mm coupled with fairly severe mid season dry spells. As a result, it is it prone to periodic droughts (Hamandawana *et al.* 2005:249; Masvingo Provincial Plan 1985:8). There are basically three seasons in Gutu district, i.e. a hot season, a rainy season and a winter season. The soil types in Gutu district are largely coarse-grained and loam sands characterised by poor water retention hence the soils are susceptible erosion. The district is also characterised by poor vegetation and is currently undergoing serious deforestation because of population pressure (Hamandawana *et al.* 2005:253-4).

The Karanga-speaking people of the *gumbo* (leg) totem predominate in the District. Missionaries of the Dutch Reformed Church recorded most of the history of the Karanga people in Gutu district. These missionaries actively operated in the area during the colonial era (see Chigwedere 1985:11). Like all Karanga communities, the inhabitants of Gutu District are patrilineally organised and are divided into a number of clans, each of which has its own clan name (*mutupo*). Males are both decision makers and household heads, and a child automatically gets his/her father's surname (Bourdillon 1987:22-23). Relationships between children and their paternal kin are strictly formal. However, maternal kinship ties are informal and a close and very special relationship exists between a mother and her children and between children and the mother's brother (see Bourdillon 1987:33). Wives are expected to be submissive to their husbands while children are expected to respect and revere both parents.

It must be noted that in Zimbabwe 'chiefs' (*madzishe*; sing. *ishe*) hold their office in accordance with Chapter 29:25 of the Traditional Leaders Act of 1998. According to the Act, the chief is the 'traditional head' of the community under his jurisdiction. Chieftainship (*ushe*) in Gutu district is hereditary in the male line of descent and restricted to those who share the *gumbo* totem. A woman is not allowed to become a chief (Bourdillon 1987:22-23; Chigwedere 1985:11-12). Bourdillon (1987:103) also points out that although each district has a chief (*ishe*) who is the highest traditional authority in a district, there are also sub-chiefs

(also called *madzishe*) with smaller areas of influence within the district. Villages are headed by village heads (*masabhuku*; sing *sabhuku*) who act on behalf of and report to the sub-chief. The position of the village head is hereditary. The *sabhuku* is responsible for the administration of the village including the apportioning of land. The latter may only be done with the approval of the chief who is considered the custodian of natural resources and land. Village members who are related to either the chief *(ishe)* or the village head (*sabhuku*) often have large pieces of land and resources (see Bourdillon 1987:103). The above observations by Bourdillon (1987) on chieftainship are still relevant to date as the same observations were also confirmed by this study.

The chief (*ishe*) and the village heads *(madzisabhuku)* form part of and make decisions in community meetings (*dare rebhuku*). Moreover, the chiefs also sit on the District Development Committee (DDC) while Chief Gutu himself sits on the Council of Chiefs *(dare remadzishe)*, a highly respected and powerful council that assists parliament in policy decisions. Mutunhu (1976:112) points out that a chief does not make decisions on his own; he in fact has a team of personal advisers *(machinda)* who are chosen from his close male relatives. The number of advisors that a chief may appoint varies considerably but they should be resident in the same constituency as the chief. There is no defined criterion that is followed by the chief in choosing advisers; he uses his own personal discretion in selecting the advisers from his relatives.

Due to the fact that rural areas fall under the Ministry of Local Government, the local government code of administration is used in managing activities in rural areas (see Table 3 below). In accordance with Chapter 29:16 of the Rural District Councils Act of 1996, the inhabitants of the wards in rural areas democratically elect councillors. Such wards on (which on average consists of 30 villages) are demarcated for a specific number of villages. Councillors report to the local government while chiefs *(madzishe)* report to the 'supreme' chief in the district (chief Gutu in Gutu District). Table 3 clearly indicates that the chiefs do not form part and parcel of the provincial and local government system.

For as long as most people can remember there has been friction between chiefs and

government councillors (District Councillors) due to the overlap in their areas of jurisdiction (see Bourdillon 1987:118; Chigwedere 1985:22-23; Mutizwa-Mangiza 1991:397-399). Moreover, chiefs are traditional leaders who derive their power from the spiritual and traditional realm while councillors are political figures who derive their power from the political realm (Bourdillon 1987:118; Chigwedere 1985:23). They also derive their positions from two different sets of legislation referred to above, i.e. the Traditional leaders Act, Chapter 29:25 of 1998 and the Local Councils Act, Chapter 29:13 of 1995 and are administrated by two totally different departments, i.e. the Rural Local Authorities Department and the Traditional Leaders Department. The local government hierarchy at provincial level is shown in table 3 below.

Table 3:
Local Government hierarchy at the provincial level

Provincial Council Consists of the members of the District Councils in rural areas (elected by the rural people within the district), the elected mayors of towns/cities, the Provincial Governor and officials of the Ministry of Local Government).
District Council Consists of the members of the Ward Development Councils and District Development Committees
Ward Development Council Consists of councillors elected by the inhabitants of each ward
Village Development Council Village head and cell chairman (often members of the local ZANU PF cell).

Source: Mutizwa-Mangiza & Helsing 1991:399

In recent years control over community development projects (and thus also rural

electrification) as well as development partners and funding agencies have become a major source of contention between chiefs and councillors. This has added yet another facet to the power politics in rural areas and the resulting tug of war has a detrimental effect on the distribution of resources such as energy. The lack of demarcation of roles and responsibilities between chiefs and councillors is a major problem which eventually manifests itself in power feuds. Confusingly, the Ministry of Local Government has not yet demarcated the roles and responsibilities of chiefs and councillors in this regard and no information seems to be forthcoming. Both aforementioned acts are silent about the demarcation of the roles and responsibilities of chiefs and councillors.

1.3.3 NDEBELE–SHONA RELATIONS

It is imperative for this study to provide basic information about the Ndebele–Shona relations in Zimbabwe. As indicated before (see 1.3.1) Shona people constitute the majority of the people in Zimbabwe. The Shona people settled in Zimbabwe long before the coming of the Ndebele in 1882. The Ndebele ethnic group originated from KwaZulu-Natal, South Africa. History has in it that in 1822, Mzilikazi a Nguni military commander came into conflict with Tshaka king of the Zulu and this resulted in him and his subordinates fleeing Zululand and ultimately settling in the Matebeleland region of the now Zimbabwe. This gave birth to the Ndebele Kingdom (Beach 1974:637-639; Lindgren 2004:174; Thomas 1987:63).

The relationship between the Shona and Ndebele has been marked by complexities and conflict and they have always treated each other with suspicion and antagonism (Thomas 1987:63 Beach 1974:639; Lindgren 2004:174). As a result the Ndebele are viewed as enemies by the Shona and vice-versa (Beach 1974:637-639). Upon attaining independence in 1980, the Shona led Zimbabwean government felt that the Ndebele-led ZAPU political party was a threat to the peace of the nation. As a response the government‘s military wing of the Fifth Brigade unleashed a reign of terror in Matebeleland and parts of the Midland province and this was code-named the ‘*Gukurahundi*’ (Thomas 1987:63). Gukurahundi is a Shona term that means ‘*the early rain which washes away the chaff before the spring rains*’ (http://en.wikipedia.org/wiki/Gukurahundi). During the Gukurahundi, the Fifth Brigade

perpetrated violence and performed a series of gruesome murders (Lindgren 2004:181; Sithole 1993:38). It is reported that the killings were aimed at ZAPU members and supporters. It is estimated that in Matabeleland and some parts of the Midlands between 10 000 to 30 000 Ndebele civilians were murdered. In 1987, a resolution was reached by the government and ZAPU, the two parties came together and signed the so called '*Unity Accord'*. Politically however, the Ndebele are still treated as political minors by their Shona counterparts (Lindgren 2004:181).

As a result of the strained relations between the Shona and Ndebele, the history of the Matebeleland region is therefore one that has been marked by exclusion, marginalization and discrimination. Even though the Unity Accord was signed, there are political under-currents between the Shona and Ndebele activists. Hence within both the opposition and the ruling party there are factions based on ethnic grounds. These ethnic struggles have spilled into the energy sector.

1.4 RESEARCH METHODOLOGY

1.4.1 RESEARCH DESIGN

The relative value of quantitative and qualitative inquiry has long been debated (see Patton 1990) and will therefore not be reviewed here. Suffice to say that the researcher agrees with Cronbach (1975:126) and Denzin and Lincoln (2000:1) that quantitative research is not able to take full account of the many interactions that take place in social settings. Phenomenological inquiry, or qualitative research on the other hand, accepts the complex and dynamic quality of the social world, seeks to understand variables that are difficult to quantify and view phenomena in context-specific settings (see Denzin & Lincoln 2000:1).

The qualitative design was used in this research because the relevant phenomena had to be studied in their natural and context-specific settings at grass-roots level. Moreover, the intricate detail of '*emic'* activities at this level as well as energy consumption patterns and the

role of electricity in development could only be extricated by utilising qualitative research methods. Since these methods are highly subjective, accuracy, validity and reliability become cardinal points. It was therefore decided to use a variety of qualitative methods while taking into cognisance that no specific method should be privileged over the other (see Flick 1998:23; Mahapa 2003:55). In this study, participant observation, life histories, in depth interviews and focus group discussions as well as time, energy and movement studies were employed to extricate data in the field.

1.4.2 LITERATURE RESEARCH

To a large degree, the literature research journey for this dissertation was directed by Annecke's article on the real and potential benefits of electrification to rural households (1998). This article did not only contain thought- provoking ideas but also alerted me to the existence of the African Energy Policy Research Network (AFREPREN) and the Energy Research Institute (ERC). I started reading AFREPREN articles on electrification and energy in general, specifically those of Dube (2004), Karekezi (1987), Kgathi (1992), Kayo (2002; 2004) Mapako and Mbewe (2004) and Ranganathan (1992). From these publications it became obvious that very little data existed on rural electrification and development.

As I became more specific I reviewed Gata's document, *Energy for tomorrow's world: the realities, the real options and the agenda for achievement* (1995), Dube's publications on rural electrification in Zimbabwe (2002 & 2004) as well as Kayo's 2003 publication on energy sector reform and unbundling in Zimbabwe. It was evident from the reviewed articles that the Zimbabwean Ministry of Energy and the Electricity Supply Authority (ZESA) had not done any research to evaluate the impact of rural electrification in Zimbabwe.

As I proceeded with my literature research, I was attracted by Crew and Harrison's book, *Whose Development: Ethnography of Aid* (2002). This book analysed the anthropology of energy in rural areas in developing countries and centralised the issue of energy consumption patterns in the energy debate. This book led me to the seminal publication of Foley *et al*. entitled *Stoves and Trees. How much wood would a stove save if a wood stove could save wood?* (1984), as well as his other extremely relevant publications (1985; 1990;

2003). This in turn led me to Eberhard's plethora of publications on energy consumption patterns in South Africa (1981; 1986; 1992).

The scholarly work of Leach also strengthened my understanding of energy consumption patterns in Africa. His article, *Energy as a tool for sustainable development in Sub Saharan Africa* (1999) helped me to understand why energy consumption patterns are noteworthy. It played a major role in the writing of parts of the second and third chapters of this dissertation.

Wendy Annecke's doctoral thesis *One man one megawatt, one woman one candle: Women, gender and energy in South Africa, with a focus on research* (2003), intrigued me to such an extent that I contacted her directly. She assisted me with very valuable information and other energy related literature, especially the publications of the Energy Research Institute (ERI), the Boiling point journal and ENERGIA website resources. Through the Energy Research Institute I was alerted to the existence of Gaunt's dissertation entitled *Electrification technology and process to meet economic and social objectives in Southern Africa* (2003), which, in turn, led me to Zomers' book *Rural electrification: Utilities' chafe or challenge?* (2001). These books grounded my understanding of electrification and energy issues to a great extent.

Reading Anton Louis' dissertation on *Institutional Mechanisms for the Delivery of Renewable Energy Technologies in Southern Africa* as well the publications on energy and development by Barnes and Floor (1996), and Barnett (1999), helped me to understand the link between energy and poverty. Cecelski's publications, especially her *Enabling equitable access to Rural Electrification: Current thinking on energy, poverty and Gender* (2002) provoked my thinking on energy and gender issues. The works of Clancy on gender and energy (2000; 2003; 2004) further assisted me in appreciating the gender-energy nexus. In all my reading I had not read academic pieces that alluded to the gender component in the energy discourse. Reading these articles and books helped me to understand that the energy sector is not immune to gender issues (see later section 2.9 and chapter 4).

After a long walk analysing different kinds of literature I ended up with two specific avenues which I could pursue, energy consumption and rural electrification. I soon realised that these two issues were closely related but was apparently not viewed as such by many scholars. This realisation naturally led me to the title of my dissertation.

In reading the literature, I however found that the determinants of energy consumption patterns were only very superficially treated in the literature. Most scholars (see for example Campbell *et al*. 2003; Davis 1997; Ebhon 1996) were of the idea that energy consumption patterns are influenced by incomes. Moreover there was silence in the literature with regard to the voices and views of the people at grassroots level concerning the benefits of rural electrification (see for example Barnes 2004; De Lange & Wentzel 2003; Foley 1990; Zomers 2001). The literature analysed the role of rural electrification in an obvious scenario where rural electrification leads to development although this had not been empirically tested (see African Development Bank (ADB) 2002; Habtetsion & Tsighe 2002; Toman & Jamelkova 2003; Ebhon 1996). What is prominent in the current literature is the analysis of the success stories of rural electrification in countries such as the United States of America, which are inadequate to be applied to the developing countries' scenarios. Furthermore many of the publications on energy consumption patterns and rural electrification are too technical and mathematical in nature and of very little use in social science research (see for example World Bank 2006; Bates *et al*. 1992).

1.4.3 FIELD RESEARCH METHODS

1.4.3.1 INTERVIEWS

In-depth face-to-face interviews were used for extracting information from interviewees, to maximise the flow of valid reliable information, and to allow for the expression of particular feelings and attitudes. An interview guide consisting of relevant topics were used to keep the discussions on track with a minimum of interruption but at the same time allowed for substantial probing when unexpected avenues emerged during an 'interview episode'. To obtain a representative sample of diverse views, in depth interviews were conducted with the

following:

1 Six officials (junior and senior) from the Ministry of Energy and power development[3].
2 Six officials from the Rural Electrification Agency (REA) Head Office.
3 One official from the Rural Electrification Agency at District level.
4 Four officials from NGOS in the energy sector.
5 One village head in each village.
6 One chief in each ward.
7 Ten development-oriented civil servants in each district.
8 Members of fifty households in Gutu District and 20 households per district in the other seven districts.

1.4.3.2 PARTICIPANT OBSERVATION

The principal research method during the six months of field research was participant observation. This required the researcher to simultaneously become a member of particular households in the community and an observer of the various activities that are performed by household and village members. This made it possible to create maximum rapport with individuals and village members and to developing a relationship of trust with everyone. This, of course, meant that great care had to be exercised to remain as objective and unbiased as possible.

Becoming part of the community in general and selected households in particular allowed me to become involved in ordinary daily activities and to accept certain responsibilities and roles. As I interacted with community members of all ages, they volunteered information of a very sensitive nature. The following are some of the key activities which I observed and performed:

- Observing and participating in firewood gathering and fire making, and partaking

[3] It should be noted that the Ministry of Energy and Power Development is centralised in Harare hence no officials could be interviewed at provincial and district level.

in the preparation of food and the sharing of meals with family members.

- Measuring the time that it takes to gather firewood, make a fire and cook a meal.
- Observing and participating in income generating activities that utilise higher order energy resources such as electricity.
- Sleeping in a shared room and observing the utilisation of lighting resources by family members.
- Observing the different types of energy resources used by different categories of villagers.
- Observing the gender dynamics in energy consumption at household and community level.
- Observing and measuring the distances that are travelled to obtain particular energy sources.

1.4.3.3 LIFE HISTORIES AND CASE STUDIES

Participant observation provided ample opportunity to obtain peoples' life histories. This entailed joining people (especially older people but often also children and young people) in '*a walk down memory lane*'. Life histories generated a lot of rich information about continuity and change in energy consumption patterns. Becoming part of the community also made it possible to photograph people, things and events effortlessly. Photographs were always taken with the consent of those who had a stake in the end product.

Participant observation, the writing down of life histories, and spontaneous as well as more 'formal' interviews, are very time consuming. Case studies therefore become almost impossible, partly because of time constraints but also because it implied adjustment to a time frame that is not in tandem with normal daily village life. I lived in constant fear that I would miss out on particular events in the households and the village in general if I took time off to conduct a more directed case study. Consequently only one case study of some importance was conducted on the Chiwore rural irrigation project in the Hurungwe District.

1.4.3.4 FOCUS GROUP DISCUSSIONS

In accordance with the suggestions of Denzin and Lincoln (2000:2-5) and Struwig and Stead (2001:15-16) focus group discussions became a significant part of my field research. Focus group discussions were carried out with male, female and mixed groups. These groups usually consisted of 8 to12 people and initially they were heterogeneous to allow for contrasting ideas (see Flick 1998:123). However, as time passed I found it more convenient to work with homogenous groups in which it is easier to facilitate effective participation of all group members. In many instances, women indicated that they preferred to have their own focus group discussions in which they could express their views '*without male interruption and ridicule*'. To counter low-turn out of participants, about 20% more people were usually invited to particular discussions. The number of participants who then actually turned out made the discussion groups very manageable. A total of thirty focus group discussions were held in the course of the field research, usually at neutral venues e.g. under the tree where regular village meetings are held. A total of 16 focus group discussions were held in Gutu district (the primary research area) and the rest in the 7 other districts.

The identification of focus group participants was done with the assistance of the village health worker because they always know most of the households in the village and was aware of all the '*small local feuds*' that could have a detrimental effect on the discussions. Great care was however taken to include village members from all sectors of the local community.

A circular seating arrangement was adopted at all discussions since it allowed all participants an equal opportunity to interact and to attract attention. In concurrence with the findings of Casley and Kumar (1995:27), it was observed that interviewees were more willing to share sensitive information with regard to food security and governance during group discussions than during individual interviews. I facilitated post-discussion meetings to accommodate those who were reluctant to share their views in the focus groups.

1.4.3.5 TIME AND MOVEMENT STUDIES

The time and movement studies that were conducted involved measuring the amount of time it takes to perform specific activities in rural households: gathering firewood or dung, making a fire and cooking different meals with different energy sources. Firewood was cut into small pieces to fit in a sack and then weighed using a scale. These measurements were later used to calculate averages.

1.5 UNITS OF ANALYSIS AND SAMPLING METHOD

The units of analysis in this study were both the household and the individual. Various definitions have been put forward for the term 'household' (see Allan & Crow 2001:5-6). However, in this study the term is used to refer to a group of people who stay together, cook together, share meals together, sleep in the same dwelling and share chores and a common domestic economy and survival strategies. This definition thus includes polygamous households**.** On average a household in Zimbabwe consists of six people (CSO 2002:9). Due to the prevalence and effects of HIV/AIDS, children from the extended family currently often form part of the average household (Matshalaga 2004:9). As a result, it is very difficult to find a nuclear family forming a household in rural Zimbabwe. It is also important to note that even though modernisation has watered down and diluted kinship ties, individualism is still not very popular in rural Zimbabwe.

It is important to point out that purposeful and opportunistic sampling was the major sampling methods that were used in this study. Purposive selection of interviewees was utilised to select the cases to be studied. This was done in accordance with Erlandson (1993:82-83) who argues that the logic and power of purposeful selection lies in selecting information-rich cases for in-depth studies.

The wealth ranking method whereby villagers themselves rank households on a poor-rich scale was employed in the study because of its capacity to ensure a representative

selection of participants. This method was also used to avoid the tendency by researchers to leave out poor households because rural communities themselves often tend to be biased towards selecting rich households for research studies. The health ranking ensured that the poorest of the poor were not left out. Moreover, such an exercise allowed the researcher to learn about how communities themselves define poverty.

The ranking was done on the basis of the 'assets' that are owned by households. The '*assets*' ranged from items as small as chickens to 'assets' as big as scotch carts, cattle and machinery. The reason for considering 'assets' that were as small as chickens (which are not considered as assets in general economic terms), is that the rural dwellers argued that if a household owns a chicken, it can be sold to raise money for a particular need. The villagers did the ranking by writing on the ground and using small stones to represent the number and types of 'assets' that a household owns. Although I expected wealth ranking to be a sensitive issue I was surprised to find that communities approached the subject without emotion.

The study drew from participants from all walks of life and ages in order to get rich data. Whilst past researchers have concentrated energy researches on the 18 to 49 age group, this study purposefully included children from the age of 10 and those who are over the age of 49 in order to get more information on the experiences of the aforementioned groups with regard to energy. Such information is of vital importance to policy makers.

1.6 DATA RECORDING AND ANALYSIS

The process of data collection, data display and data reduction was done concurrently during and after the fieldwork. A diary was used and all completed activities as well as those that still had to be done were captured in the diary. This was done to keep the fieldwork on track and to monitor the progress. At the end of each day a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis was done which made it possible to adjust my *modus operandi* on a daily basis.

All fieldwork data (observations, interviews, etc.) were captured manually in notebooks. At the end of each day these data were transferred and provisionally systematised

in two sets of logbooks, one for the verbal interactions and the other one for observations. Periodically, a content analysis was performed and the information arranged thematically

According to Erlandson (1993:82-83) and Punch (1994:90) reliability, validity and accuracy is a rule of thumb in qualitative research. To enhance validity and reliability, methodological as well as investigator triangulation were used. To fulfill the methodological triangulation, the different methods indicated earlier were used while investigator triangulation was insured by discussing draft copies of different chapters with academics as well as with professionals in the energy sector.

1. 7 THE FIELD RESEARCH PROCESS AND ETHICAL CONSIDERATIONS

According to Punch (1994:90) ethical issues are important and should be considered before getting into the field. The researcher provided the Provincial Administrator of Masvingo Province, the Ministry of Energy as well as the Rural Electrification Agency (REA) with the research proposal and received their permission to conduct the intended research (see annexure A, B and C). At the local level, verbal permission to do research was obtained from the chiefs, sub-chiefs and headmen and meetings were organised with the communities where I wanted to conduct the research. At these meetings the aims and objectives of the study and the use of photographs was explained to community members and their participation in the actual research was discussed at length. Verbal consent was obtained from all participants after the issue of anonymity and the right to withdraw from the study was thoroughly discussed with them. Written consent forms were not used because I was advised against their use by the Permanent Secretary's office in the Ministry of Energy and the Chiefs as well as headmen. The political situation in Zimbabwe is so sensitive that villagers are reluctant to put their particulars and signatures on 'legal-looking' forms. In addition, as a result of the current drought and humanitarian aid villagers also often think that if '*strangers*' write down their names, they will be provided with food packages. At the aforementioned village meetings it was therefore also explained that the researcher had neither the means nor the intention to reward participants in cash or in kind. However, the English and translated consent forms have been attached herein for reference (see annexures D and E).

The consent obtained at village (community level) was also sought and obtained at household level and at the individual level before commencing with the research. In the case of all households consent was obtained from the household head. In child headed households[4] consent was initially obtained from the guardian (*sarapavana*[5]*)* but afterwards consent was also sought from the particular child in his/her own right.

The research started in earnest after the success of the proposal defence in July 2005. An application was made to the Research Ethics Committee for ethical clearance, while I waited to start on fieldwork. During the waiting period from July to September, an extensive literature research was done with the help of the personnel of the Academic Information Service (Library) at the University of Pretoria. Field research in Zimbabwe was conducted from September 2005 until the end of March 2006 after permission was obtained from the Ministry of energy and Power Development, the rural Electrification Agency (REA) and the Masvingo Provincial Administrator. I first interviewed officials from REA and the Ministry of Energy in Harare before I left for Gutu. Officials from REA and the Ministry of Energy were extremely helpful and we often had lengthy and informative discussions. After completing these discussions I started interviewing the personnel of Non-governmental Organisations (NGOs) that were or are still active in the energy field in Zimbabwe.

After completing the above interviews I proceeded to Gutu District (Masvingo Province) where I paid a courtesy call to the District Administrator who had already been informed of my research by the Provincial Administrator's office. I then left for the rural areas of Gutu where, in every instance, the relevant local chief became my point of entry into communities (villages). I explained everything concerning my research to them and showed them all the letters of permission that was provided to me by the relevant 'higher' authorities. All the chiefs that I visited were enthusiastic about my research and assisted me in making contact with families with whom I could stay during the course of my field research. The first

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[4] A child-headed household is a household which are headed by a person who is under the age of 18. In practice such a child become the '*single parent'* of his/her orphaned brothers, sisters and even cousins

[5] Sarapavana is a Shona word which literally means '*he who remains with the children'*, i.e. the custodian, usually the most senior available male relative.

local chief that I visited, Chief Nyamandi of Gutu North put me in contact with his fellow chiefs which made it very easy to obtain permission and assistance when I extended my research to other parts of the district at a later stage.

The chiefs, in liaison with the village heads, introduced me to the villages' members and assisted me during the subsequent village meetings where I endeavoured to obtain the informed consent of the entire community. The Chief and/or Village Head usually introduced me, talked briefly about my research (especially when I visited villages that were far from the particular chief's homestead) and then gave me the opportunity to provide in-dept information and to answer the questions that community members put to me.

Spot-checking in the other seven districts became possible after the core data had been collected in the Gutu District. It should be noted that in the other seven districts, the main focus was to determine whether the information that had been obtained in Gutu District could also be applied to other districts and henceforth to the country as a whole.

Despite my familiarity with local conditions, I had to learn anew what it means to survive in resource poor communities and households when I was conducting participant observation. In most instances it implied adjustment to circumstances I was not used to (any more). It involved, *inter alia*, walking long distances on foot since there were very few buses and adjusting my diet to that of people who where often near starvation. I also therefore had a 'hands-on' experience of the energy (fuel) crises in the country.

After returning from the research area in April 2006, I commenced with the processing of the research data. Since I collated and systematized my data concurrently with my field research it was not very difficult to analyse the information. However, it still entailed a lot of hard work to organise the large volumes of data, re-interpret the literature and to do the actual writing. Constant discussion with my study leader was no longer a choice but a necessity.

I arranged each chapter according to major and sub themes and then manually wrote every chapter before typing it on computer. In this process my research proposal served as a

point of departure but after receiving my study leader's comments and recommendations on my first draft copy I had to dismantle much of what I did and to start afresh dealing with the work on a chapter-by-chapter basis. The entire process of writing up became a learning experience never to be forgotten.

It is fully acknowledged that there is no scientific research without limitations (Flick 1998:23). The scope of the research certainly required more time and money than was available. Consequently, the researcher had to limit the field work to a six month period. Secondly the generalisation of the findings to secondary research areas was also problematic due to the fact that there are different conditions (cultural, social, development and infrastructure) among districts. The research was done at the height of a fuel crisis and transport was often a major problem. In addition the scattered settlement pattern of rural areas made travelling difficult. Participation was also hampered by the rainy weather and research time had to be synchronised with farming activities. As a result the researcher had to effectively gather as much data on non raining days and to work extensively on Thursdays and Sundays (which were non farming days).

CHAPTER 2

LITERATURE REVIEW: ARGUMENTS AND ISSUES IN THE ENERGY DEBATE

2.1 INTRODUCTION

This chapter provides an overview of the contributions of other scholars to the debate on development, energy consumption and rural electrification. It is pointed out that energy consumption and the role of electricity in development is misunderstood, shrouded in mystery and characterised by erroneous assumptions. From the available literature it is clear that rural electrification provides little impetus to rural development although it has been viewed as a panacea for the problems which confront rural communities. The chapter also appreciates the need to understand the nature of energy consumption patterns and also the people who are involved in shaping it. The energy consumption theories are discussed and their applicability to developing countries assessed. The development discourse will be briefly discussed as a point of departure.

2.2 THE GENERAL DEVELOPMENT DEBATE

According to Davids (2005:4) the body of knowledge that is generally referred to as 'development theory' is fairly new; indeed scientific inquiry into the development paradigm actually only started after the Second World War. It was dominated until the 1960s by the Modernisation Theory and in the late 1960s and early 1970s by the Dependency Theory as well as the World Systems Theory[6].

[6] In essence the **Modernisation Theory,** of which W.W. Rostow (1960) was an important protagonist, proposed that if the 'less-developed' countries wished to develop, their only option was to follow the development path taken by the 'developed' countries over the past 200 years. The **Dependency Theory** that is associated with A.G. Frank (1967) emerged largely as a response to Modernisation Theory and is antithetical to it. The **World** Systems Theory is associated with I.M. Wallerstein (1974), was one of the branches of the dependency paradigm that was most critical to modernization theory.

After that the emphasis gradually started shifting away from such macro development theories towards the micro-level where humans, and especially human communities, became the focal point (see Jeppe, Theron & Van Baalen 1992:62; Moll 1986:22). Nevertheless, the concept of development, though resonating with apparent good intentions, remained controversial (see Escobar 1995:4; Gardner 1996:171; Gates 1996:576; Ismael 2005:1: Stirrat 193:296). Authors like Ferguson (1990:xiii) and Ismael (2005:1) agree that it has not been defined with any precision while Sachs (2002:4 in Annecke 2003:2) calls it a concept of '*monumental emptiness carrying vaguely positive connotations*'. These and other authors (see Crew & Harrison 2002:1) also concur that the so-called 'development' has dismally failed to be faithful to its implied objectives. Escobar (1995:4) is even more adamant when he emphasises that '*development has produced its opposite — massive underdevelopment and impoverishment, untold exploitation*'.

Radical thinkers like Harrison and Crew (2002) and Ferguson (1990:11) argue that development is one of the by-products of capitalism and not a genuine development endeavour. Ferguson (1990:11) argues that '(c)*apitalism is not a progressive force but a reactionary one in the third world, not a cause of development but the obstacle to it, not the cure for poverty but the cause of it'*. For many critical thinkers (see Crush 1995:20; Escobar 1995:26), development remains a collection of rational prescriptions which industrialised nations use to impose their views and models onto the recipients of their aid, thus forcing a change in the latter's identities. In this regard Esteva (1997:7) argues that development has '*transformed people into an inverted image of others'reality of what it means to be developed'*. Moreover, there is a persistent tendency to think that development experts must necessarily be '*outsiders'*. This is in spite of the fact that such experts often only create ideas about illiteracy, underdevelopment, malnutrition etc. in developing countries to facilitate their entry into developing countries where they then provide the alleged 'cure' — a very lucrative endeavour (see Escobar 1995:26).

The intention with development interventions is to move societies from a condition in which they are believed to be worse off, to conditions in which they are assumed to be better

off. There is, of course, still a great deal of controversy about who and what should be considered 'worse' and 'better'. Development research has recently become multi-disciplinary, thus embracing policy analysis and focusing on the major symptom of failed development, namely poverty. The current argument is that development should be viewed as a means for achieving better living conditions for humans, especially those in rural areas, and that its economic, biological, social, cultural and political dimensions should be integrated.

A distinction should be made between 'positive progress' and the 'progress' advocated by the modernisation paradigm. The modernisation theory regards progress as possible only when 'modern' ideas, policies or technologies replace the 'traditional' ones. This is highly controversial because the terms 'modernisation' and 'traditional' are flawed. In most instances a technology, idea or policy is branded either 'traditional' or 'modern' simply because of its 'source' (Crew & Harrison 2002:43). Therefore, most ideas and technologies from developing countries are termed 'traditional' while those from the West are termed 'modern'. The classification of 'modern' and 'traditional' has resulted in the developing world shunning functional and acceptable ideas in a bid to match 'modern' standards (Crew & Harrison 2002:43; Ismael 2005:11). Ismael (2005:11) is correct when he argues that the term modernisation reflects 'western arrogance'.

In view of the above, it may be concluded that development is a highly controversial subject and that the arguments for and against it will be part of any future development scenario. It is, however, beyond the scope of this dissertation to discuss these arguments in detail. One does, however, agree with De Wet (2001:8) that 'development' "*is a Humpty-Dumpty kind of word, as when Humpty says: 'when I use a word, it means exactly what I want it to mean'*". Suffice it to state then that the term 'development' will henceforth be used to refer to positive progress in economic, social, political, human and environmental conditions attained through participation thus resulting in poverty reduction at the individual, household, community and national level.

Before discussing the different issues in the energy debate, it is also necessary to say something about the term 'poor' as it is used in developing countries and the development debate in general. Unfortunately the term has come to mean just about anything. Crew and Harrison (2000:28) rightly assert that the term, though not derogatory in itself, may become a euphemism for tabooed words such as '*primitive*', '*savage*' or '*native*'. Over the years the poor have been erroneously viewed as a homogeneous group (see Aldrich 2001:34; Moser 1993:18) yet poor people are heterogeneous with attitudes, interests, perceptions, needs and priorities that are different and often diametrically opposed. In this dissertation the term 'poor' will be used to refer to those members of society who live below the poverty line (poverty threshold), who lack purchasing power, have insufficient access to social and economic services and few income generating opportunities and who are constantly exposed to a multitude of risks and the ever present threat of starvation.

2.3 THE ROLE OF ENERGY IN DEVELOPMENT

Provision of energy to the poor and the rich alike is increasingly being viewed as an incentive for (or synonymous to) development. As a result of the assumed potential and the actual role of energy in development, major role players in the development sector, such as the World Bank, United Nations (UN) and United States Aid (USAID), support quite a number of energy initiatives (Crew & Harrison 2002:11-12). According to the World Bank (2000:10) '*access to energy is a means of direct poverty reduction'* and Zomers (20003:13) asserts that the lack of access to renewable energy sources is a major impediment to sustainable development in developing countries. Madubansi (2003:1) concurs with these views when he emphasises that '*energy is a fundamental and strategic tool to attain the minimum quality of life'*. These views are largely influenced by the energy transition theory (see 2.5.3) which is based on the assumption that there is a direct link between energy consumption and economic growth (Banda & Tinto 2004:1; Pachauri 1993:10-11). These views on rural energy consumption patterns has formed the backbone of many energy projects in the developing world such as the improved stoves programme, solar programmes, wind-energy programmes, biogas programmes, mini-grid electricity, and currently also rural electrification.

The recognised relationship between energy and development necessitated the introduction of the concept 'energy for development' i.e. energy that is delivered with the aim of developing recipients and recipient areas. The major proponents of the idea of energy for development are Annecke (2003), Habtetsion & Tsighe (2002), Madubanzi; Mwanza & Pashvok (1995), and Stasse & Kotze (1995).

According to Annecke (2003:19) social scientists entered the energy for development debate as poor cousins to economists and engineers. Thus their arguments played second fiddle to those of economists and engineers. However, a few social scientists have lately given impetus to a critical examination of the 'social' role of energy in development. This has led to the exploration and demystification of the subject and a reappraisal of the issue of poverty reduction.

According to Barnett (2000:30; see also Cecelski 2002:11) the current position on energy and poverty is that firstly, 'modern' forms of energy such as electricity provide the necessary input for economic development and the elimination of poverty (*inter alia* because a variety of income generating activities are possible with electricity). Secondly poor people need energy for multiple tasks (lighting, cooking, heating, cooling and communication) and they require a variety of fuel types. Thirdly women and children usually constitute the majority of poor people in any community and women are usually major energy users. Lastly the energy technology available to the poor results in very low energy conversion efficiency.

Against this backdrop, Toman and Jamelkova (2003:94) emphasises the need to anchor poverty reduction in energy for development programmes. They further contend that the critical role of energy in development is proved by its integration into the Millennium Development Goals[7] (MDGs) — even though energy is not an MDG in itself.

[7] The Millennium Development Goals (MDGs) are based on the United Nations Millennium Declaration (2000). The Declaration focused on development and poverty eradication through peace and security, values and human rights, democracy, and good governance. There are eight MDGs and they focus on (1) poverty eradication, (2) universal provision of primary education, (3) promotion of gender equality and women empowerment, (4) reducing child mortality, (5) improving maternal health, (6) combating HIV/AIDS, malaria and other diseases, (7) ensuring environmental sustainability, (8) developing a global partnership for development. (http://www.ilo.org/public/english/bureau/exrel/mdg/briefs/overview.pdf accessed 21 August 2006).

Table 4:

Links between energy and the eight Millennium Development Goals

GOALS (MDGs)	ENERGY LINKS
To eradicate extreme poverty and hunger	Energy inputs such as electricity and fuels are essential to generate jobs, industrial activities, transportation, commerce, micro enterprises and agricultural outputs.
To achieve universal primary education	To attract teachers to rural areas electricity is needed for homes and schools, After dusk study requires illumination. Many children, especially girls do not attend primary schools in order to carry wood and water to meet family subsistence needs.
To promote gender equality and empower women	Lack of access to modern fuels and electricity contributes to gender inequality. Women are responsible for most household cooking and water boiling activities. This takes time away from other productive activities as well as from educational and social participation. Access to modern fuels eases women's domestic burden and allows them to pursue educational, economic and other opportunities.
To reduce child mortality	Diseases caused by unboiled water, and respiratory illness caused by the effects of indoor air pollution from traditional fuels and stoves, directly contribute to infant and child mortality.
To Improve maternal health	Women are disproportionately affected by indoor air pollution and water and food borne illnesses. Lack of electricity in health clinics, lack of illumination for night time deliveries, and the daily drudgery and physical burden of fuel collection and transport all contribute to poor maternal health conditions, especially in rural areas.
To combat HIV/AIDS, malaria and other diseases	Electricity for communication such as radio can spread important public health information to combat deadly diseases. Health care facilities, doctors and nurses, all require electricity and the services that it provides (illumination, refrigeration, sterilisation etc.).
To ensure environmental sustainability	Energy production, distribution and consumption has many adverse effects on the local, regional and global environment; these effects include indoor, local and regional air pollution; local particulates; land degradation; acidification of land and water; and climate change. Cleaner energy systems are needed to address all these effects and to contribute to environmental sustainability.
To develop a global partnership for development	The World Summit for Sustainable Development (WSSD) called for partnerships between public entities, development agencies, civil society and the private sector to support sustainable development, including the delivery of affordable, reliable and environmentally friendly sustainable energy services.

Source: UNDP 2005:2-5; UN 2006:1

Although none of the eight Millennium Development Goals deals directly with energy '*access to energy services is a prerequisite to the achievement of all the eight MDGs'* (UNDP 2005:1; see also (UNDP 2005:1; UN 2005: 1-3). However, this will most probably prove to be a mammoth task because energy has been treated as a poor and second cousin to agriculture and other development sectors for quite some time (see Annecke 2003:19). According to the ITDG (2004) few, if any, the MDGs will be achieved without improved access to energy sources.

The links between energy and the MDGs are of crucial importance because issues of poverty, gender, education, employment, HIV/AIDS and environmental conservation addressed in the MDGs are closely intertwined with energy consumption patterns and the role of electricity as a development incentive. The most obvious and important links are indicated in Table 4 (see UNDP 2005:2-5; UN 2006:1).

The fact that access to energy and poverty reduction is closely linked was not recognised until the late 1980s. Agenda 21, which was among the first to recognise the role of energy in development, came into effect only in 1992 after the Rio Conference. Agenda 21[8], *inter alia* advocated the establishment of rural energy programmes that included the following (see Makan 1994:2).

- Initiating and encouraging transition of a diversified and environmentally sound energy structure by making new renewable sources of energy available.
- Increasing the energy inputs available for households and for agro-industrial needs through planning and appropriate technology transfer.
- Implementing those programmes that favour the development of renewable energy sources and energy efficiency.

In spite of its noble ideals most of the strategies that were advocated by Agenda 21 have unfortunately remained pipedreams as far as energy issues are concerned (see Leach &

[8] Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by the United Nations, governments, and major groups in all areas in which humans impact on the environment. It was designed to protect and encourage nations to move towards achieving sustainable development in the 21st century. (http://www.esd.rgs.org/glossarypopup.html).

Mearns 1988:3; Makan 1994:2).

Currently, it is accepted that energy issues and poverty reduction efforts have to be integrated. The Intermediate Technology Development Group[9] (ITDG) (2004) even developed a pro-poor energy policy agenda for integrating energy into poverty reduction programmes. This agenda was put in the limelight during the International Conference for Renewable Energies held in Bonn in June 2004. The following objectives formed part of the pro poor energy policy agenda:

- **Putting energy at the heart of poverty reduction.** Among other things this should be accomplished by integrating energy in poverty reduction strategy papers (ITDG 2004). This idea is also advocated by authors such as Mapako and Mbewe (2004:1); Pachauri (1993:10) and Toman and Jamelkova (2003:94) who bemoans the fact that social scientists have ignored the role of energy in development for so many years.

- **Supporting sustainable energy options for the poor.** ITDG (2004) argues that development aid should realise that the primary energy need for the poor is cooking and the second priority is to increase access to off-grid electricity in rural areas. The locally defined needs of the poor should be sought and respected (see also Clark 1998:58; Crew & Harrison 2002:14-15; Madubansi 200:103; Ramachandra & Shatri 1996:17).

- **Developing financing mechanisms to reach the grassroots.** Developing financial mechanisms to reach the grassroots should be acknowledged as a crucial component of poverty-reduction efforts because they can provide leverage to the poor when they want to access commercialised energy sources such as electricity.

[9] ITDG (Intermediate Technology Development Group) is currently known as 'Practical Action'. It was founded in 1966, as ITDG, by the radical economist DR. E.F. Schumacher to prove that his philosophy of 'small is beautiful' could bring real and sustainable improvements to people's lives

However, extreme care should be taken with credit schemes since such schemes may lock the poor even firmer in a vicious cycle of poverty through debts (Toman & Jamelkova 2003: 94).

- **Increasing national capacity for sustainable energy.** Developing countries' capacity to promote sustainable energy for development needs to be strengthened. In this regard the focus should be on basic national assessments of potential local renewable energy resources, quality assurance to ensure reliability and consumer confidence in the available technologies, business and technical training, and the strengthening of business development services. Service providers must provide support for small and medium enterprises and local financial institutions must be encouraged to target renewable energy as a sound investment.

- **Leveraging private sector partnerships to target the poor.** There is a dire need to support the intervention of the private sector in the energy sector as part of the latter's social responsibility.

- **Engaging the poor as active change agents.** Poor people should be employed as change agents in development initiatives. The poor should be active participants in the energy projects that they are supposed to benefit from. According to Leach and Mearns (1988:24) poor people should be involved in shaping their destiny and devising energy strategies that are specific to the type of poverty in their communities. Burkey (1993:56) quotes Paulo Freire, the father of popular participation who argues that poor people should be treated as actors and not objects of development.

- **Best practice in knowledge sharing.** Learning from the good practices of the past and from other countries is highly important. Such sharing will incrementally enhance the south-to-south technology transfer, experience and knowledge which is vital in poverty reduction.

2.4 THE NECESSITY OF ENERGY POLICIES AND INSTITUTIONAL FRAMEWORKS

According to Annecke (2003:258; see also UNDP 2004:15) energy policies are concerned with the use of energy as a development tool and should therefore be regarded as an essential component of all development programmes and projects. In this regard, Thom (1994:iii) asserts that, although energy policies provide a framework for energy planning they are often non-existent in developing countries and where they do exist, they generally have an elitist bias and are deeply entrenched in modernisation thought and its concomitant top-down approach (see Learch & Mearns 1988:24-26). In practice the poor do not get the opportunity to participate actively in formulating the energy policies that will affect them. If this is the case, energy for development may not really benefit the poor at all (see Aldrich 2001:23).

Energy for development policies emphasise the role played by subsidies in assisting the poor to access affordable energy services. While energy subsidies may be regarded as a noble venture, they often do not reach the intended beneficiaries. As a result the poorest of the poor continue to suffer even when the subsidies are available. Cases in point are China, Ecuador and Indonesia where the rich and the middle class hijacked energy subsidies. Reference is made to these countries as they can provide a learning case for Zimbabwe. Thus, subsidies did not bridge the gap between the rich and the poor but rather increased it. Moreover, if energy development programmes are to play a significant role in the alleviation of poverty, it is imperative for the poor to actively participate in fuel pricing and energy policy making (see Barnes & Floor 1996:518).

For energy policies to be effective it is imperative to establish functional institutional frameworks. In the developing world this seldom happens (see Vedavalli 1995:47; UNDP 2004:15). Barnett (2001:1-6) provides examples of eight institutions that may support energy policies and indicates the responsibilities of each:

- **National governments** are responsible for supplying electricity and for creating much of the 'enabling environment' that are required for efficient public and

private sector development. They are also the main source of subsidies, price control and taxes on imported energy conversion technology as well as the main regulator of the type of ownership and degree of competition at each part of the energy supply chain.

- **Local Governments** are responsible for small-scale energy (particularly the rate and direction of grid), for transport infrastructure (which affects the availability and costs of fossil fuel delivery), and for the issuing of permits associated with small-scale energy retail business as well as for access to communal resources such as water.

- **Community level institutions** determine community ownership of energy projects and are therefore important in the mobilisation, organisation and development of schemes to introduce decentralised energy supplies (diesel, mini-grids, etc).

- **Firms a**re responsible for energy services and, in partnership with governments, for supplying energy related infrastructure. Small and micro firms are likely to be the main actors in the supply and use of improved energy services that are used by poor people.

- **Non-governmental Organizations (NGOs)** play a major role in interventions to improve energy services at the local level (e.g. the introduction of appropriate energy technologies and organising community-based initiatives to meet locally defined energy needs). They are, however, often restricted by limited funds, inclination, or expertise to a limited range of technical options.

- **Laws** regulate the provision of energy services (including public health and safety), as well as the tender procedures and determines the monopoly powers of the state.

- **Gender relations** determine how energy assets and technologies are used. Women

are the main users and suppliers of energy at the household level in poor communities. The poverty impact of energy related interventions will be largely determined by end use technologies that are adopted, and the gender impact will in turn depend on the extent to which women are empowered to choose.

- **Other power relations** such as village hierarchies, caste, belief systems, etc. can play an important role in determining the space in which energy services can be improved (access to common property resources for firewood collection; access to credit; access to information; the 'rights' to set up retail outlets). Religious beliefs are particularly significant in determining cooking practices and the use of certain types of fuel (pig waste, human waste, etc).

2.5 ENERGY CONSUMPTION

2.5.1 HOUSEHOLD ENERGY SOURCES

Having made the above submissions on the role that income plays in determining energy sources, it is important to provide an overview of household energy sources in Africa. This information about energy sources is important in analysing consumption patterns and in performing needs analyses. Table 5 (from Mapako & Mbewe 2004:22) provides an overview of the percentages of specific types of fuel that are used for cooking in rural areas in those African countries for which comparable information is available.

From the table below it is clear that energy consumption patterns differ from one country to the next and that there are variations with regard to the fuel sources that are used. In the rural areas of many countries people are clearly still using inferior energy sources which supports the findings of Charon (2005), UN (2006) and WHO (2006). The major reason for this is the prevalence of poverty in rural communities; many households live below the poverty line and this makes it impossible for them to adopt 'modern' energy sources such as electricity (UN (2006). The table also confirms the presumption that electricity access in rural Africa is still very low. According to Karekezi, Kimani, Majoro & Wambile (2005:2) 57% of an estimated 1.6 billion people (about 57% of the total population) do not have access to

electricity.

Table 5:
Percentage of specific types of energy sources utilised in the rural areas of selected African countries

Country	Firewood	Gas or Kerosene	Charcoal	Electricity	Other
Central African Republic	100	0	0	0	0
Guinea	99	0	1	0	0
Gambia	97	1	1	0	0
Mali	97	0	0	0	2
Tanzania	96	0	3	0	0
Madagascar	94	0	5	0	0
Uganda	94	2	4	0	0
Kenya	93	2	4	0	0
Burkina Faso	91	1	1	0	7
Niger	90	1	0	0	9
Cote d'Ivoire	89	1	2	0	8
Zambia	89	7	9	1	1
Botswana	86	14	0	0	0
Senegal	84	2	12	0	2
South Africa	49	23	5	21	2
Djibouti	44	48	5	1	2

Source: Mapako & Mbewe 2004:22

It may therefore be concluded that electricity and gas are still scarce commodities in Africa. In contrast to South Africa, which has rural electricity access of 21%, all the other countries in Table 5 have an electricity access of below 5%.

2.5.2 THE NECESSITY OF STUDYING ENERGY CONSUMPTION PATTERNS

In spite of the fact that energy consumption patterns did not receive due attention in the literature (see 1.1) it remains undisputed that these patterns form the backbone of energy intervention strategies at all levels (see Barnett 2000:14; Foley & Moss 1985:12).

Understanding the multi-faceted nature of energy consumption widens the options of energy planners in energy planning and an appreciation of energy consumption patterns requires not only an understanding of the patterns themselves but also of the people who are involved in shaping them.

Energy consumption patterns and fuel use practices are embedded in specific social contexts and cannot be divorced from the cultural beliefs and practices and the social structure of a particular society (see Bank 1999:128). Yet, '*remarkably little is known about what actually determines the patterns of domestic energy use in the developing world*' (Foley & Moss 1985:12). Gata (1995:15) and Mwanza and Pashkov (1995:143-144) point out that 80% of the total household energy consumption in developing countries results from cooking. A study of energy consumption patterns should therefore start but not end at household level. In this regard it should be noted that in the past there has been a tendency among policy makers to view households as homogeneous entities with uniform consumption patterns. Researchers have concentrated on the household rather than on the intra household activities (Ross 1992:44). Eberhard (1992:19) contents that such a view is problematic because energy utilisation patterns vary substantially from one household to another.

Rossouw and Venter (1993:87) argue that although there is a mutual relationship between income and the type of fuel source used, the role that income plays in consumption patterns has been overestimated with the result that knowledge, attitudes, behaviour and practices of households were often ignored. Mapako and Mbewe (2004:22) add that policy makers are not well informed about the factors that determine energy choices. Hence they only focus on income as the major determinant of consumption patterns. This has resulted in misdirected interventions such as the solar programmes (especially the solar cookers) (Kroon 2004:3). According to Kroon (2004:4) solar cookers were unsuccessful in Africa because planners and technicians did not take 'trivial' issues such as cooking time, cooking position and the climate into account.

Although many scholars view energy consumption at household level as a simple act, evidence on the ground points to the opposite. According to Annecke (1993:50) issues of

control, decision-making and power, which are viewed as trivial, play a pivotal role in deciding what type of fuel is used and how it is used. Bank (1997:159) adds that the power struggles within households also influence energy utilisation patterns. Factors such as these also affect energy consumption patterns at macro level (community and national level), though on a different scale. Energy consumption patterns are, therefore, part of the overall survival strategies of households and not merely an assessment of one variable (Ross 1992:44; see also May 2000:156).

2.5.3 THE MAIN ENERGY CONSUMPTION THEORIES

There are three major theories that have been propounded to explain energy and development in developing countries, *viz*. the Energy Transition Theory, the Leapfrogging theory and the Gap theory. They will be discussed briefly.

THE ENERGY TRANSITION THEORY

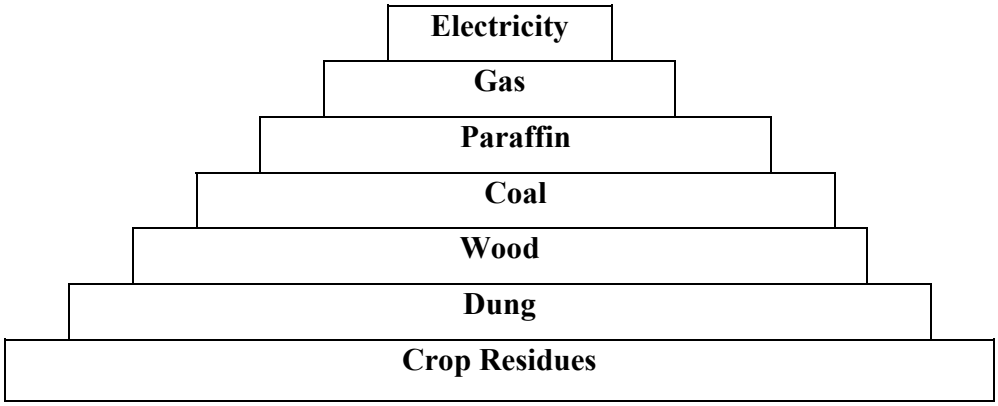
The energy transition theory is a popular theory in energy circles and has played a pivotal role in influencing energy studies. According to Campbell,Vermeulen, Mangono and Mabugu (2003:553) and Davis (1998:207) this theory proposes that there is always a *'ladder of fuel preferences*' from low quality fuels such as biomass to high order, modern fuels such as electricity. Banda and Tinto (2003:5) further argue that the Energy Transition Theory classifies energy resources into types based on their modernity, efficiency, cleanliness and convenience. Ross (1993:44) and Madubansi (2003:11) add that according to the Energy Transition Theory the major determinant for moving to a higher order fuel is increased income; people will abandon lower order for higher order fuel types as their income increases. The energy pyramid (see Figure 2 below) is used to explain and describe this theory. At the base of the pyramid are '*traditional, dirty and inconvenient fuels'*, with '*convenient and clean fuels'* at the apex. (see Madubansi 2003:11).

Although the Energy Transition Theory is highly regarded in energy debates, it has been widely criticised because it fails to explain the complex nature of consumption patterns. It is

against this background that Bank (1999:31-33); Davis (1998:207) and Ross (1993:44) argue that a rise in income is not the only factor that determines households' fuel choices because power relations, the type of food being cooked, gender, and culturally determined beliefs and practices come into play in choosing fuel type. In fact, Madubansi (2003:12) found that even when income increases, households do not follow clear phases in taking up new fuel types as the theory proposes. Besides, multiple fuel use has been found even in households that have a high income (Bank 1999:31-33).

Figure 2:

The energy pyramid



Source: Madubansi 2003:12

In a study done in East London (South Africa), Bank (1991:131) found that domestic energy use patterns rarely follow a clear progression from traditional technologies to modern technologies. In fact, he observed that even in electrified households '*there was a strong and enduring commitment to use a variety of non electrical sources*'. He also concluded that energy use patterns are influenced by the context and type of activity being carried out and that energy consumption patterns change in dynamic, different, complicated and non-directional ways (Bank 1999:131-132). In this regard Friedman (1994:1) argues that energy consumption is a complicated subject, which must be understood in the context of life strategies. He believes that consumption patterns have to be viewed as a social phenomenon and not merely as an economic process where research findings are expressed in terms of money, numbers and services. This nullifies to an extent, the opinion that is held by the proponents of the energy transition theory that rural energy patterns follow and evolve through

a set of phases that are predetermined as people climb the energy ladder (Bank 1999:131; Banda & Tinto 2004:2-4).

From the above, it is clear that although the Energy Transition Theory informed and still informs rural energy technology debates in developing countries, researchers working at grass roots level are highly critical of it and there are even indications that it is partly to blame for the failure of rural energy technologies such as the improved stove programmes (see 2.6). It is also clear that more extensive research on energy consumption patterns in rural areas is a necessity (Mapako 1997:1).

THE LEAPFROGGING THEORY

Leapfrogging is a theory of development in which developing countries skip inferior, less efficient, more polluting technologies and industries move directly to more advanced ones without going through the intermediate stages that occurred elsewhere. A familiar example is that of countries which jumped the phase of landlines to cellular phones (http://en.wikipedia.org/wiki/Leapfrogging). Leapfrogging can be an alternative to development as a catching-up process. In theoretical contexts the term is often used to explain how newly industrialised economies (for example South Korea) 'jumped' stages of industrialisation to catch up with advanced countries by 'assimilating and adapting the more or less obsolete technology of the advanced countries' (Madubansi 2003:12). In the energy field the Leapfrogging Theory is used to explain a direct transition from traditional energy sources such as biomass, to modern energy sources, such as electricity (see Madubansi 2003:12).

In the context of energy, this theory however has loopholes in that it fails to explain multiple fuel uses and fails to articulate what causes households to skip from one energy source to the other. Moreover, the theory is based on make belief scenarios because it does not take into account the fact that government policies can have a negative impact and ultimately hamper the act or process of leaping forward. Due to the fact that change is

always a contentious issue, governments may at first resist new and innovative ideas in favour of the old ideas that they are used to (Brezis, Krugman & Tsiddon). Brezis *et al.* (1993:2) further argue that institutional inflexibility at any level can also negatively impact on leapfrogging. Furthermore, the culture of the beneficiaries may act as a stumbling block for the success of leapfrogging. On the local level, households may also refuse to leap forward owing to cultural reasons; in fact they may actually go backwards as this may be in their best interest.

THE GAP THEORY

In energy debates, the Gap Theory is primarily concerned with the question of supply and demand of firewood (Eberhard 1992:19). The theory proposes that a growing gap between demand and diminishing supplies would need to be met primarily by increasing the supply of wood through forestation and by regulating demand through the introduction of more efficient stoves. The firewood crisis is thus conceptualised in terms of a 'gap' in firewood supply, which occurs when consumption exceeds supply from forests and woodlands. The gap, it is argued will widen as consumption increases due to population growth (Annecke 1998a: 38; Eberhard 1992:19).

This theory has been criticised by scholars such as Hosier (1998) see also Leach and Mearns (1968) because of its over-reliance on large–scale aggregation of data that tends to blur local surpluses and deficits. The basis of the criticism is that the data on consumption and supply is often inaccurate and that the national or regional models that are used tend to blur local variations (Bank 1997:319). It is therefore Gandar's opinion that many of the estimates of wood consumption in the developing world '*can best be described as educated guesses*' (see Annecke 1998a: 38).

As articulated before, it must be emphasised that household consumption vary enormously. It is therefore very difficult to make reliable estimates of wood supply from an area with vastly differing tree species. In this regard, Leach and Mearns (1988:8) adds that '*large scale aggregate perspectives of the gap theory help to obscure the fact that wood fuel*

problems are location specific'. According to Leach and Mearns (1988:8) the World Bank has been criticised for endorsing the Gap Theory on the basis of the study they carried out in 1984. In this study the World Bank argued that Sub Saharan Africa needed to increase tree planting by fifteen-fold to close a projected gap that would occur by the year 2000. This later proved to be empirically wrong (Leach & Mearns 1988:8).

2.5.3 ENERGY CONSUMPTION PATTERNS BY END USE

Due to the emphasis on income in determining energy consumption patterns at household level, it is important to provide a brief indication of the types of energy used in developing countries, the different end uses of energy and the link between end use and income. Table 6 below (adapted from Mapako & Mbewe 2004:22; World Bank 1996:25) provides an indication of rural energy use patterns in Sub Saharan countries by end use.

Table 6:
Rural energy use patterns by end use in Sub-Saharan Africa

END USE	RURAL HOUSEHOLD INCOME		
	LOW	**MEDIUM**	**HIGH**
Cooking	dung, residues, wood	dung, residues, wood, kerosene and coal	wood, kerosene, coal, LPG, biogas
Lighting	kerosene, candles	kerosene[10], candles and batteries	Kerosene, LPG and electricity
Space heating	dung, residues, wood.	dung, residues, wood, kerosene and coal	kerosene, LPG, electricity, dung, residues, wood, kerosene and coal
Other appliances	None	grid or genset[11] based electricity	grid or genset based electricity and batteries

Source: Mapako & Mbewe 2004:23

[10] The term kerosene and paraffin is used interchangeably in this dissertation.
[11] A genset is a portable power generator, which converts fuel into electrical power by mechanical means.

From the table above it is clear that low-income households tend to use inferior sources of energy such as dung and residues. This supports, to some extent, the Energy Transition Theory articulated before. The table also indicates that middle class households tend to use relatively better fuel sources that are less polluting (e.g. kerosene, batteries, and candles). According to the Energy Transition Theory, this is because of insufficient funds, which forces households to mix poor and relatively better energy sources.

High-income households use more modern sources of energy; an indication of the role that income plays in sourcing energy. However, the table also shows that even high-income households can go 'backwards' to inferior energy sources. This is in diametrical opposition to the Energy Transition Theory and indicates that income may not be the only determinant in selecting energy sources.

2.6 TECHNOLOGY TRANSFER AND DISSEMINATION

Development proponents regard technology as a vital key to development or even synonymous with it (ITDG 2004:2-3; Stamp 1989:51-54). This idea is endorsed by the Brandt Report (1980:193 in Crew & Harrison 2002:31) which state that '*the developing countries' major weakness is that of lack of access to technology or command of it'*. Thus disciples of the technology paradigm view technology as a magical key that unlocks doors to development and reduces poverty in rural areas. Despite the apparent problems about 'indigenous' as opposed to 'technical' expertise, the perceived need for technology in rural areas remains topmost in the development industry. Actually the term technology has become a buzzword in development agendas (Crew & Harrison 2002:33; Stamp 1989:1). There is a very important relationship between rural energy technologies, energy consumption patterns and development.

Rural energy technologies have been at the centre of the energy debate for a long time. In the early 1980s improved cooking stoves were introduced in Zimbabwe and elsewhere with the aim of changing energy consumption patterns and more specifically to reduce the use of

firewood in order to curb environmental degradation (Hosier 1988:142; Mapako & Mbewe 2004:58).

It was erroneously believed that rural people refuse to accept, adapt, and sustain improved technologies because of their 'backwardness' and 'ignorance'. More specifically, it was believed that the traditional three-stone-fire wasted firewood and that a more 'sophisticated' stove technology would cause rural people to reduce wood consumption (Stamp 1989:1). As mentioned before, improved stoves[12] were implemented in Africa in the hope that this '*appropriate technology'* would change the consumption patterns of rural households. However, the programme failed dismally. Table 7 (adapted from Mapako & Mbewe 2004) provides an indication of the magnitude of the dissemination of improved bio-fuel stoves in a number of Sub-Saharan countries. Taking the funds appropriated for the dissemination of stoves into consideration, relatively few households have been reached.

According to Mapako (1997) the chief weaknesses of the improved stoves were that they started up and cooled down very slowly which became a problem in hot and cold weather. Insufficient space heating especially in the winter season and too much heat during the summer season (especially in Southern Africa with its mixture of very cold winters and very hot summers) also militated against the effectiveness of the stoves. The chimneys were usually wrongly placed with smoke being forced into the cooking space and the stoves were not compatible with the ceramic (clay) pots that are still widely used in rural areas. Last but not least, the stoves were often positioned in such a way that women had to cook standing in front of everyone in the kitchen often with her back to her guests. This is taboo in several African cultures (see poem on page v).

The improved stoves programme failed dismally and by the late 1980s Africa (and other developing countries) became littered with defunct improved stoves. In Zimbabwe, over 95% of such stoves are currently defunct and deserted (Mapako & Mbewe 2004:75).

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[12] Although generically the same, different names have been used for bio-fuel stoves in different areas, *viz.* the *jiko*-stove in Kenya, the *chingwa*-stove in Zimbabwe, the *nkokonono*-stove in Lesotho and the rocket-stove in Uganda.

Eventually in the late 1990s, because of the widespread failure, donor organisations dismissed the idea of improved cooking stoves and withdrew their aid from the programme completely (Crew & Harrison 2002:32; Hoffman *et al*. 1982:7).

Table 7:
Number of bio-fuel stoves disseminated in selected Sub-Saharan countries

Country	Number of stoves disseminated
Botswana	1.500
Malawi	3.700
Zimbabwe	20.880
Sudan	28.000
Ethiopia	45.000
Eritrea	50.000
Uganda	52.000
Tanzania	54. 000
South Africa	1.250.000
Kenya	1.450.000

Source Mapako & Mbewe 2004:35

Zimbabwe has had more than 20 years of disseminating energy technologies; however failure has been the order of the day in the dissemination process. According to Mapako and Mbewe (2004:58) biogas plants were also an overall failure, 95% of wood stoves were abandoned, and the solar energy system borders on failure.

Many researchers were commissioned to find out why this '*noble technology*' failed. In most instances it appeared that technologies were rejected by communities for sound cultural and environmental reasons (see Crew & Harrison 2002:32; Stamp 1989:59; Hoffman 1982:7). The poor have their own unique ways of energy conservation but because the energy transition theorists believed that rural people are only climbing the energy ladder if they opt for commercial energy sources, 'local' energy utilisation and conservation strategies were

considered to be inferior (see Banda & Tinto 2004:5). Stamp (1988:51) probably sums up most research findings when she points out that the 'outsiders' who were responsible for the stoves programmes did not take rural fuel use and gender dynamics into consideration; indeed the stove models violated a lot of rural customs and social practices. Stamp (1989:1) emphasises that researchers and policy makers fail to comprehend that '*technology is an attitude of mind and not an assemblage of artefacts*' and that developers need to understand that technology is actually a social construction of the society's history and an active social force (Stamp 1988:1). Technology transfers have carried with them a '*Trojan horse of western ideology'* (Stamp 1989:1) which is often incompatible with the developing world's view of development (Ferguson 1990:18; Stamp 1989:51).

According to Crew and Harrison (2002:31) '*it is often assumed that technology can tame the natural environment as well as act as a catalyst towards a more productive economy. It is therefore seen as a key to poverty alleviation*.' Crew and Harrison (2002:31) further assert that technology development programmes are a western generated idea that has served to perpetuate a relationship of subordination and dependence of the developing world on the developed world.

Although rural energy technology programmes[13] present developing countries with an opportunity to reduce poverty, it is indisputable that they have failed to meet their advertised objectives (see Rouse 1999:10-12). This shows that sometimes technology on its own cannot bring the desired results because it is not an end in itself (Lennon 1999:45). Moreover, it should be stressed that energy technologies should meet the felt needs of beneficiaries (Rouse 1999:10-12).

2.7 ENERGY AND RURAL INCOME GENERATING ACTIVITIES.

Rural income generating activities remain one of the best ways to provide economic

[13] Several rural energy technologies were being implemented in Africa from the 1970s. These were the improved stoves programme, solar energy technologies (this includes a variety of solar PVs, solar cookers and heaters), biogas, grid electricity and mini hydro electricity.

stability and food security in rural areas of the developing world. Such activities form part and parcel of the energy consumption patterns of rural dwellers. More often than not, policy makers are insensitive to the energy needs of small income generating activities because such activities are home based (Mapako & Mbewe 2004:13). Therefore, the role of energy in non-farming income generating activities has continuously been ignored. Due to the fact that energy and rural income generating activities are ignored, the existing literature fails to provide useful detail on energy and rural income generating activities.

Table 8:
Assets that are important in rural income generating projects

Capital Asset	Link with energy intervention/improvement
Social Capital Social resources on which people draw in pursuit of livelihoods i.e. relationships, members of networks.	• Networks and social relations often determine individual's access to natural resources, access to energy conversion technologies and access to other people's skills.
Physical Capital Basic infrastructure for energy, shelter, water, transport, communication, production equipment.	• Access to energy sources. • Access to technology required to convert energy into a useful form e.g. machines. • Production technology that enables inanimate energy to replace the drudgery of human labour. • Transport services depend on access to reliable and reasonably priced fuels.
Financial Capital Financial resources available which provide livelihood options e.g. savings, credit, remittances.	• Cheaper, more convenient fuels (and the associated conversion technology) increase in labour and decrease the costs of production and product prices. • Cheaper and convenient energy sources that can be easily utilised in SMEs • Capital base to start SMEs

Source: Barnett 2001:13

Barnett: (2001:3) lists the different assets, which are prerequisites for rural dwellers to become entrepreneurs and also indicate how these assets are linked with energy interventions (improvements). These assets and the linked interventions are indicated in Table 8 (see Barnett: 2001:3).

From the exposition below it is clear that a multitude of variables are involved in income generating projects. These have to be taken into consideration when pursuing income-generating activities that utilise energy sources. This is because rural people's failure to be enterprising is mainly due to the unavailability of such assets. As indicated in the table above, there is interplay of various assets. This contradicts economic theories which propound that income is the only asset that is important in rural Small and Medium Enterprises (SMEs). Without social and physical assets they are bound to fail. This has to be critically considered in rural credit schemes because many rural credit schemes have failed to turn around the fortunes of the rural poor because they do not address the other important variables mentioned above that are also common denominators in rural SMEs.

2.8 ENERGY, POLLUTION, AND ENVIRONMENTAL CONSERVATION

Households in developing countries are characterised by the use of inefficient and polluting energy sources (Banda & Tinto 2004:1; Leach 1999:2; Huismans 1995:40; Kotze 1996:40; Lennon & Du Toit 1995:43). The effects of such pollution on the health and safety of rural families is rarely explored with the commitment it deserves. Whilst there has been a lot written on the effects of **outdoor** air pollution, nothing much has been done on **indoor air** pollution. There has been a lot of international backing for out door air pollution especially regarding climate change but the same has not happened with regard to indoor air pollution. Cecelski (2005); Charron (2005); Mishra (2003) and Smith (2003; 2002; 1999) are some of the handful of authors who have written on the subject of indoor air pollution. They have, however, largely concentrated on the diseases that are caused by indoor air pollution (such as lung cancer, low birth weight, tuberculosis, respiratory diseases, pneumonia, asthma etc.).

Mapako and Mbewe (2004:23) argue that about 4 to 5 million children die every year

in the developing world with illnesses such as acute respiratory infections, which are mainly caused by indoor air pollution. According to the WHO (2005:1) indoor air pollution is responsible for the death of 1.6 million people (that is one death every 20 seconds) annually. Authors like Bruce (2000:1) put the figure at more than 3 million while Rehfuess (2006:508) puts the figure at 4000 deaths per day. Moreover, Charron (2005:12) indicates that particulates in kitchens in developing countries average between 200m^3 and 500m^3, which are far above the recommended WHO levels. The WHO will soon rank the sustained household exposure to burning solid fuels as the fourth or fifth highest global risk to health after malnutrition, bad water sanitation and HIV/AIDS. Women of all developing countries spend anywhere between 2 and 9 hours each day cooking and collecting fuel and fodder. A study in Uttarachal, India found miscarriages to be five times the national average and linked it to heavy load bearing during pregnancy. In Nepal women suffer high incidence of uterine prolapse that is in all likelihood linked to carrying heavy loads of wood soon after childbirth. Men of the developing countries spend 10 times less on such daily drudgery (see Cecelski 2002:31). However it should be noted that the above figures are subject to debate because the method used to calculate the figures is flawed.

It is clear that there is a conspicuous dearth in the literature on indoor air pollution and governments have failed to appreciate the severity and seriousness of the problem. Moreover, the existing studies do not critically examine why rural people perpetuate behaviour that exposes them to indoor air pollution, and do not critically examine the role of energy consumption patterns in indoor air pollution.

Sustainable use of energy presents developing countries with an opportunity to halt excessive pollution as well as the degradation of their natural environment. However, there is an ongoing debate on whether the use of firewood leads to deforestation. Ardayfio-Schandorf (1992:413), Dankelman and Davidson (1998:68) and Hosier (1988:167) point out that the argument that the use of firewood is the major cause of deforestation in rural areas, is based on misinformation and that it diverts attention from the principal causes of deforestation, namely the clearing of trees for agricultural and housing purposes. They argue that rural people rarely cut down trees but rely on dead wood for cooking purposes.

Elliot (1998:13) and Mapako and Mbewe (2004:68) on the other hand, advance the argument that the cutting of trees for firewood purposes significantly increases deforestation. ZERO in Mapako and Mbewe (2004) point out that activities such as beer brewing can use on average 3.36 tonnes of firewood per annum. Since the debate on deforestation is beyond the scope of this dissertation, only the role of energy in environmental conservation will be addressed briefly.

Energy programmes such as the improved stove programmes and rural electrification are all aimed at sustaining and saving the environment. However, Leach and Mearns (1988:3) point out that these energy strategies have failed in enhancing environmental conservation programmes. They argue that '*while there have been a few successes with these energy focussed efforts most have failed to turn the tide of wood depletion or prevent growing pockets of wood scarcity*'. In as much as it is acknowledged that many energy efforts have failed to hinder deforestation, it still stands that sustainable energy programmes can go a long way in enhancing environmental conservation.

The hopes of abetting deforestation in rural areas by implementing wood stoves were dashed when rural people refused to accept the stoves. Thus, it is very difficult to determine whether the stoves would have had a meaningful impact on deforestation. Currently, there are also no studies that have been done to determine whether there is a correlation between rural electrification and deforestation. Theoretically, rural energy technologies including electricity have great potential to foster environmental conservation. There is also a strong assumption that rural electrification will automatically lead to environmental conservation. However, this is not what happens in practice. It is increasingly being recognised that electrified rural households do not cease to use firewood (Bank 1999:130-31; May 2001:155; Rossouw & Venter 1993:92-93). The case study of Orange Farm in South Africa clearly shows that, even where electricity exists, poverty and environmental degradation can form an unrighteous union. Thus Annecke (1998:124) concludes that electrification might not offer the desired cure for environmental degradation.

2.9 GENDER AND ENERGY CONSUMPTION

Although many energy experts treat energy and gender as separate entities, it has recently been indicated that they are closely integrated issues. Clancy *et al.* (2004:1) defines gender as '*the socially constructed roles of women and men rather than biologically-determined differences' and emphasises that the gender roles of men and women, with their accompanying responsibilities, constraints, opportunities and needs are defined by a particular society'*.

Unfortunately the gender concept has not really permeated the literature on energy (see Clancy, Skutsch and Batchelor 2004:1; Gqalangile 2003:15). In most instances the focus has merely been on efforts to solve the problems of 'women'. As a result, the link that exists between gender and energy issues have received very little attention. Nevertheless, gender plays a pivotal role in shaping energy consumption patterns and survival strategies and still determines access to energy sources at household, provincial and national level (see Banda & Tinto 2004:1-2; Hooper-Box 1999:18-19; May 2000:156). Clancy *et al*. (2004:1-2) emphasises that a gender perspective on energy production and consumption patterns is important not merely because 'men and women often use, are impacted on, or benefit from energy services differently but more importantly because the activities of one may impact on the opportunities of the other'.

Many authors agree that the absence of a thorough analysis of gender dynamics has been one of the major reasons for the failure of rural energy technologies (Cecelski 1987, 19995; Hoper-Box 1999:18; McDonald 2002:68; May 2000:156). Hoper-Box (1999:18-19) emphasises that '(*i)t is blindness to these sorts of gender dynamics that have meant that over the last 10 years the introduction of energy technologies in developing countries has failed'*. From the beginning, women in Zimbabwe and elsewhere have occupied the lowest position in the society due to the oppressive nature of the patriarchal system[14].

[14] Since ethnographers in the colonial era were males, the influence of women in 'traditional' Shona and Ndebele society were only reported in passing.

Patriarchy[15] is still rife in most African countries. In Zimbabwe the effects of patriarchy were further exacerbated by a colonial regime which sought to engineer class within the society on gender patterns. During the colonial era, black women were actually considered as 'chattels' of black men (Ncube 2006:3). The coming of independence ushered in a new dispensation where women had a platform to fight for their rights but unfortunately old customs die hard.

It may be argued that one of the most dreadful mistakes that have been made in the energy sector was the failure to recognise that the energy sector, just like any of the other sectors, is characterised by gender inequalities and that women still find themselves at the bottom of the social and economic ladder. It has to be stressed that the devil in gender energy matters is in the detail as well as in the specifics of how men and women access, control and use different energy sources. Annecke (2003:1) argues that the position of women has not transformed amidst the strides that have been made in the development sector. If anything, women are today often worse off than their grandmothers and great-grandmothers (Annecke 2003:1). With the steps that have been made in development, it was assumed that the position of women will follow suit but this has not materialised.

It has to be fully recognised that the way males and females view energy is very different. According to a study that was undertaken by Hooper–Box in 1999 in the informal settlements of the Western Cape in South Africa, it was found that women viewed electricity as vital for performing household and income generating activities, while men preferred electricity to other energy sources because it made it possible for them to watch TV and listen to the radio. This is only the tip of the iceberg on the different views and perceptions that men and women have on energy services. It has been realised that different energy use patterns

[15] In its narrow meaning, patriarchy refers to the system, historically derived from Greek and Roman law, in which the male head of the household had absolute legal and economic power over his dependent female and male family members. Patriarchy in its wider definition means the manifestation and institutionalisation of male dominance over women and children in the family and the extension of male dominance over women in society in general. It implies that men hold power in all the important institutions of society and that women are deprived of access to such power. It does not imply that women are either totally powerless or totally deprived of rights, influence, and resources (http://www.ruralwomyn.net/define.html accessed 12 December 2006).

between men and women are anchored in the division of labour.

Whilst there has been a gender dimension in energy programmes, such a dimension has failed to change the inequalities that exist in the way men and women utilise energy (Cecelski 1995:563; Kaale 1998:8; Gqalangile 2003:15). The methods that have been used to bridge inequalities did not really challenge patriarchy and the energy sector is still not free from its effects. Governments, researchers and energy professionals have often chosen to be silent about these effects and continued to romanticise it under the banner of culture. It is argued that donors do not want to deal with the '*hardware*' of women's issues and prefer to remain darlings of the governments (Annecke 2003:237). For the gender approach in the energy sector to be effective it has to bring about a change in position of women *vis-à-vis* men. Annecke (2000:10); Cecelski (1995:569); Parikh (1995:145) and Skutsch (1998:945) agree that gender issues in the energy sector have been depoliticised and neutralised hence they fail to challenge gender inequalities. Clancy *et al*. (2004:4) argues that there is a dire need to change the way people look at gender issues in the energy sector. She argues that the reason for the failure of the current gender approach is that it lacks social action.

Table 9:
Women's energy needs

ENERGY FORM	PRACTICAL	PRODUCTIVE	STRATEGIC
Electricity	Plumbing water (reducing the need to haul and carry water); mills for grinding; lighting improves working conditions at home	Increase possibility of activities during evening hours; provide refrigeration for food; power for specialised enterprises such as hair dressing and internet	Make streets safer: allowing participation in other activities (evening classes, women's group meetings, etc.); open horizons through radio, TV and Internet.
Improved biomass (supply and conversion of technology)	Improved health through better stoves; less time and effort in gathering and carrying firewood	More time for productive activities; lower cost of processed heat for income generating activities	Control of natural forests in community forestry management frameworks.
Mechanical	Milling and grinding; transport; watering of gardens and crop fields	Increases variety of enterprises	Transport-allowing access to commercial and social and political opposition

Source: Clancy *et al*. 2003:5

It remains indisputable that energy consumption patterns at all levels are determined by decision making power, control and access to resources. For this reason Annecke (2003:1) argues that even today, women can not easily claim their energy rights at any level because they lack control, access to resources and decision making power. Because the energy needs of males and females are not yet very clear in energy circles the interventions that have been made have failed to meet felt needs. Table 9 (above)adapted from Clancy *et al*. (2003:5) shows how different energy sources may be utilised for the upliftment of women in society.

Although not exhaustive, the above table provides a basis for an understanding of women's needs and consumption patterns. Such an analysis may form the basis of a sound genderised energy policy. In many developing countries energy policies are not gender sensitive (UNDP 2004:21-22). According to Karekezi and Wangeci (2005:15) policy makers and planners are only beginning to realise the importance of gender sensitive energy policies. In the past '*policy makers often failed to recognise gender inequalities with the result that supposedly gender–neutral energy policies discriminate against women*' (Karekezi & Wangeci 2005:15; see also UNDP 2004:28).

Karekezi and Wangeci (2005:15) point out that although there is a growing awareness of the problem among policy makers, most are still marred by either *vague policy objectives that are difficult to measure or "narrow, practical and welfare oriented policy objectives that are neither strategic nor integrated into comprehensive gender frameworks*". Table 10 adapted from Karekezi and Wangeci (2005:15) provides a summary of the gender dimension in national energy policy documents of a number of African countries.

Without data, the engendering of energy policies will remain wishful thinking. According to Feenstra (2002:41) there are five characteristics that are fundamental to a gender-aware energy policy. These are access, availability, affordability, security and sustainability of energy services. Table 11 below adapted from Feenstra (2002:4) shows the issues that should be considered for the development of a gender aware-energy policy. The table below also gives summaries of gender policies of different countries in Southern Africa.

Table 10:
Gender dimension in national energy policies of Botswana, Kenya, Tanzania and Zimbabwe

COUNTRY AND SUMMARY OF GENDER POLICY	NUMBER OF TIMES GENDER (OR WOMEN) IS MENTIONED	NUMBER OF GENDER-SPECIFIC POLICY STATEMENTS (OR MEASURES)
BOTSWANA		
Strong statements of commitment to gender equality.	Gender (5)	Policy statements (1)
Acknowledgement of women's roles and problems, but no framework to address them	Women (14)	Policy measures (1)
KENYA		
Strong statements to redressing gender imbalance.	Gender (6)	Policy statements (0)
Limited educational and welfare goals planned	Women (6)	Policy measure (1)
TANZANIA		
Strong statements of commitment to gender equality. Welfare measures planned.	Gender (11)	Policy statements (5)
Participation of women encouraged but not required.	Women (16)	Policy measures (0)
ZIMBABWE		
Limited mention of gender issues in energy documents	Gender (0)	Policy statements (1)
No explicit policy measures to address gender issues or women's interest.	Women (0)	Policy measures (0)

Source: Karekezi & Wangeci 2005:15

There is a host of undisputed evidence that women and children's health is negatively affected by poor energy sources. According to Nyoni (1997:1) and Cecelski (2005:17) women

are household managers and as a result they bear the brunt of firewood collection and they inhale the lion's share of intoxicating smoke while they are cooking. This causes acute respiratory infections, chronic obstructive lung diseases and low birth weight, and lung cancer (Cecelski 1995:566). An awareness of issues such as those indicated in Table 11 may go a long way towards the drafting of gender sensitive energy policies. However, such policies need to be backed by resources and a strong political will (Annecke 2003:285).

Table 11:
Characteristics of a gender aware energy policy

ISSUES	POLITICAL	ECONOMIC	ENVIRONMENTAL	SOCIAL
Access	Control of resources	Pricing	Access to renewables	Participation in decision making
Availability	Guaranteeing equal access and distribution of energy resources	Prices to reflect supply and demand subsidies for marginalised groups in society	Availability of renewables	Equal distribution of energy sources in society
Affordability	Promote affordable energy services	Pricing and subsidies	Subsidised price of renewables	Subsidising energy services for the poor.
Security	Regulate use of unsafe energy sources Promote safe energy	Sanction use of toxic energy sources Subsidise use of safe energy sources like renewables	Promote the use of none polluting energy	Protect men and women in collecting energy in unsafe areas
Sustainability	Promoting alternative energy sources Enabling (by legislation) the use of renewable energy	Subsidising renewable energy	Energy efficiency	Gender equality

Source: Feenstra 2002:4

2.10 RURAL ELECTRIFICATION AND DEVELOPMENT.

Electrification has emerged as the global choice for developing countries (Anton-

Louis 199:7-8). This has paved the way for rural electrification which is apparently viewed as a politically correct option in many developing countries (Annecke 1998:120). According to Gaunt (2003:45-47) rural electrification falls in the '*social electrification category'* and is aimed at poverty reduction. Electricity consumption in this sense is entirely consumptive and does not make any contribution to the national coffers. There is a euphoric support for rural electrification in the developing world and the slogan '*electricity for all*' carries with it the belief that electricity provision is a right and that electricity will answer all the energy problems and meet all the needs of the rural poor, push them up the energy ladder, elevate them above the poverty line, and save the environment from degradation (Annecke 1998:120; Gaunt 2003:45; Ranganathan 1992:1). Consequently, rural electrification is viewed as a tool for national socio-economic development (Munasinghe 1987:29). According to Annecke (1998:121) the assumption is that electricity will enhance rural people's ability to generate incomes and become economically active members of the modern society. This assumption is heavily influenced by the rural electrification process that took place in the United States of America (see Annecke 1998:120-123).

Although electricity has emerged as the choice for development, it has to be contented that the link between electricity and development has its roots in the modernisation paradigm (Anton-Louis 1997:7-8; James 1995:2). Since many of the modernisation strategies have failed to reduce poverty in the third world one sincerely hopes this will not be the case with rural electrification (Crew & Harrison 2000:8-12).

It may be argued that rural electrification liberates communities because electrical reticulation widens the development horizons of rural communities and ushers them into an era of industrialisation (Steyn 2005:4). James (1995:1) argues that the effectiveness of electrification programmes in the development of areas depends largely on whether the governments meet their advertised objectives. However, meeting such objectives largely depends on the conditions that are prevailing in a particular country or community.

There are a variety of objectives that are often associated with rural electrification. The objectives indicated by Schramm (1984; adapted by James 1995:1-2) are presented in

Table 12 below. To reinforce these objectives many governments in developing countries agree that rural electrification is a tool for development. This is validated by the South African Minister of Minerals and Energy who made the following statement: (*e)lectrification of poor communities is one of the engines of socio-economic revival. This economic revival for the poor is the core of addressing endemic poverty, creation of jobs, eradication of crime and creation of functional communities*.'

Table 12:
Rural Electrification objectives

ECONOMIC OBJECTIVES	SOCIAL OBJECTIVES	POLITICAL OBJECTIVES	ENVIRONMENTAL OBJECTIVES
To act as a catalyst for stimulating or encouraging diversity of agriculture, industrial and commercial development in rural areas. To replace more costly energy sources such as kerosene for lighting, diesel for individual motors, irrigation pumps and generators. To improve the standard of living for the rural poor.	To improve the quality of life through such means as improved quality of light and use of domestic appliance resulting in time saving particularly for women. To improve health care, education and community facilities To stem migration from the rural to urban areas. To address urban/rural bias and correct regional imbalances	Improve security and political stability	To reduce indoor pollution from fires and stoves To reduce deforestation by replacing firewood or charcoal

Source: James 1995:1-2

While the objectives above are noble they are often not understood properly and it is often difficult to list the anticipated benefits of rural electrification. Energy, Poverty and Gender (EnPoGen) studies by ESMAP are among the few that documents the benefits of rural electrification (Annecke 2005: Personal Communication). The following benefits are, however, generally assumed (see Annecke 1998:121):

- Improvement in the quality of infrastructure

- Growth of agro-industries
- Improvement in living standards
- Reduced burden on women
- Alleviation of environmental pressures
- Reduced rural-urban migration
- Less rural–urban imbalances
- Improved educational services
- Improved communication

According to Annecke (1998:121) no such list has yet been compiled for South Africa and to the best of my knowledge no such list exists for Zimbabwe either. This is despite the fact that rural electrification is implemented with the hope of increasing incomes and reducing poverty. Gaunt (2003:45) and Schuurman (2001:6) opposes this view and argue that rural electrification just like other rural energy technologies may not necessarily lead to poverty reduction and subsequently development. Schuurman (2000:6) argues that, if anything, '*such a technology will only sever indigenous people from their roots and expose them as helpless victims to the global exploitative capitalistic system that will manipulate them to consume wrong things for the wrong reasons using the money that they do not have'*. Although Munasinghe (1987:2) believes that electrification directly leads to development he also warns that electrification alone may fail to contribute to development and that rural electrification may in fact be very expensive and ineffective.

In many instances rural electrification has not gone much beyond lighting and the benefits of electrification projects are shockingly lower than were expected (African Development Bank 2001:15-16). It has been observed that people in rural areas are not utilising electricity in generating incomes. This raises the question whether there is indeed such a direct relationship between rural electrification and development (Africa Development Bank 2002:15-16; Anton-Louis: 1999:7; Gaunt 2003:47). Munasinghe (1987:29-31) holds the view that poverty and underdevelopment exist even where there are abundant energy supplies. The research carried out by Gaunt (2003:52) at Orange Farm in South Africa confirms Munasinghe's argument. Gaunt (20003) came to the conclusion that even where electricity

exists, poverty and environmental degradation can form an unholy alliance. He also found that the provision of cheap electricity at Orange Farm, failed to help households to cross the poverty line.

CHAPTER 3

AVAILABILITY AND UTILISATION OF ENERGY SOURCES

3.1 INTRODUCTION

In this chapter, the past and present consumption patterns are discussed paying special attention to how different rural households consume energy. The chapter starts with a discussion of the way in which villagers ranked energy *vis-à-vis* water, education, food and health services. This is followed by an exposition of the types of energy resources that are used as well as the way in which these resources are procured and utilised. Thirdly attention is focused on different types of energy consumption patterns. Special attention is paid to the energy consumption patterns of child headed households – the often forgotten and ignored portion of the community. The last two sections of the chapter are devoted to the issue of environmental degradation. The chapter also emphasises that the rural populace appears to be ignorant of the detrimental effects of environmental degradation caused by the use of inferior sources of energy.

The research findings on energy resources and consumption patterns in this chapter should be viewed against the backdrop of the circumstances that prevailed in the research area during the research period. In many of the rural areas of Zimbabwe people were unable to harvest more than one month's supply of food during the period in which the field research was conducted (September 2005–March 2006). The Gutu District was especially hard hit by four consecutive and catastrophic droughts in a row. Consequently, households had to survive on one meal per day. The government was unable to support rural households because the national grain reserves were depleted and the general deterioration of the economy made it almost impossible for the government to import maize. The blazing heat and the fact that most shallow wells had dried up made it impossible for households without irrigation or tap water to cultivate food gardens. Even where water was available, agricultural activities had to be downsized and large numbers of livestock perished because of a lack of food and water.

Those rural households that relied on remittances from children or other family members working in urban areas were detrimentally affected by the country wide economic crisis which made saving impossible. Many interviewees stated that they '*have been forced to surrender to fate*'. One middle-aged male summarized the feelings of large numbers of people in rural areas: '*We are living in bondage. Our suffering is like that of the Israelites in Egypt. We are only waiting for the day the Lord will be taking us away. We are tired of this suffering*'. Others emphasized that '*those who formerly sent us money have become victims of operation Murambatsvina*[16] *and can no longer help us*'. One of the many detrimental effects of Operation Murambatsvina was that large numbers of people who were actively involved in the informal sector in the urban areas were forced to return to the rural areas were they became an additional burden to those households that already found it difficult to make ends meet and who were themselves in need of outside assistance.

It was found that for a household of six to have maize meal porridge thrice daily, would mean four buckets (about 80 kg) of maize meal per month. At Z$350 000.00 - Z$500 000.00 per bucket it would mean an expenditure of between Z$1.4 million - Z$2 million per month on maize alone. If one adds another Z$ 600 000.00 that has to be spent on other basic commodities and school fees, it is clear that the average household that had an income of approximately Z$500.00 constantly found themselves on the brink of starvation.

3.2 THE RELATIVE IMPORTANCE OF ENERGY IN THE LIVES OF RURAL PEOPLE

It was considered important to determine how people in the research area rank energy *vis-à-vis* water, education, food and health services. With this in mind a ranking exercise was performed with 25 key informants, adult members of 55 households and 15 children who accepted responsibility for a child headed household. These interviewees were asked to rank

16 Operation Murambatsvina (literally '*operation trash clean-up'*) was part of the Zimbabwean government's *modus operandi* to clear up slums and to remove 'illegal' city dwellers. Although the international world condemned it as a '*man made disaster'*, no action was taken to end the atrocities. (see Britain & Zimbabwe 2005:1).

energy, water, food, and health services in order of their current importance in a household. They were then interviewed about their decisions. The findings (see Table 13 below) indicate that such rankings are indicative of energy consumption patterns and should be done more extensively by policy makers and those who are responsible for energy programmes and projects.

Table 13:
The relative importance of energy in the daily lives of interviewees

	RANKING BY 'RESPONSIBLE' CHILDREN IN CHILD-HEADED HOUSEHOLDS N = 15				RANKING BY ADULTS (25 KEY INFORMANTS AND 55 MEMBERS OF HOUSEHOLDS) N = 80			
	M N = 6	%	F N = 9	%	M N = 30	%	F N = 50	%
Food	3	50	4	44.4	10	33.3	20	40
Health services	1	16.6	1	11.1	5	16.6	11	30
Water	1	16.6	2	22.2	7	23.3	9	18
Education	1	16.6	1	11.1	6	20	6	12
Energy	0	0	1	11.1	2	6.6	4	8

The figures reflect the sentiments of people in the face of the harsh economic climate that prevailed during the period of field research. The highest priority (the worst problem/most dire need) was awarded to food; both children and adults clearly viewed food as their most pressing need and most immediate problem. One young mother made the following statement in this regard:

> *You want to talk about energy issues. Energy is not important for me. Let me tell you that what I am concerned about now is to get a plate of sadza and drinking water and to take my dying child to hospital. You cannot talk of energy before eating. Whoever wants to help us, tell them that they should first give us sadza*[17]*. Then we will listen to their stories.*'

[17] *Sadza* is the staple food of Zimbabwe.

The notion that the appalling situation in rural areas could in some way be linked to a lack of education and health services is also bourn out by the figures. However, interviewees often found it difficult to elaborate on this notion. Many of them simply emphasized that they do not have food, do not have access to water, and can no longer afford to send children to school or utilize high quality medical care. The fact that the HIV/AIDS pandemic has forced many afflicted people to seek home-based care in the rural areas has further exacerbated the situation.

In view of the above it comes as no surprise that energy was ranked very low by interviewees. However, during follow-up discussions it became clear that most people have a very limited knowledge of the real versus potential role of energy in the survival process and in local development. In concurrence with the findings of Barnett (2000), very few interviewees were able to comprehend how appropriate energy utilization could ensure (and sustain) food security at the household and national level. The sentiments expressed by interviewees also support Maslow's 'hierarchy of needs': food as a lower order need will take precedence over higher order needs (such as higher order fuels) when people struggle to survive.

3.3 MAIN ENERGY SOURCES: AVAILABILITY AND UTILIZATION

In the paragraphs below an exposition will be given of the main energy sources utilized by Zimbabweans in general and the inhabitants of the research area in particular.

3.3.1 ELECTRICITY

Interviewees agreed that electricity is the cleanest, most efficient and cost effective energy source. Even though some of them have not yet benefited from the rural electrification programme they clearly linked electricity to urbanization and modernization. Those that had benefited from rural electrification were often quite ecstatic when they recalled how electricity reduced the drudgery of their daily lives. The expression that '*we are now living in an urban*

area' (*kugara muchirungu*) was often heard and interviewees frequently remarked that they want the government to tar the gravel roads '*so that the rural areas can become even more modernized*'. Even those people who had not yet benefited from the rural electrification program indicated that they were grateful to the Rural Electrification agency for the rural electrification programme because the maize meal at the local electrified grinding mill is cheaper and that their children at school are now able to read and study after dark.

Electricity is mainly used for lighting, cooking, interior heating and income generating activities. Although electricity is cheap the members of an average rural household paid between Z$20 000.00 and Z$50 000.00 per month for the energy they consume. Very few households can afford electrical appliances such as geysers, heaters and stoves simply because they are too expensive. Even a simple two-plate stove costs between Z$2.5 million and Z$3 million (approximately US$25-US$30 at the inter bank rate and US$15-US$20 on the black market). Lights and appliances with low electricity consumption such as radios and refrigerators are the most common. Electricity is also used for income generating activities such as maize grinding, peanut butter making, carpentry, welding, sewing, irrigation and baking.

It is clear that rural electrification had a considerable impact on the energy consumption patterns of people in the rural areas. However, it was found that even households that had electricity and electric stoves and other cooking appliances continued to use firewood for cooking purposes. Many people are still convinced that some dishes (especially *sadza, mutakura* and traditional rice) can only be prepared in a pot over a fire. Some interviewees also pointed out that firewood with its sweet smelling scent adds a particular flavour to food which no electrical appliance can equal. Moreover, it is well nigh impossible to prepare food for large numbers of people on electric stoves. It was also emphasised that cooking with fire keep termites out of the thatch of the roofs and the research seems to indicate that at least for cooking purposes, electricity will not take the place of firewood overnight.

3.3.2 SOLAR ENERGY

Although interviewees were aware of the fact that solar energy is a clean and sustainable energy source it is not often utilized because solar kits are imported from South Africa and are therefore very expensive. These kits are also very difficult to repair and solar energy cannot be used for cooking and refrigeration. It is mainly used for lighting and entertainment (radios and television sets). It was often suggested that the Zimbabwean government (Ministry of Energy and Development) should manufacture solar panels locally so that they can be bought and maintained at a lower cost.

3.3.3 GAS

It was found that gas is an almost insignificant energy source in the researched areas, in Gutu District it was found that only two households used gas as a source of energy. The reason for this is that gas is extremely expensive and it is still widely believed that '*gas suffocates its users easily*'. Horror stories were told about the way in which an entire family in Mpandawana in Gutu District died as a result of gas. During discussions interviewees would often remark that even if one could afford it, gas should not be considered as an alternative energy source. That would be tantamount to '*killing your own family members'*. It was also rumoured that gas stoves are used by '*those who would like to kill their family members to please a chikwambo* (the Shona variant of *uthikoloshe)*'. The effects of these rumours and perceptions on the utilization of gas as an energy source are obvious.

3.3.4 BIO-GEL

Bio gel is a green jelly like substance that is used for cooking in Zimbabwe. The bio-gel which is manufactured in Zimbabwe is highly efficient for cooking purposes. It is sold in 500-gram packets and is often used by teachers and other civil servants working in the rural areas. A packet of bio-gel costs about Z$80 000.00 and will last for about three days. It is used with a small stove that can accommodate a pot that is large enough for a family of six. The bio-gel burns efficiently and has almost no odour. Currently, bio-gel is very difficult to

obtain in rural areas and is sold by only a few selected shops. Making it more readily available will lead to the achievement of one of the major objectives of the Ministry of Energy and Development, i.e. the provision of clean fuel to rural areas. However, more research and technical innovation is also necessary so that bio-gel can be manufactured and sold in bulk and can also be used for lighting purposes. This will go a long way towards alleviating the negative impact of paraffin use in the rural areas.

3.3.5 PARAFFIN

Paraffin is mainly used for cooking, lighting and interior heating. Formerly one of the main energy sources in rural areas, it is now almost unavailable and extremely expensive–a direct result of the current fuel crises in Zimbabwe. At the time of the field research paraffin had to be bought for Z$ 150.000 (approximately US$1 on the black market and US$0.70 at the inter bank rate). In the urban areas it was slightly cheaper (about Z$130.000) because it could be bought directly from general dealers. The latter bought the paraffin in bulk (often at less than the government gazetted retail price of Z$20.000) and sold it at exorbitant prices in the rural areas. This explains why paraffin has become quite a status symbol in rural Zimbabwe. Rural households find themselves in a serious predicament; they cannot afford the precious liquid but they also cannot run a household without it.

Zimbabwe started to experience severe fuel shortages since 2001 (due to socio-economic and political circumstances that lie beyond the scope of this dissertation). Towards the middle of 2005 fuel stations ran dry and before anyone knew what was happening, all petroleum products (including paraffin) disappeared from the conventional selling points and ordinary citizens had to turn to the black market. Although the selling of fuel at black market prices was illegal, the government had to turn a blind eye towards offenders since it became the only way in which ordinary citizens could obtain fuel and petroleum-based products.

Strictly speaking the black market for fuel in Zimbabwe can therefore not be called '*illegal*' since it is general knowledge that it has been (un)officially endorsed and rumour has it that a considerable number of government officials are selling petroleum products on the

black market—a very lucrative endeavour. Although black market activities cannot be condoned, they are a reality at grass-roots level in the research area.

Formerly the National Oil Company of Zimbabwe (NOCZIM) and private fuel companies were responsible for importing petroleum based products such as paraffin. During the time when paraffin was available, the government only negotiated fuel prices with these companies and the inhabitants of the rural areas (who are the main consumers of paraffin) were never included in these negotiations. Before the fuel crises the Zimbabwean government subsidised 40% of the total cost of paraffin in the country. Very often, the intended benefit did not reach rural households because the commodity passed through a multitude of 'middle men' before reaching the rural consumers. Since rural people buy paraffin in small quantities (250ml – 500ml), they often had to pay three times more than the gazetted retail price. The subsidies were terminated in 2005 because of the deterioration of the national economy and the fact that they did no longer receive a foreign exchange allocation from the Reserve Bank of Zimbabwe. Accordingly, the price of paraffin increased drastically after January 2005. Table 14 provides an indication of the retail and black market prices observed by the researcher and confirmed by interviewees.

The type of paraffin that is used for domestic purposes in Zimbabwe is contaminated jet A1 fuel. The Ministry of Energy and Development does not monitor the quality of the paraffin and since the black market has taken over the procurement and selling of paraffin the degree of contamination has increased drastically. Water is often added to the already contaminated paraffin to increase the volume and since non-transparent containers are used consumers only realise that they have been done in when they start using the mixture. Government officials simply turn a blind eye to these highly irregular activities. Moreover, consumers are not alerted to the dangers of the smoke and toxic gases emitted by contaminated paraffin and how the detrimental effects can be prevented or minimised. The fact that this situation can be attributed to the absence of a clear national energy policy is obvious (see 1.3.1).

Table 14:
Paraffin prices in rural Zimbabwe: January to December 2005

MONTH	RETAIL PRICE (Z$)	BLACK MARKET (Z$)
January	3 450.00	Black market dormant because paraffin available in shops
April	4 000.00	Black market dormant because paraffin available in shops
May/June	4 000.00	20 000.00
August/ September	6 500.00	70 000.00
November/December	22 000.00	100 000.00 - 150 00.00
January 2006	22 000.00	150 000.00

In rural households paraffin is mainly used for lighting. Paraffin lamps or lanterns (*zvibani*) were formerly the main source of lighting in rural areas. The liquid also makes the starting of cooking fires almost effortless. It was found that starting a fire with paraffin takes five minutes or less while without it starting a good fire may take up to 30 minutes. The poorest of poor households have resorted to using dry grass as kindling and the old custom of borrowing fire has resurfaced because matches have become almost unaffordable; a box of matches currently costs about Z$50 000.00. Paraffin is also used as a last option, e.g. when it is raining and dry wood is unavailable. Sometimes when women are very busy or if a visitor needs food in a short time, paraffin stoves may also be used. Teachers and extension workers are the only ones who regularly use paraffin for cooking purposes.

Although the paraffin lamps and lanterns that were formerly used emitted some smoke, they were definitely more efficient and environment friendly than the variety of lighting materials currently used in rural areas. Almost all women indicated that they cook their meals before sunset when they can still see properly. Others revealed that they use sticks from trees such as *mupangara* which provide a fairly bright flame when they have to cook in the dark. The burning stick is moved to and fro over the pots to provide a little light. Such burning

sticks are also carried around inside the house until everyone has bedded down.

Some households also utilise diesel procured from buses or heavy trucks to provide some indoor lighting. The product provides a very weak flame, emits a heavy black smoke and leaves a sooty deposit. Consequently many people suffer from headaches as well as skin, eye and upper respiratory problems in those households where diesel is used for lighting purposes. This is a very serious health risk especially for children. No medical treatment is, however, sought for these conditions simply because according to interviewees, '*it is not a disease…almost all village members have these problems*'.

Other households cut old rubber sandals (*patapata*) into strips and use the strips as wicks in paraffin lamps. The odour and amount of smoke produced by these lamps depend on the type of *patapata* that was used (pure rubber or a rubber and plastic combinations). These lamps provide insufficient light, the flame is easily extinguished it and it burns inconsistently. The *patapata* strips are sometimes replaced by strips cut from car and truck tire which are sold for this purpose at about Z$20.00 per tyre. Some people even trade their labour for these tyres. Child headed households constitute a bigger percentage of those who find themselves trading their labour for resources such as tyres. In some unfortunate incidents, orphans and vulnerable children (usually from child-headed households) engage in transactional sex to obtain energy resources, thus predisposing them to HIV/AIDS. Interviewees agreed that they are more worried about getting a source of light than about the potential effect of the product on their health. They often remarked that '*our people are used to smoke in the kitchen and our parents lived to become grandparents*'.

Those who cannot afford or procure the above material, learn to do without lighting. While female-headed households are hard hit by the paraffin scarcity, child headed households are even worse off because children lack the skills to improvise and they cannot compete with adults in trading their labour. In an unfortunate incident in Gutu District a member of a child headed household died of snakebite. The household did not have any form of lighting and in the pitch dark interior of the room the unfortunate child did not see the snake in her blankets. Households with patients and breastfeeding mothers who need light during the night are of

course in the same predicament.

3.3.6 CANDLES

Candles are also another energy source that is used in rural Zimbabwe. Candles cannot be used for much more than lighting and because they are very expensive, they are currently only used by the more affluent households in rural areas. Many owners of rural shops emphasised that they do not stock candles any more simply because the market is not big enough. Those who can afford candles buy them at the larger towns or growth points such as Mpandawana. Candles rarely last for more than three days and sells for $50 000.00 each. Some interviewees therefore believed that local candle making might not only be a lucrative endeavour but will also provide a much cleaner form of lighting than the variety of other sources of lighting that people are currently forced to use.

3.3.7 FIREWOOD

Wood gathered in the areas adjacent to villages, has, since time immemorial, been the major source of energy in the rural areas of Zimbabwe. Since the population has increased hand over hand in these areas, large tracts of land have been cleared for purposes of housing, construction and crop cultivation. The remaining pockets of virgin bush are therefore often far from the villages. Thus the ability to walk long distances and to carry heavy loads determines the amount of firewood that a person can gather.

It is considered the responsibility of women and children to gather firewood. They often cover long distances in the process; on average people travel 5 to 10 kilometer per round trip (Table 15). In the past, wood was gathered in the well-wooded areas but as a result of the severe deforestation – especially in the Gutu District - this activity is nowadays performed along the riverbanks. Although fully dried wood is preferred, green branches are currently often cut from trees or are partly broken off so that they can become air dried for collection at a later stage.

Table15:
Gathering of firewood: distance and mass

District	Average distance (round trip) traveled per person per week	Average mass of firewood gathered per person per week
Gutu	11km	15kg
Mutasa	6km	25kg
Zvimba	10km	15kg
Murewa	7km	20kg
Bikita	5,5km	27,5kg
Chirumhanzu	8km	20kg
Hurungwe	6km	27,5kg
Bindura	9km	20kg

In the bush axes and/or bare hands are used to gather firewood. The wood branches are arranged in a bundle and tied with string or with the bark (*makavi*) of the tree. The bundle of wood is carried on the head or, when possible, transported by wheelbarrow or donkey cart. Since many of the trees have long protruding thorns injuries often occur when gathering, carrying or transporting the firewood. Women and children also risk sexual harassment and even rape (*kubhinywa)* when gathering firewood. One middle-aged interviewee made the following statement in this regard:

> '*The* firewood-*gathering business has never been easy. It is risky, especially in these days when men behave like predators. You get raped while looking for firewood that you can often not find anyway. They actually lie in wait for us, their prey come so that they can rape us far away from our homes where we cannot get help. Surely the government must help us'.*

Although wood gathering with axe or pickaxes has been banned in the rural areas, these implements are often used to chip splinters from large branches or to uproot tree stumps that have been left behind form previous 'deforestation expeditions'. Axes and pickaxes may only be used in ones own field or homestead. Unless permission has been obtained form the 'owner' gathering of firewood in someone else's fields or homestead is viewed as theft. The fine for transgression of these rules is Z$ 60 000.00 cash. The transgressor is also expected to

provide a goat for the Chief and his court councillors who preside over the case. Some chiefs add as many as five clay pots of beer to the fine.

From the above it should be clear that the gathering of firewood is a time consuming activity. In the rainy season it takes on average five to six hours. People literally scavenge for firewood and one often comes home after a hard days work with a '*shameful bundle of twigs*' – especially when you observe the rule and refrain from using an axe. In Gutu District Thursdays and Sundays are devoted to this time consuming activity. Sunday is an obvious resting day for 'Christians' while Thursdays are devoted to the 'ancestors' and no agricultural activities are allowed. Instead of sitting around idly, women and children use the opportunity to fetch wood. During the dry season when there are no agricultural activities, firewood gathering may occur on any day of the week.

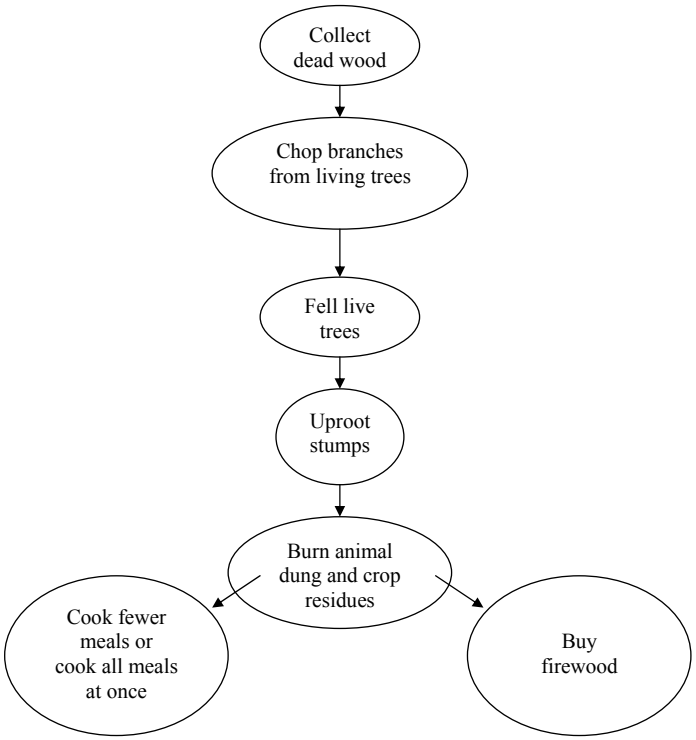
Female and child-headed households are severely affected by the firewood crisis because they often have no fields and even when they do they only hold them in usufruct. Thus they have to get permission from the '*owners*' for non-agricultural activities such as the gathering of firewood. The '*owners*' of course, prefer to sell the available firewood themselves. In such instances the women and children are forced to gather firewood in already depleted '*no man's land'*.

In spite of the above malpractices and although the gathering of firewood is a time consuming and cumbersome activity, it was interesting to note that it is also an escape from the drudgery of household chores and an opportunity to socialise. It is not only a time to catch up on local gossip and to laugh a lot but also an opportunity to discuss domestic problems. Girls receive informal sex education, young women receive tips on how to cook and run a household and older women discuss marital problems. For this reason even those girls and women who have the luxury of electricity would join the wood-gathering parties.

Rural households follow a sequence of responses to firewood scarcity (see Figure 8 below). These responses do not only effect the environment detrimentally, but also have a negative impact on family life and the actions associated with the preparation of food.

Figure 3:

Sequence of responses to firewood shortage



Adapted from Katerere (1998: 41) and supported by field findings

In those areas where it has become extremely difficult to procure firewood, interviewees confessed that they have been forced to devise wood-saving strategies. Firstly the wood is now cut into much smaller pieces in order to maximize utilization and fires are extinguished immediately when the cooking process has been completed and the remains of one fire is used in building the next one- cooking fires can simply not be allowed to burn out by themselves. The result of this practice is that meals are often not cooked properly. Iron grates have also been lowered to prevent the loss of heat and to increase their efficiency. Many households have also reverted to the traditional three-stone cooking fire since it has been found that it saves wood and facilitates better control of the heat that is required. The use of this type of cooking fire by child-headed households is therefore not only the result of poverty but also a practical wood saving strategy. Dung and agricultural residues have

recently also become more important sources of energy. The use of dung indicates the severity of the energy crises since all interviewees emphasized that it is has very poor heating qualities and that the odour interferes with the cooking process. Interviewees also pointed out that trees that were formerly tabooed for use as firewood are currently widely used. Under normal circumstances trees such as *munyamharadzi, muzeze* and *chizhuzhu are* not used for firewood purposes because of particular taboos and because they are used in ancestral rituals. They are also used as tombstones or coffins and as a fly deterrent (*kunina nhunzi*). The most preferred trees are those that provide consistent smokeless flames and coals, e.g. *mutondo, mupangara and musasa.* In response to the issue of using tabooed trees, one of the children heading a household remarked that '*there are no taboos in times of scarcity'*.

The scarcity of firewood also has a very detrimental effect on family life in the sense that activities such as spending time around the fire after supper have become a rarity. In the past a lot of socialising took place around the evening fire where grandparents, parents and children spent time together, exchanged news and told or listened to stories while roasting ground nuts and eating wild fruit and other delicacies. Both cooking and beer brewing is currently done over a fire made of wood that is not yet fully dry. People often have to leave the cooking space to avoid the smoke from such fires.

During the research period visits were paid to a considerable number of households where people living with HIV/AIDS were encountered. Both those who were severely ill and their caregivers complained about the scarcity of firewood. Some patients told the researcher that they do not have enough firewood to boil contaminated water and that they often have to eat half-cooked food. Some complained about the fact that it is impossible to heat their rooms and that the cold often exacerbates their condition. During one focus group discussion the female participants agreed that HIV/AIDS was causing many deaths in their village and that the wood scarcity made it very difficult to provide food to the people that attend the funerals. They admitted that there is a direct relationship between the increase in the number of funerals and the deforestation of the areas adjacent to their village.

Newly married women face a very difficult situation because of the scarcity of firewood. It is expected of a new daughter-in-law to keep a neat firewood bank (*bakwa)* at her

new homestead. The *bakwa* should consist of firewood from trees which are renowned for their high burning efficiency. None of the tabooed trees are allowed in this *bakwa*. The quality and quantity of wood in the *bakwa* is a measure of the abilities and industriousness of a new daughter-in-law which currently means that she often has to travel very long distances to fetch firewood if she expects to be accepted by her husband's family.

The scarcity of firewood has, of course, led to its commercialisation in spite of the fact that according to the Chiefs, the selling of firewood is taboo. Those people who have trees on their land (especially able-bodied males) cut and sell firewood at exorbitant prices. Children from child headed households also participate in firewood-selling to raise money for school fees and subsistence. A wheel barrow load of firewood sells at Z$50 000.00 and a large bundle sells at Z$20 000.00 in many parts of the researched districts. Firewood is bought by teachers and other members of the community who do not have the labour to gather firewood. Some interviewees indicted that they often trade old clothes for firewood. In reality, a household energy crisis is often a labour crisis. This supports the findings of other researchers (see Cecelski 1987:61). When there are many family members who can take turns in gathering firewood there are often less problems and such families are often also active in selling firewood. Households with a large number of aged and sick members suffer a lot in this regard.

In this regard it should be noted that children - especially those from child headed households are often forced to gather wood during school hours in order to generate some sort of income. Interviewed children (especially girls) often complained that they have to gather firewood as a 'favour' for teachers during school hours when there are few people looking for firewood. It also happens that teachers use children to do their cooking and several cases were reported of teachers who sexually abused such children. The negative impact of this practice on the education of children is obvious. However, because many community members still believe that the gathering of firewood by children is a 'normal' activity, nothing much is being done to prevent this obvious denial of the rights of children. A national policy that outlaws such practices and provides for the education of communities around this issue is long overdue.

3.3.8 DUNG

Although dung is an inefficient and inferior source of energy many households now have to rely on it for cooking purposes simply because of the scarcity of firewood. It is therefore widely used in the Zvimba, Gutu and Chirumhanzu Districts of Zimbabwe where it is available in large quantities (see table 16 below). The distances traveled to gather dung are more or less the same because the cattle kraals (the main sources of dung) are located close to the homesteads (kraals are normally about 200m - 500m from the homesteads). Children and sometimes also adult women, usually gather dung from the nearby cattle kraals in the afternoon or during weekends. The dung is gathered in large bags and stored in a covered shed or storeroom to keep it dry. Interviewees emphasised that it is much easier to gather dung than firewood because it is readily available from the cattle kraals and it is not as heavy as firewood. Children gather an average of 10kg and adult women an average of 20kg of dung per day. A 20kg bag of dung lasts for approximately three days. When cooking, the dung is mixed with firewood and crop residues (see table 16 below).

Table 16:
Gathering of dung: distance and mass

District	Average distance (round trip) traveled per person per week	Average mass of firewood gathered per person per trip per week
Gutu	450m	37,5kg
Mutasa	650m	17,5kg
Zvimba	200m	35kg
Murewa	300m	20kg
Bikita	150m	15kg
Chirumhanzu	300m	20kg
Hurungwe	200m	15kg
Bindura	300m	25kg

3.4 ENERGY CONSUMPTION DURING THE PREPARATION OF MEALS

Currently, there is very little variation in the food consumed by households in the rural

areas of Zimbabwe; indeed, the general economic deterioration and recurring drought has a very detrimental effect on variation in meals and experimentation with new dishes. The whole enterprise of cooking is, however, still considered the exclusive province of women; indeed it is believed and often emphasised that '*the place of a woman is in the home*' and a woman who cannot prepare good food may not complain when her husband has extramarital affairs.

*Sadza (*maize porridge) is the staple food and remains the sole or main component of almost all meals in rural households. *Sadza* is prepared in more or less the same way in all households: Water is first boiled and then a paste of maize meal is made with cold water. The paste is then added to the boiling water and stirred continuously and vigorously over a low fire until it thickens. This thick paste is left to simmer for about 10 to 15 minutes and then more meal is stirred in until the contents become smooth. The duration of this process and therefore also the amount of energy consumed, depends largely on a women's prowess in controlling the fire and stirring the porridge. After stirring, the *sadza* is left on a low-burning fire for at least another five minutes.

The type of relish that is consumed with the *sadza* and the process of preparing it differ from household to household and from one district to another (see table 17 below). The type and quantity of relish is determined mainly by income but cultural factors also come into play depending on the type of occasion for which it is prepared. Below are a range of dishes that are usually prepared using energy sources in rural Zimbabwe.

- *Sadza* and vegetables: Sadza is usually prepared with one or more of the various types of vegetables that are available. Some have to be bought but a variety is also cultivated in backyards or gathered in the veldt. The two major types are the 'traditional' ones (such as *muboora, mushamba, munyevhe and mowa*) and the 'modern' ones (*covo,* cabbage, tomato, spinach, etc.). The 'traditional' types are, of course, seasonal and therefore consumed mainly during the rainy season while the 'modern' ones predominate during the dry season.

- *Sadza* and meat: Formerly beef and chicken were considered a necessity at weddings or during bride-wealth (*lobola*) negotiations. A son-in-law would never be offered *sadza* with a vegetable relish when visiting his wife's family and consequently households went out of their way to procure meat even if they had to borrow money. A daughter-in-law was not treated with the same reverence and could expect to be offered *sadza* and a vegetable relish even on her first visit to her husband's household. This is yet another example of the influence of patriarchy in Zimbabwe. Men were (and in most instances still are) served first (in order of their seniority) and at gatherings as well as during daily meals in the household they receive the best portions. Women and children often have to be content with soup made of the men's leftovers. Moreover, it is generally accepted that '*men do not like vegetables*' and domestic violence is often triggered when women are unable to provide their husbands with meat.

- Currently, beef and even chicken are reserved for special occasions or special visitors. The meat is first boiled and then fried and added to a rich tomato soup. Moreover, household members are nowadays only allowed one piece of meat each so that they '*can just feel how it is to eat meat*'. Frying of meat over an open fire is regarded as wasteful and is seldom done. Cattle have become the one asset that helps to cushion households during times of drought and economic decline. They are allowed to multiply and are sold to pay for school fees, hospitalisation and similar household expenditures.

- Although fish has never been in high demand in the rural areas, the current economic decline is forcing more and more families to include fish in their daily diet. Small dried fish, known as *matemba* are fried, dipped in a rich tomato relish and eaten with *sadza*. Unfortunately, the *matemba* tend to leave a bitter after-taste which some people find difficult to get used to.

- *Sadza* and beans: During the period of field research many households in the researched districts used beans as a relish despite the fact that beans is relatively expensive and are only grown in the highveld areas were the rainfall is relatively high. The reason for the higher than normal consumption of beans is that they are distributed for free by

humanitarian organisations in the drought-stricken areas. Larger quantities than normal is therefore also currently consumed per meal. Most people prefer the red beans to the white beans that are usually distributed by donors because they are tastier and less dry than the white ones. Moreover, more energy is needed to cook white beans.

- *Sadza* and termites *(majuru):* Termites are normally found during the rainy season and since the field research coincided with the rainy season the researcher was often offered this tasty and highly nutritious dish. If cooking oil was available the termites were usually fried. They are, however, also boiled and then added to a thick peanut butter soup.

Apart form the above, the maize crop is also used in the preparation of another dish know as *mutakura*. *Mutakura* consist of boiled maize combined with groundnuts, round nuts or beans. It is usually eaten during lunch when people have not cooked *sadza* or when there are a lot of people present, such as during a cooperative farming event (*humwe*). *Mutakura* takes considerable time to prepare - five hours or more and it is therefore not prepared on gas or paraffin stoves. It was, however, interesting to note that because of the unrealistic electricity tariffs people are increasingly using electric stoves to cook *mutakura* and beans.

The time that is taken up by making a fire and preparing different meals for a household of six members appear in Table 16. It should be noted that the type of food being cooked as well as the recipe that is used determines the amount of firewood that is needed but that the time that it takes to prepare meals is also directly related to the prowess and experience of the cook. Gas, paraffin and bio-gel are not utilised in the preparation of food such as beans because of the negative relationship between cost and cooking time. Firewood is still the main energy source in the preparation of those dishes that take a long time to cook. Differences between the use of electricity and gas are mainly due to different cooking methods. In the Gutu, Bindura, Zvimba, and especially the Chiweshe area, cooking with fire takes more time because of the firewood shortage which forces people to use inferior types of firewood.

Table 17:
Time spent on the preparation of different types of meals in the researched districts

District	Type of Food being cooked	Duration taken to cook with different energy sources used					
		Dung	Electricity	Gas	Firewood	Paraffin	Bio-gel
Chirumanzu	Sadza &Vegetables	90-120 min	30-35 min	40- 50 min	60-90 min	50-60 min	45-55 min
	Sadza &Beans	350 min	120 min	*********	240 min	********	********
	Mutakura	360 min	120 min	*********	300min	********	********
Hurungwe	Sadza &Vegetables	90 min	30-35 min	40-50 min	60 min	50-70 min	45-55 min
	Sadza &termites	60 min	25 min	30-35 min	45 min	50 min	40 min
	Sadza &beans	240 min	120 min	*******	180 min	*******	*******
	Mutakura	350 min	200 min	*******	240 min	*******	*******
Murewa	Sadza&Vegetables	80 min	35-40 min	40-45 min	55 min	50- 70 min	45-50 min
	Sadza&Beef	200 min	60-80 min	125 min	100-120 min	180 min	170 min
	Sadza&Beans	240 min	120 min	*******	210 min	*******	********
	Mutakura	370 min	190 min	*******	340 min	*******	********
Bindura	Sadza &Vegetables	90 min	35-40 min	40-45 min	50- 70 min	80 min	70 min
	Sadza &beef	200 min	80 min	95 min	100 min	150 min	120 min
	Sadza &Beans	60 min	25 min	30-35 min	50 min	45 min	40 min
	Sadza &Termites	230 min	130 min	********	210 min	******	******
	Mutakura	380 min	180 min	********	330 min	*******	*******
Mutasa	Sadza &Vegetables	85 min	35-40 min	45-55 min	70 mi n	80 min	50 min
	Sadza &Chiken	150 min	80 min	90 min	120 min	140 min	125 min
	Sadza &Beans	300 min	185 min	*******	260 min	*******	*******
	Mutakura	360 min	255 min	*******	2000min	*******	*******
Bikita	Sadza&Vegetables	60 min	30-40 min	45-55 min	50 min	68 min	70 min
	Sadza &Beef	190 min	90 min	120 min	125 min	140 min	110 min
	Sadza &Termites	75 min	35 min	45-55 min	45 min	60 min	50 min
	Sadza &Beans	240 min	150 min	*******	180 min	******	*****
	Mutakura	320 min	250 min	*******	310 min	******	*****
Zvimba	Sadza &Vegetables	55min	35 min	40-45 min	60 min	65 min	55 min
	Sadza &Termites	40 min	30 min	40 min	50 min	55 min	45 min
	Sadza &Beans	335 min	260 min	******	300 min	******	*****8
Gutu	Sadza &Vegetables	55 min	45 min	50 min	70 min	60 min	55 min
	Sadza &Matemba	50 min	30 min	40 min	60 min	50 min	40 min
	Sadza &Termites	45 min	40 min	35 min	55 min	50 min	50 min
	Sdza &Beans	400 min	280 min	******	450 min	******	******
	Mutakura	500 min	300 min	******	500 min	******	******

*** indicates that the energy source could not be used

3.5 ENVIRONMENTAL DEGRADATION AND THE FAILURE OF THE IMPROVED STOVES PROGRAMME

Since attaining independence in 1980, Zimbabwe has witnessed escalating levels of environmental degradation. The inhabitants of the rural areas (especially in parts of the Gutu, Zvimba, Chiweshe and Chirumahanzu Districts) have been faced with the realities of diminishing soil value, decreasing productivity, reliance on low level energy sources and severe poverty ─a perpetual degradation cycle. To substantiate the above, Bird and Shepherd (2003:13) postulate that Gutu district now has only 21% forest cover because of deforestation compared to more than 60% cover which existed in the 1960s. Although the magnitude of deforestation is severe, very little has as yet been done to curb the process of degradation and to ensure environmental sustainability. To worsen the matter, at community level, dwellers are not aware of the nexus between poverty and environmental degradation.

The most common forms of degradation are deforestation, water deficiency, soil erosion and loss of biodiversity. The deteriorating financial situation in Zimbabwe and the lack of proper control over resources has resulted in increased gold panning, diamond digging and pottery that leaves unsightly scars on an already degraded landscape. Large numbers of households in the researched areas are dependent upon subsistence agriculture for their survival. As a result of the population pressure peasant farmers have been forced to start cultivating marginal land on steep slopes and riverbanks and in vlei and other ecologically sensitive areas. Interviewees emphasized that women bear the brunt of the environmental damage in rural areas since they are household managers with only usufruct rights to land.

The increase in population numbers (with a concomitant rise in population density), the deteriorating economy, and the absence of a clear policy on the sustainable use of natural resources has been identified as the most important reasons for environmental degradation. Scholars such as Bird and Shepherd (2003:13) argue that the time bomb for land degradation was set when the colonial administration inaugurated the concept of black reserves. It is argued that the creation of black reserves resulted in the unequal land distribution which led to unequal access to natural resources. In rural areas where natural resources are communally owned, people are not motivated to utilize natural resources in a sustainable manner because

of uncertainty about ownership of land. Activities at the grass roots level causes exploitation rather than proper management of resources. Firewood has become the principal source of energy for rural communities and these communities are therefore, of necessity, contributing to the deforestation of communal land and the degradation of their physical environment. Large quantities of firewood are also used in entrepreneurial activities such as brick making.

In spite of their situation the inhabitants of these areas have not, as yet, initiated any communal conservation strategies. Other than the communal conservation effected by the government through the tribal chiefs nothing is happening at the household level in terms of environmental conservation. One household head interviewee said, '*We are still waiting for the government to come with the seedlings as they did in the 1980s. We do not have the money to start such kind of projects. This is government responsibility.'*

Although the government implemented forestry projects in the early 1980s lack of community involvement and cooperation led to the discontinuation of these projects. Lack of community initiation and participation is still prevalent to date. This is confirmed by the fact that only one household in the entire area pursued the cultivation of household woodlots using fast-growing indigenous trees. The responsible person in this household reported that indigenous trees are easy to grow because the seedlings can be collected free of charge in the bush and these trees do not need as much fertilizer and care as the exotic trees that were previously recommended. This is contrary to what many interviewees reported namely that they found tree growing expensive.

The improved stoves programme that was introduced in rural Zimbabwe in the 1980s did very little to combat indoor air pollution simply because it was doomed to failure right from the beginning. Interviewees agreed that the stoves starts up and cools down too slowly and provides insufficient interior heating in winter and too much during summer. The chimneys often force smoke into the kitchen interior and the stoves force women to cook with their backs to their guests which is culturally unacceptable. Moreover, the stoves cannot accommodate 'traditional' clay pots. A large number of households - especially female and child headed households – cannot afford metal cookware any more with the result that clay

pots are now widely used again and the old women who are renowned potters are once again operating at full capacity hampered only by the wood-scarcity (large quantities of quality firewood are used in the firing of clay pots).

The Zimbabwean government currently encourages communities to participate in the improved stoves programmes but communities have to initiate the programme by requesting assistance from the Ministry of Energy through a written proposal. Communities select the beneficiaries of the programme themselves and the latter is then trained in the construction of the stoves. The government subsidises about 80% of the total cost involved (Z$ 310 000. 00 at the end of 2005). Members of the National Youth Service have been used in the dissemination of the improved stoves technology and unfortunately they do not have a good record in most local communities. The National Youth Service members are known for unleashing a reign of terror in rural communities especially to those who are not affiliated to the ruling party. One interviewee stated clearly that lack of funds is not the true reason for people's reluctance to adopt the new technology, the interviewee stated that they simply do not want anything that is associated with these youths. The improved stoves programme is also gender insensitive. Men dominate the initiation of such programmes and women are supposed to concern themselves with testing and using the stoves. When government officials arrive to discuss such projects and to train the builders, women are seldom involved. The discussions and training sessions are scheduled at times when it is inconvenient for women to participate actively because they are fetching water, cooking, gathering firewood and performing other household chores.

CHAPTER 4

THE ROLE OF GENDER AND POWER RELATIONS IN THE UTILISATION OF ENERGY SOURCES

4.1 INTRODUCTION

It was pointed out earlier (see 2.9) that gender plays a pivotal role in determining access to energy sources and in shaping energy consumption patterns as well as survival strategies in developing countries. It is generally agreed that patriarchy characterized most African societies in the pre-colonial era (see 2.9). Some would argue that very little change has occurred in this regard and that most of these countries have failed to address gender inequality and sexism with the same vigour as they did colonialism and other forms of injustice (see for example Annecke 2003). It is also argued that one of the most dreadful mistakes that have been made in these countries was the failure to recognise the negative role of gender inequalities in the energy sector and the different ways in which men and women view and utilise energy (Annecke 2003; Cecelski; Hoper-Box 1999). This chapter attempts to indicate how gender and power relations currently influence the consumption and utilization of energy sources in the research area and in rural Zimbabwe in general.

Before discussing the situation with regard to gender and power relations at community level, it is imperative to point out there are currently three types of households in the research area and in Zimbabwe in general, *viz.* male-headed households, female headed household and child headed households. Two types of female headed households can be differentiated: those where the male is permanently absent as a result of divorce, death or other similar reasons and those where the male is temporarily absent as result of migrant labour or imprisonment. Moser (1993:17) refers to the former a *de jure* female-headed households and to the latter as *de facto* female-headed households.

4.2 GENDER AND POWER RELATIONS AT DIFFERENT LEVELS

The role of colonialism in perpetuating and reinforcing skewed gender and power relations between men and women in Zimbabwe has been analysed by many scholars for several years (Ncube 2006). Although Zimbabwe was liberated from colonial subjugation, it carried inherited structures and practices of colonialism into the post-colonial era (Ncube 2006). It is against this background that interviewees and key informants reported that independence speeches were characterised with promises to dismantle structures that were responsible for unequal power relations in the country. However, more than two and half decades after the independence, not much has been done in the area of gender equality. It has to be pointed out that the state is still an expression of patriarchal power highlighting other forms of patriarchal oppression. The exclusion of women from the state and its structures, it is argued, is an indication rather than a cause of gender inequality. This is because the structures of the state are made by men and they use the state as an agent to perpetuate female domination. As a result the state and its organs are biased against women. The state power is therefore another form of patriarchal power were men have direct access to resources. This is a clear manifestation of what is happening in Zimbabwe presently. It is an uncontested fact that women are under-represented from the grassroots structures up to the national level.

Although the government instituted legal frameworks such as The Legal Age of Majority Act (LAMA) of 1982 and the Matrimonial Causes Act of 1985 which recognize women's rights to own property independent of their husbands or fathers, these acts did not address the underlying cultural and economic systems that form the basis of power and gender inequality. The system that was adopted to equalize power between genders did not challenge patriarchy, which is the source of inequitable power distribution.

Key informants (especially women) reported that the legacy of unequal power relations continues to manifest itself even in present-day Zimbabwe. It was reported by interviewees that women are put in positions of power or in the parliament for cosmetic reasons so that the government and its structures appear to be gender sensitive and to be abiding with international declarations on the empowerment of women. It was indicated that because the

state is regulated by men through the patriarchal system, women are still relegated to the periphery and the energy sector is not an exception.

It was also reported by interviewees that up to date women do not have the power to make decisions with regard to community development projects. This has been the case even with rural electrification as women do not have the power to make any meaningful decisions. It was found that even in the rural electrification board at national and provincial level, women are not well represented. At national level, there is only one woman who sits in the rural electrification board. She was unfortunately not available for an interview during the period of the field research. It was further reported by key informants that her influence is insignificant since her ideas on gender sensitivity and equality in rural electrification are consistently shot down by her male counter parts. It was also interesting to note that men who sit in such board meetings either do not have adequate knowledge about gender equality or they totally disregard gender issues.

At national level, the role of gender in influencing the access and control of energy (especially rural electrification) has not yet gained momentum. It is quite evident that gender and power relations that are rooted in patriarchy and capitalism play centre stage in the distribution of electricity. These cascades down to the household were men who have the means and control over resources determine whether houses have to be electrified or not. In terms of policy making, it was clear that there are no gender concerns that are put in place during the design and implementation of rural electrification and other energy projects in general. Due to the fact that electrification has been used as a campaigning tool, it is normal for a rural electrification route to be diverted to another area for campaigning purposes. It was reported that the political terrain in Zimbabwe does not recognise power or gender equality. As a result rural electrification projects implemented under such a political agenda actually fuels gender and power inequalities in the society. Further, the Rural Electrification Agency does not have a gender mainstreaming policy. The agency and the country as whole therefore face problems of instituting gender mainstreaming within government structures.

As has been indicated earlier on, the government has tried to address issues of gender

equality but the strategies that have been used leave quite a lot be desired. The strategies that have been used have failed to do justice to the dynamics and complexities that characterize gender issues. Furthermore, the system treats women as a homogeneous group. This is, however, a gross mistake since women are different, and fall into different categories and they have different needs. Such an approach in dealing with gender issues has resulted in patriarchy being left unchallenged.

It was reported by key informants that whilst the organs of government and the private sector alike subscribe to the notion that they are gender sensitive, it is still difficult for women to get into positions of authority. It was reported by key informants that even in the energy sector, it was difficult for women to be in positions of power. Some interviewees indicated that some women end up '*sleeping their way up*' because within a patriarchal system this is one of the easiest ways to get patriarchal favours. This is a clear manifestation of the oppression of women and the effects of skewed power relations between men and women within the Zimbabwean society.

As a follow up to the preceding section, reference will be made here to the power struggle between the chiefs and councillors. However, not much will be said about the nature of the office of chiefs and councillors since this has been discussed in 1.3.2. As alluded to earlier on in the aforementioned section it was found that there is power politics between chiefs and councillors in rural Zimbabwe. This becomes worse if the chief and the councillor belong to different political parties. Interviewees reported that there are cases in the researched districts where rural villages failed to benefit from rural electrification because the councillor for the village belonged to the Movement for Democratic Change (MDC) (the major political opposition group in Zimbabwe). This is because rural electrification is run by a parastatal (REA), which is a semi autonomous government body. Due to this way of operation, key informants and interviewees argued that REA aligns its operations with the ZUNU-PF manifesto. Therefore, if a councillor is elected on an MDC ticket this means that the ward(s) that he/she represents will not benefit from rural electrification and other development projects. Interviewees reported that the ZANU-PF government openly declared that areas which are run by councillors from the MDC will not benefit from rural

electrification as well as other critical development projects and relief aid. This was not surprising to the interviewees as the ZANU-PF government has always been in a bid to prove power to the opposition by denying opposition-administered areas basic rights such as food aid. These same findings have also been confirmed by Mlanga (2006:6).

Even in areas where chiefs and councillors belong to the same political party, the overlapping of roles discussed earlier in section 1.3.2 cause chiefs and councillors to have a tug of war. Consequently, chiefs and councillors misinform development officials including officials from REA about the general outlook of the areas under their jurisdiction. In a bid to discredit each other, chiefs and councillors end up delaying the electrification process because they do not facilitate the smooth entry of officials from REA into the villages. This is because they will be busy with other agendas such as proving that one of them is wrong. It was also reported that councillors and chiefs sometimes use witchcraft to silence each other and *muti* to get favours from development officials. Such power politics end up affecting innocent citizens in the rural communities negatively.

The issue of ethnicity and power politics in rural electrification was of great importance in this study as it introduces yet another facet of power politics electrification in rural Zimbabwe. It was found that the differences in the electrification of districts in rural Zimbabwe were also attributed to the power play between the Shona and the Ndebele. The Ndebele constitute about 25% of the total population. Since the late 19th Century there have always been power struggles between the Shona and the Ndebele. These struggles have been reflected in the way resources are distributed.

Many scholars agree that Matebeleland region lags behind in development (Mlanga; 2006:6; Thomas 1987:63; Lindgren 2004:174). Key development indicators such as health, education, road infrastructure, agriculture and water and sanitation are at a very low level in Matebeleland region compared to other regions. To elaborate this statement Mlanga (2006:6) states that '*the Government of Zimbabwe is being accused of being negligent and insensitive to the plight of the Matebeleland region'*. This is despite the fact that Matebeleland is situated in a dry climatic region, which is characterized, by low rainfall and persistent droughts.

Because of the ethnic power play and the fact that the majority of decision makers in the rural electrification body are Shona, not much has been done in terms of rural electrification in the Matebeleland region. As shall be indicated in Chapter 5, Matebeleland region still lags behind in rural electrification. The Matebeleland region is the least electrified region in the whole country. The interviewees maintained that the low levels of electrification was a clear sign of the boardroom power politics, whereby, the Matebeleland region was marginalized because of its lack of political power.

4.3 ROLE OF THE MONEY ECONOMY IN THE DISEMPOWERMENT OF WOMEN

As a follow up to the issues of colonialism and relations between males and females discussed above (4.2), this section will discuss the role of money in the disempowerment of women. In Zimbabwe, gender and power relations are firmly embedded in a social system characterized by patrilineally organized clans in which males were the decision makers at all levels of society (see 1.3.2). In terms of energy consumption a married women was little more than the manager of her household. Older interviewees were nevertheless of the opinion that women wielded considerable power at household and village level in the pre-colonial era and that the former role of '*strong women'* and the father's sister in decisions that were made at household, lineage and village level should not be underestimated. It was also pointed out that energy issues at both the household and village (community) level were formerly not a source of gender or power conflict because the energy resources that were utilized (mostly firewood) were readily available and there were no market forces at play. Older interviewees reported that colonization and the introduction of a money economy changed the energy scene dramatically. Household heads (men) had to find ways of earning money to pay for taxes (e.g. hut tax) and food as well as other commodities which made their spouses and families economically dependent on them. In this way the money economy eroded what was left of women's bargaining power, reinforced patriarchy and marginalized women in the process.

Another factor which aggravated the marginalization of women during the colonial era was the relocation of large numbers of rural families to tribal trust lands that were not suitable

for '*traditional*' agricultural purposes. Women often could not practice sustainable agriculture any more and thus they became even more dependent on the money which their husbands remitted to them. Population pressure and the resulting deforestation made it difficult to obtain enough firewood for cooking purposes and if they wanted to utilize other '*modern*' energy sources women once again had to obtain money from their husbands. Since women had limited access to produce that which could translate into cash, their household economies were at the mercy of their husbands or guardians. Consequently they lost what was left of their bargaining and decision-making powers at household and community level.

4.4 GENDER INEQUALITIES

4.4.1 THE DIVERSE ENERGY NEEDS OF MALES AND FEMALES

While women are energy managers at household level, it was observed that their management (especially in male headed households) only concerns issues that do not involve money. When it involves money, the decision and management is done by males. It was found that men and women need energy for different purposes. While women need energy for household chores such as cooking, space heating, water pumping and security, males need energy for entertainment and income generating activities. Due to the fact that women are more concerned about energy for household energy purposes, they are more acquainted with energy survival strategies than men.

Through observation, experience and interviews in the research area it became clear that women have little power to make decisions and to buy the energy source of their choice. In most of the male-headed households the decision to electrify the household was made by the male head even in instances where women had the money to afford connection to the grid. However, in female-headed households, the decision to electrify households was not contested by the males who were part of the household.

It was a common scenario in male headed households that men would buy entertainment gadgets like radios and TVs before buying stoves because the former satisfied

their need for entertainment. This shows that the needs of the one who owns and controls resources and has decision making power are met first regardless of whether the needs are important or not. It was also found that even when a radio is bought in the household, the men are the ones who determine the programmes to be listened to. In many male-headed households it was common that men would choose Sport FM (a radio station that broadcasts in English and has a western orientation) instead of Radio Zimbabwe which broadcasts development programmes in Shona and Ndebele. This means that even if a household owns a radio, the woman, because she has no power to choose the radio station, may not benefit meaningfully from the electrical asset. This also shows that issues of access, control and ownership of resources are central when analysing energy issues. The research found that having an electric gadget such as a radio in a household does not guarantee or translate into a benefit for a woman. This is because gender inequalities at household level may prohibit the women of enjoying these benefits.

Despite the existence of such unequal power relations, the welfare approach is still used in energy projects in Zimbabwe. Women are still treated as passive recipients in energy programmes, with men making decisions on their behalf. The issue of such inequalities is romanticised and energy implementers are not willing to bring on board programmes aimed at changing the status quo. Gender inequality at community level can best be illustrated by referring to four specific instances, *viz.* the *chingwa* stove project, the provision of energy income generating activities, credit facilities and rural electrification.

The improved *chingwa* stove project: The improved *chingwa* stove pilot project is one of the projects of the Ministry of Energy (see 2.6). It was found that the participation of women is peripheral both at community and household level. Women are not taught how to repair the stove in the event that it gets damaged because building is considered by and large a masculine job. This is despite the fact that many female headed households are beneficiaries of the *chingwa* stove. More so, the decision of whether to install a *chingwa* stove is made by men. Even if the woman needs the stove and understands its benefits, the man has the final say because '*it is his house'*. The women can only suggest but they cannot make decisions. As a result women fail to benefit from the project because they do not have the power to make a

decision to become a beneficiary of the project.

Energy income generating activities: Another specific example that illustrates the inequality of males and females has to do with income generating activities sponsored by the government and other development partners. It was found in Hurungwe, Murewa, Bikita and Gutu district that men were always given large-scale income generating equipment such as irrigation equipment while women are given more humble equipment such as sewing machines. This is because such equipment is regarded as masculine and feminine respectively. Government officials and NGO personnel do not think beyond the sewing machine when they are dealing with women in the energy field. Therefore female-run SMEs are survivalist in nature. This is entrenched in the patriarchal system that views women as second-class citizens. Even though women and men can work equally alongside each other in big projects like irrigation, they are relegated to the periphery because it is always assumed that their income generating projects should be confined to the household so that they can continue performing the role of being a mother and an energy and household manager.

Credit facilities: A third specific example of gender inequality may be indicated in the area of credit facilities. Few women benefited from credit facilities that are offered to start energy intensive SMEs such as grinding mills, freezit making machines and water pumps. This is mainly because women do not have collateral security. Men own cattle and other assets that they can easily use as collateral security while women do not. Even in some cases where institutions did not require collateral, women were given mediocre loans, which force them to engage in survivalist income generating activities.

The role of rural electrification in reducing inequalities in rural areas therefore remains questionable. According to Seers (1970), one of the critical tenets of development is to analyze what has happened to inequalities. As indicated above, rural electrification in Zimbabwe is not oriented towards the poor. There are no pro-poor policies: the poor are relegated to the periphery and therefore sidelined in the rural electrification process. Rural electrification in Zimbabwe was also found to be elitist. This has resulted in an increase of the gap between the rich and the poor.

The Rural Electrification Agency does not have a gender unit, neither does it have an official who deals with gender issues. This is further exacerbated by the fact that REA does not have a genderised rural electrification policy. It was found that issues of gender are peripheral in the operations of REA.

One official said, '*we don't deal with gender issues here, if you want to lose your position for nothing, go to the bosses talking about gender issues. Our work is by and large engineering and therefore gender has no place'*. Key informants argued that the above situation is worsened by the gender imbalance in decision-making positions. The chief executive officer is male and so are the other three directors. Out of the eleven mangers only one is a woman. Such an imbalance is, not surprisingly, also reflected in the activities that take place at a community level.

The study also found that the gender-related nature of energy consumption is not only shaped at household level but also at national level. At policy level there is a general lack of understanding of engendered energy policies. For example, engendered policies are non-existent in energy departments of government and NGOs. The question 'what is an engendered energy policy?' was very topical among key informants from the energy sector. There is no gender energy policy and as a result the data used in the Energy Department are not gender disaggregated. Even though the Government of Zimbabwe stipulates that each and every ministry should have a gender desk, the ministry of energy does not have such a facility. It was found that more than 80% of the decision-making staff is comprised of males.

Officials of the Ministry of Energy showed that they were not interested in gender issues. They would make remarks such as the following:

> *'Young lady you want to talk about gender issues*, '*Are you one of those crazy ladies from Msasa Project Energy programmes do not have anything to do with gender. All we do is to make sure that people get their energy needs satisfied. What has this got to do with gender? You women sometimes you take it too far*

with this gender thing of yours[18]*'*.

The above statement shows that gender issues are resisted because males prefer the current *status quo*. However, the statement also shows that the prevailing view of gender and energy in Zimbabwe is that gender is all about men benefiting at the expense of women and that women are oppressed while men are cruel and uncooperative. This is a wrong view of gender as gender includes both men and women (Clancy *et al*. 2003:3).

It was interesting to note that in rural areas of Zimbabwe (especially in Gutu district), a reversal of gender roles is taking place with regard to firewood gathering. In Gutu district men are now very active in firewood gathering, an activity that was done by women before. It was found that men started participating in firewood gathering when firewood was commodified. This shows that men only participate actively in firewood gathering where there is a monetary value attached to it. The participation of men in commercialized firewood business actually pushed women out of the business because men gather firewood and sell it at any time. Although the males who participated in focus group discussions during the research were aware of these changes they still argued that patriarchal power of men over women is '*the core fabric of our traditional culture'* and that it '*insures harmony, peace and social order'*.

4.4.2 GENDER AND INDOOR AIR POLLUTION IN ZIMBABWE

Indoor air pollution in Zimbabwe like elsewhere in the developing world has a gender dimension. Cooking and household chores constitute women's gender roles in the society, therefore it follows that women are disproportionately affected as they are exposed to indoor air pollution more than the other males. Cecelski (2005:17) assert that women are household managers and as a result they bear not only the brunt of firewood collection but also endure intoxicating smoke while they are cooking. The findings of this study support this line of thought.

[18] Msasa Project is a Women rights and advocacy NGO; it is very strong in the area of domestic violence. Most activities to do with gender in Zimbabwe are associated with Msasa. Most men do not want to be associated with this institution as it challenges gender inequalities.

As mentioned before, men and women need energy for different purposes (see 4.2.1.1). Whilst women need energy to meet household chores such as cooking, space heating, water pumping and security, males demand energy for entertainment and income generating activities. Women indicated that they need energy to meet household energy needs, which is part of their reproductive roles. Thus it was a common scenario in male headed households that men would buy entertainment gadgets like radios and televisions before buying stoves. This is despite the fact that women suffer drudgery when they use fire to cook. Hence, even in electrified households, it was found that women sometimes continued to be exposed to indoor air pollution because they did not have the resources to buy stoves. Interviewed women complained that they are suffering because of the drudgery when using firewood. They reported that even if the male household members had money to buy electric stoves they did not do so because they had other "pressing needs" of buying entertainment gadgets.

Interviewees indicated that women take between 3-7 hours in the kitchen while cooking and doing other household chores and they are exposed to smoke in the process. In winter the level of exposure is increased because of the cold weather. In some households where there are houses are not enough rooms, children sleep in the kitchen thus lengthening the length of the exposure.

During the winter months the pollution becomes worse when the entrance door is closed against the cold. In this way some household members are exposed to indoor air pollution for even longer periods. For economic and cultural reasons home based care for HIV/AIDS and terminally ill patients occurs extensively. For practical reasons (heat, surveillance and provision of food) such patients are normally cared for in the kitchen. This results in an unholy alliance between an already compromised immune system and indoor air pollution which predisposes patients to opportunistic infections. Medical personnel in the research area regard this as one of the most serious health problems.

4.4.3 CAUSES OF INDOOR AIR POLLUTION IN ZIMBABWE

The physical lay out of kitchens in Zimbabwe play a crucial part in exacerbating indoor air pollution. Kitchens in rural Zimbabwe are round in shape and grass thatched. Ideally the door for the kitchen is supposed to be high enough in order to accommodate people of all heights, however doors of poor households are very low (a sign of poor house construction). Although these kitchens have windows, it was found that many of them are small, usually V-shaped and less than 30 cm in diameter. As if this is not enough, sacks are stuffed on the windows as this is the traditional place were sacks are kept. These factors compromises the ventilation of the house and it was found that women do not realize the dangers of a lack of ventilation.

Whilst rural electrification has been singled out as one option that can significantly reduce indoor pollution according to the energy transition theory, the findings in rural Zimbabwe contests this assertion. This is because even in electrified households where electric stoves were available, it was observed that households continued to use the three stone fire. Women pointed out that the presence of electricity did not cause them to sever ties with the *'traditional'* kitchen. This is because they believe that cooking in the kitchen is a custom that cannot be easily abandoned. Interviewees argued that the way the kitchen is constructed makes it a focal point for social interaction and entertainment.

Key informants from the Ministry of Energy, Health and Environment concurred that the government of Zimbabwe had no funds to commit to indoor air pollution mitigation programmes. More so, they reported there was insufficient literature and research available to warrant indoor air pollution mitigation exercises. One other reason that was brought up was that the government had more pressing problems. They indicated that they were waiting for World Health Organisation and other United Nations agencies to spearhead such programmes.

From the above it is clear that the information about the effects of indoor air pollution is not reaching the grassroots. It can be argued that years after the dangers associated with indoor air pollution emerged the *"language"* of indoor air pollution is only circulating among

researchers, professionals and academics. The message has not yet reached the intended beneficiaries. Hence they continue to suffer from indoor air pollution without realising its dangers. People cannot act unless they have knowledge. In particular, there haven't been efforts to develop messages on indoor air pollution that have a gender dimension. Thus, if rural dwellers do not know about indoor air pollution and its dangers, they do not have an incentive to reduce it or to come up with strategies that may reduce it. This to some extent questions the existence of indigenous knowledge in the area of indoor air pollution. This challenges the universal applicability of the term indigenous knowledge systems in Zimbabwe which has been promoted by scholars like Matowanyika (2000).

While health care services from rural government clinics are still for free as articulated before, it was interesting to note that rural people did not show any health seeking behaviour for conditions that are caused by indoor air pollution. Neither do they make interventions to mitigate indoor air pollution even if there is evidence that they can afford to do so. Therefore, the basic conclusion on indoor air pollution remains that the dangers of indoor air pollution are not known at grassroots level. Health staff at grass roots level also indicated that they did not have specific tools to measure the impact of such pollution on community members.

CHAPTER 5

THE ROLE OF ELECTRICITY IN THE DEVELOPMENT OF RURAL COMMUNITIES

5.1 INTRODUCTION

This chapter is devoted to the presentation of research findings with regard to the potential and actual role of electricity in the development of rural communities. It particularly interrogates the common assumption that there is an axiomatic relationship between rural electrification and development. The chapter also exposes the findings with regard to the factors that determine the provision of electricity to rural households.

5.2 THE RURAL ELECTRIFICATION PROCESS IN ZIMBABWE

5.2.1 THE ORGANISATIONAL STRUCTURE

Upon attaining independence in 1980, the government of Zimbabwe launched the rural electrification programme as part of its many rural development programmes. Initially, the focus was on growth points, rural services centres and business oriented institutions. In 1995 the government initiated the Expanded Rural Electrification Programme. Until 2002, both rural and urban electrification in Zimbabwe was the responsibility of the Zimbabwe Electricity Supply Authority (ZESA). In 2002 the government of Zimbabwe enacted the Rural Electrification Fund Act, Chapter 13:19 of 2002 which provided for the establishment of the Rural Electrification Fund Board and the establishment of the Rural Electrification Agency (REA). This gave impetus to the electrification of rural areas (REA pamphlet).

The vision of the Rural electrification Agency (REA) is '*the total electrification of Zimbabwe*' and its aim is to embark on an Expanded Rural Electrification programme which seeks to electrify all institutions that serve the entire community (schools, clinics, government extension centres and offices, community based irrigation schemes, Model A1 farms[19], and resettlements schemes, and to expand the national power supply grid simultaneously to all rural institutions without a capital contribution by the communities. The Rural Electrification Agency's main objectives may be summarised as follows:

- To improve of the accessibility of electricity in all rural communities.
- To improve the quality of life through the delivery of modern social services like health, education etc.
- To stimulate a new investment in rural areas so as to create employment and increase incomes.
- To improve the general economic and social status of people in rural areas.
- To help reverse urban migration and energy related environmental degradation.

REA has three departments, namely the Operations Department, the Business Development Department and the Finance and Administration Department. An Executive Director heads the Operations Department and it offers the following products to rural communities:

- **Community initiated rural electrification programme:** This service is aimed at participation of rural people in electrification programmes. Rural communities are encouraged to come up with projects that complement the current projects run by REA in the expanded rural electrification programme. Community initiated projects qualify for a 60% capital subsidy. The community meets 40% of the cost of electrification done by REA. This however does not include installation costs from the ZESA meter point to the households.

[19] Model A1 farms are based on the village concept with communal residential and grazing areas that are separate from farming areas (Paradzayi 2007:3).

- **Rural electrification guarantee scheme (REGS)**: This scheme assists rural communities who cannot afford the total cost of connection fees. Such communities have to raise a 10% deposit and must repay their debt within 5 years at an interest rate of 50% per annum.

It is important to mention that the Expanded Rural Electrification Programme consisted of the phases set out in Table 18.

Table 18:
Rural electrification phases in Zimbabwe

Phase 1	Includes all projects[20] within 5 km of the network
Phase 2	Includes all projects within 10 km of the network
Phase 3	Includes all projects within 15 km of the network
Phase 4	Includes all projects within 20 km of the network
Phase 5	Includes all projects beyond 20 km of the network

Source: REA pamphlet: no year & page

In the analysis of the potential and actual role of electricity in development this dissertation shall continually refer to the objectives of REA, which is the institution that is responsible for rural electrification in Zimbabwe. The Rural Electrification Agency apparently has two vision and mission statements. One appears on pamphlets and the other one is in the REA Business plan 2005, which is apparently a '*confidential document'*. Due to the sufficient rapport that I created with the officials at REA, I was provided with the document as well as other documents for review. The vision and mission of REA also appears in an undated pamphlet which some staff members believe was produced late in 2004. Senior officials were uncertain of the year of production because '*such matters are the responsibility of our subordinates*'. However, some officials believed that the vision and mission statement of REA is continuously changed to create the idea that it is closely following development

[20]Projects referred to in the above table include households, schools, irrigation, borehole points, clinics etc. The term 'network' used in the table refers to electricity grid.

events when in most cases, it does not.

The Rural Electrification Agency endeavours to play the dual role of an element and a catalyst in the process of rural development, economic empowerment, capacity building and poverty reduction. It is an element in the sense that it plays a facilitatory and complementary role to other organisations that are involved in rural development programmes. Therefore, REA '*is committed*' to rapid and equitable electrification of rural areas and to promoting the productive use of electricity for socio-economic empowerment of rural communities collectively and individually.

Just like any other parastatal, the financial capacity of the mother company that owns REA, i.e. ZESA Holdings, has deteriorated significantly due to the negative economic situation in Zimbabwe and also partly due to an unsustainable tariff regime. However, this should be analysed in view of the fact that ZESA charges all electricity consumers a 6% rural electrification levy and 1% development levy since June 1994. In 2004 ZESA was unable to remit the rural electrification levy to REA. This put both REA and ZESA in a difficult position, to the point where REA's project implementation rate fell from 20 projects a month to almost zero between December 2004 and March 2005. This resulted in REA suspending all its projects in most of the districts.

5.2.2 THE EXTENT OF RURAL ELECTRIFICATION

Before discussing the developmental role of electrification it is also important to provide some indication of the extent of rural electrification in Zimbabwe. The statistics which are tabulated in Annexures E and F provides the following picture.

From 1980 until August 2005 the Government of Zimbabwe electrified a total of 1008 primary schools, 607 secondary schools, 714 Business centres, 356 rural health centres, 233 Government extension offices,148 Chiefs' homesteads, 435 small-scale farms, 361 villages, 85 irrigation schemes and 45 borehole points (see Annexure E). If the different provinces are viewed separately, the following picture emerges with regard to the number of electrified

institutions (see Annexure G):

- **Midlands Province** has a total of 433 electrified institutions. The districts with the largest and smallest number of electrified institutions is Gokwe North (67) and Runde (30) respectively.

- **Matebeleland South Province** has a total of 393 electrified institutions. The largest number of electrified institutions occurs in the Gwanda District (81) and the smallest number in the Umuzingwane District (32).

- **Matebeleland North Province** has a total of 339 electrified institutions, 67 in the Tsholotsho District and 29 in the Bubi District.

- **Masvingo Province** has a total of 603 electrified institutions, the second largest number in the eight provinces. The district with the largest number of electrified institutions is Gutu district with (143) the smallest number occurring in Chivi District (30).

- **Mashonaland West Province** has a total of 521 electrified institutions. The number of electrified institutions in the Hurungwe district is very high (147) which made it possible to compare the findings in this district with those in Gutu. Kariba District has the lowest number of electrified institutions (34) in this province.

- **Mashonaland East** has a total of 565 electrified institutions. The district with the largest number of electrified institutions is Marondera (103) while Murewa District has only 50.

- **Mashonaland Central Province** has a total of 510 electrified institutions. The largest number of electrified institutions occurs in the Mount Darwin District (67) and the smallest number in the Shamva District (44).

- **Manicaland Province** has the largest number of electrified institutions in Zimbabwe. Makoni District has the largest number of electrified institutions in this province (166) and Mutasa District the lowest (69).

Unfortunately, it is impossible to determine the extent to which rural households have been electrified to date because the figure that were provided in the REA internal Progress Report of 2005 refer only to 'villages' without specifying how many individual households have actually been connected to the grid. The last time that figures about the national coverage were made available, was in 2002 by the Central Statistics Office (see CSO 2002:133). However, there are serious problems with the CSO data in the sense that the data has many discrepancies, gaps and above all it is poorly quantified and it is unreliable (FAO 1998; Malaba 2006:5). As a result rural electrification data provided by CSO 2002 can not be relied upon as valid and reliable.

The Rural Electrification Agency itself could not provide figures on the extent of rural household electrification and could not provide gender specific data with regard to rural electrification. In addition it could not provide statistics with regard to the number of people who are on a waiting list. As far as could be determined, the Rural Electrification Agency is in the dark about the number of households that are in dire need of and eligible for electrification. It was also found that before 2002 neither REA nor its mother company ZESA has performed any evaluation exercises to determine the impact of the post independence rural electrification program (REA internal Progress Report 2005:16). Interviewees and key informants also confirmed this state of affairs.

This absence of reliable data is probably the main reason why the rural interventions of the Rural Electrification Agency are largely ineffective. Rural communities are connected to the electricity grid and then the service providers disappear, only to reappear when a transformer is struck by lightning. After electrification REA provides little after-care. This also explains why there are so many gaps in the organisation's data. Interviewees often remarked that REA is dominated by engineers who attach little value to impact assessments and the needs and

opinion of community members: '*Once they have connected a number of households to the grid they think that they have done a great job and you never see them again*'.

Officials attributed the differences in the number of electrified institutions in the eight provinces to the country's geography and the settlement pattern of the population. In the more mountainous areas where households are often far from each other, electrification is much more time consuming and expensive (Munasinghe 1987; World Bank 2006). This does not, of course, explain why the mountainous Manicaland Province has the largest number of electrified institutions.

It was also reported that the unequal electrification pattern can be attributed to differences in household income, indeed, this was often indicated as the reason why Manicaland was electrified more extensively than the other provinces. Manicaland has a high rainfall and fertile soils and is therefore largely an agricultural region. Households in this province have relatively high incomes because of their active engagement in agricultural activities and therefore find it easier to pay the required connection fees.

Some officials also attributed the differences in degree of electrification to power relations and politics. It was indicated that this was the reason why the districts of the two Matebeleland provinces have not experienced the same degree of rural electrification as those in other provinces. The Matebeleland region is the least electrified region in the whole country. Interviewees maintained that the issue of geography was a flimsy reason for the low levels of electrification. They believed that the low level of electrification is a clear sign of the board-room power of the Shona. Key informants reiterated that most parts of Matebeleland are not electrified despite the fact that this region houses the Hwange power station which generates most of the power in the country.

The basic criterion that has been used in electrifying rural Zimbabwe is distance of the institution/households from the grid. The rural electrification is carried out in phases as indicated in the table 18. Rural Electrification Agency officials pointed out that they are now in the 3rd phase in some rural areas, especially in Masvingo province and Manicaland

provinces. However, it was very difficult to establish the validity of such an assertion because there were no statistics that indicated the distances from the grid of those institutions that had been electrified. It was pointed out that schools, health centres, government extension offices and business centres were given first preference during the first phases of electrification. Government related institutions were electrified at 100% subsidy while business centres were electrified at a less subsidised capital subsidy of 60%.

Government related institutions and business centres were given priority because of the overall role they are believed to play in the improvement of the standard of living of rural people. It is envisaged that business centres will give impetus to SME development and subsequently to employment. Chiefs' homesteads were also put in the same bracket as government related institutions. They therefore get connected to electricity without paying any fees. Interviewees indicated that the electrification of the chiefs' homesteads was not necessary and was a waste of tax payers' money. They argued that chiefs should pay for rural electrification just like other ordinary citizens. Chiefs' homesteads that are far away from the grid often get connected to electricity before other homesteads that are very close to the grid. This reinforces the allegiance of the chiefs to the government. Since this programme of electrifying the chiefs' homesteads commenced, chiefs have been very active in supporting government policies and actions (such as Operation Murambatsvina).

It was found that the distance from the grid is not always a factor that determines whether one gets electricity or not. There are many cases in Gutu district alone, where homesteads which are 15-20km away from the grid have benefited from rural electrification while those that are near to the grid, that have the resources, and are eligible, have not yet benefited from rural electrification. Politicians and other influential people in the country as well as ZESA officials are the ones who usually benefit. This shows that rural electrification is also determined by one's position in society. This has highly compromised the role of rural electrification in Zimbabwe. There are cases where homesteads that engage in small enterprises that enhance food security and employment in the community have been bypassed in favour of a homestead that belongs to influential people who only use the electricity for lighting and entertainment.

In addition to the above, it was also found that as a matter of policy, politicians, influential people and ZESA staff had power lines diverted to their homesteads contrary to the original plan. There are cases were electricity earmarked for community projects such as irrigation and business centres, did not materialise because an influential person diverted the electricity line to his/her house or to that of a relative. It was surprising to note that houses that happened to be in the way of such power lines often only benefited from rural electrification after the diversion was completed.

It was reported that as a matter of policy, thatched houses are not eligible for electrification. Interviewees indicated that this simply means that the poor are not eligible for RE since most poor homesteads have thatched roofs. That also makes the whole process of RE an elitist one. Interviewees indicated that the pre requisite that one should have a brick roofed house was meant to exclude the poor from benefiting from rural electrification. While interviewees and key informants appreciated the risks that go with electrification of thatched houses, many questioned why the policy was being applied in rural areas. In urban areas grass thatched houses are electrified like all other houses.

Another criterion that is used for electrification of houses is that of the standard of house. Dilapidated and poorly constructed houses are not eligible for rural electrification. It was found that the state of houses of politicians, influential people and those who work for ZESA Holdings (REA included) are not scrutinised and some dilapidated homesteads have indeed been electrified. This poses a danger to the inhabitants as well as the employees who connect electricity to such dwellings.

When private electricians are contracted to do the wiring of houses, the ZESA regulation and standards should be adhered to. No wires may be left be exposed after the wiring process. However, it was found that in some houses the wiring was below standard and electric cords were often exposed, thus posing a risk to the inhabitants. Interviewees indicated that beneficiaries in such cases are either related to staff members or are bribed to use cheap material.

5.2.3 THE COST OF RURAL ELECTRIFICATION

Rural electrification tariffs are determined by the Zimbabwean government and ZESA Holdings and approved by the Zimbabwe Regulatory Commission in terms of section 53 of the Electricity Act (Chapter 13:9). It was found that rural consumers are not consulted when tariffs are determined. REA does not assess the incomes of electrified households in rural areas or consult rural consumers about tariffs. Rural people do not know how much they are charged per kilowatt hour (kWh[21]) or even what kilowatt hour means.

Table 19:
Electricity tariffs in selected African countries

COUNTRY	RATE	COUNTRY	RATE
Zimbabwe	0.0012	Uganda	0.0440
Ethiopia	0.0050	South Africa	0.0460
Malawi	0.0200	Kenya	0.0580
Zambia	0.0290	Botswana	0.0600
Tanzania	0.0440		

Source: Mapako and Mbewe 2004:67

Zimbabwe has the lowest tariff regime in Southern and Eastern Africa. According to Mapako and Mbewe (2004:67) the average tariff rate for 450 kWh in US dollars for countries in the region is indicated in table 19 above.

In view of the aforementioned, it can be concluded that rural electrification tariffs in rural Zimbabwe as well as those charged in urban areas are the lowest in the region. Chiwawa

[21] kWh stands for kilowatt-hour, a basic unit of electricity usage. Example: 10 - 100 watt light bulbs burning for one hour is equal to 1 kWh. (10 x 100 watts = 1,000 [kilo = 1,000] = 1 kilowatt x 1 hour = 1 kWh.) www.zesa.net/zedc/FAQs.htm.

(2007) argues that '*ZESA currently produces a kilowatt-hour of electricity at a cost of 1,386 Zimbabwean dollars but because of the low tariffs, sells it for just 218 dollars. As a result of the discrepancy, last year it suffered operational losses of eight trillion Zimbabwean dollars, US$80 million*'.

While it is appreciated that the tariffs for rural households are subsidised, they are unsustainable and unrealistic. The calculations made during the course of the research indicate that rural households pay about $Z 30000. 00 per month for electricity (approximately US$ 0.15). Such a tariff includes 1% development levy, 6% rural electrification levy and 17.5% value added tax. This figure is actually close to the findings of Mapako and Mbewe in table 19 above.

The connection charges also remain very low. The average connection fee in rural areas is Z$ 172 000. 00 (Approximately US$1 on the black market rate and US$ 2.50 on the inter bank rate. This amount includes the connection fee and the security deposit. This is very cheap considering that during the same period the average rural income was pegged at Z$ 500000.00. Given the fact that ZESA has been collecting rural electrification levy since 1994, the coverage of rural electrification should be close to 50% but this is not the case. The national average for electrification in Zimbabwe is currently at 33.13% while the average for rural electrification is below 5% (CSO 2002:133). The actual percentages for rural electrification are unfortunately not available.

In 2004 ZESA Holdings failed to grant money to REA to the point where REA had to downscale its projects from 20 to zero per district between 2004 and March 2005. From January – March 2005 only 20 billion Zimbabwean dollars was remitted to REA from ZESA. With inflation at more than 700% this was a paltry amount. According to the Zimbabwe Electricity Distribution Company (2005) the first 250 kWh are charged at unsustainable tariffs. This is clearly shown in table 20.

Interviewees pointed out that in most cases rural electrification was used by politicians to buy votes. One interviewee said, '*They* (the politicians) *will only bring electricity here when we*

vote for them. If we don't we were told that we will not see electricity lights for the next hundred years'. It is worth noting that the expanded rural electrification programme was introduced in the new millennium when the government was threatened by the opposition. Rural electrification was consequently used to influence voters in rural areas and the adage *'electricity for all'* was rehearsed like a chorus.

Table 20:
Rural Conventional metre charges

Energy per kWh	**Cost**
1st 250 kWh	$18.75
251-500 kWh	$ 12.42
Balance	$374.90

Source: Zimbabwe Electricity Distribution Company 2005

5.3 THE ACTUAL ROLE OF ELECTRICITY IN RURAL DEVELOPMENT

Interviewees believed that electricity has a lot of potential in as far as transforming rural areas is concerned. Many shopping lists were put forward by interviewees depicting their view of the potential of rural electrification. They foresaw a world of make-belief where rural areas will be transformed into a hub of business activities and indicated that electricity had the potential to raise their incomes substantially. The income-generating activities that were most often referred to are irrigation for agriculture, grinding mills, welding, carpentry, sewing, knitting, freezit making, peanut butter making, soap making.

Women indicated that electricity had the potential of reducing their workload as well as facilitating income-generating activities which in turn would free them from patriarchy and narrow inequalities between men and women. Other interviewees believed that rural electrification would reduce rural-urban migration by providing employment opportunities in rural areas. It was put forward that both the economically active as well as victims of

Operation Murambatsvina would be able to find employment. Improvement in the standard of living, improvement in communication, improvement of roads, mitigation of environmental degradation and improvement in health service delivery were also some of the potential results of rural electrification that were identified.

5.3.1 RURAL ELECTRIFICATION AND AGRICULTURE

It was found that rural electrification is playing a very significant role in the agricultural sector especially in the establishment of irrigation projects. To date rural electrification has resulted in the establishment of 85 irrigation schemes. It was found that irrigation enhanced agricultural production and resulted in greater food security. Irrigation schemes have indeed transformed subsistence farmers into commercial farmers.

In Hurungwe West, rural electrification resulted in the establishment of Chiwore irrigation scheme. In this scheme farmers have plots that range from 1 to 10 acres. Up to 150 households from 30 villages have benefited from the irrigation scheme. Farmers are involved in horticulture and cultivation of cash crops, groundnuts, beans as well as maize and corn.

The irrigation project is dependent on Chiwore Dam in the perennial Chiwore River. The farmers sell their produce at markets in Magunje and Karoi. Sometimes it is sold directly to people who come from as far as Chinhoyi and Kariba. They also supply hotels and lodges within a radius of 6-40 kilometres from the scheme. Some of the produce is sold to teachers, nurses and other extension staff that work in the area. The total cost of electricity is divided amongst all 450 members who are involved in the scheme. The farmers indicated that they pay an average of Z$ 500 000.00 per month to cover for the cost of electricity and maintenance of the irrigation equipment.

The situation of these farmers has changed markedly since electrification. Before the establishment of the irrigation scheme they formerly indicated that they were living on less than US $1 a day. There were indications that they lived in abject poverty, their incomes were

very low, their households were food insecure, and they could not afford their children basic health services. However, after the establishment of the irrigation scheme their households became food secure and they found their incomes rising from close to nothing to Z$ 20 million per month, five times the salary of a degreed civil servant. Households involved in the irrigation scheme are now even able to send their children to boarding schools. It was reported that rural urban migration had reduced significantly as a result of local employment opportunities.

Although the Chiwore irrigation scheme has transformed the lives of the households that are involved, it has left quite a lot to be desired with regard to the position of women. More than 95% of households are still male-headed households. No child-headed households are involved in this scheme. It was noted that women from female-headed households were sidelined because land is the preserve of men. Women who belonged to male headed households did not benefit much because all the proceeds that are accrued in the business are controlled by the men. Therefore women in male-headed households have remained economically disempowered despite participating in a financially viable project. This was also the case in the other irrigation schemes that were studied in Mutasa, Gutu, Murewa, Zvimba and Mutoko Districts.

In Gutu, Chirumanzu and Murewa Districts, REA is not doing much with regard to irrigation. In Bikita and Bindura districts, it was found that many communities are still using diesel powered engines for irrigation even when the area had benefited from rural electrification. This is in spite of the fact that those communities had indicated their willingness to pay for the change from diesel to electricity. It was indicated by farmers in the irrigation project in Matsai that they made this request to REA well before the advent of the fuel crises. Although other business and government offices in the area have benefited from electrification the irrigation scheme was left out. The farmers are currently in dire straits because diesel has become scarce and expensive. The farmers have since failed to procure diesel and the crop which they had under irrigation will probably be lost.

In some districts, it was also found that the role of RE in developing communities was

hampered by the community members themselves. A case in point is Nyamandi area which is in Gutu North. The Nyamandi community received a diesel powered water pump in the 1980s. The water was used for drinking and household purposes and cultivation of gardens. Because of the fuel crises the engine stopped functioning. This has negatively affected the household income and food security of more than 100 households.

Some of the community members who are beneficiaries of the project approached REA and the latter indicated that *'If the community raise Z$15 million, the engine could be changed within a week'*. Some community members refused to contribute the Z$ 150 000.00 that was requested, insisting that it was the government's responsibility to change the engine. Community members failed to appreciate that food insecurity, the drinking of unsafe water and the subsequent lose of incomes cost them more than the Z$ 150 000.00 they were refusing to pay.

It was interesting to note how rural electrification through irrigation has been used to augment Home Based Care Activities (CHBC). Such a synergy was the first of its kind in the whole country. Community Home Based Care (CHBC) is now a common phenomenon in rural Zimbabwe because of the effects of HIV/AIDS. The University Of Zimbabwe Quality Of Care Project that is running a CHBC project in Murewa district fostered a unique synergy between CHBC and irrigation that is powered by electricity. The University Of Zimbabwe Quality Of Care Programme realised that secondary caregivers, who are the principal drivers of CHBC operate without any incentives. As if this is not enough, they end up taking food from their own households to feed the sick clients in other households. To solve this problem the project established an irrigation scheme that is powered by electricity for all the CHBC caregivers. The project had many positive results:

- Care givers became motivated because they raised incomes from their produce
- CHBC clients households became food secure because care givers found it very easy to give them part of their produce for free as they used to do with food from their households.

- The general community also became food secure because they bought farm produce at reasonable prices all year round.
- The scheme employs some members of the community paying them in cash or kind.

5.3.2 RURAL ELECTRIFICATION AND INFRASTRUCTURAL DEVELOPMENT

In Mutoko and Murewa, communities which have benefited from rural electrification and subsequent irrigation fails to break even because they do not have external markets for their produce. Although food security problems were solved, the community is facing a daunting challenge of finding markets. More often than not the produce from the farms also rot before getting to markets because of lack of efficient transport networks and poor marketing. Transport operators are not willing to ply the route because of poor roads.

It should be noted that irrigation on its own may fail to develop rural communities. There is need for complementation of the irrigation projects by infrastructure, efficient transport and markets. The government, private sector and NGOs should assist the community to strategically market their produce so as to reduce losses. Other interviewees indicated that there is a need for the community to collaborate with the private sector and commercially package the various vegetables and tomatoes thus adding value to the products. More so, these products can be exported and earn the country the much needed foreign currency. It was found that rural electrification utilised for irrigation in rural Zimbabwe increases incomes in households under the following conditions,

- When beneficiaries own the project and are willing to share costs incurred in running the project with relevant stakeholders.
- When there is an effective transport system and developed infrastructure (e.g. properly maintained roads, telephones and strategic markets).
- When the irrigation projects are gender sensitive and also take child-headed House-holds on board.

5.3.3 RURAL ELECTRIFICATION AND INCOME GENERATING ACTIVITIES

While REA envisaged that electricity would be utilised in income generating activities, it was found that this is not happening. Beneficiaries of rural electrification do not have the capital to buy the machines that are needed and there are no credit facilities available. The few that are offered by REA are only for schools and cooperatives.

The reason for failure of communities to engage in SMEs is that households do not know how electricity can be used beyond lighting and the type of SMEs that they can engage in. There were no indications of gender sensitivity in the income generating activities that are powered by rural electrification. Women are involved in SMEs that do not involve high technology such as sewing machines, while men are usually involved in grinding mills and irrigation projects which are very technical and yield high returns.

It was found that rural electrification has enormous power to turn around the tide of low incomes in rural areas. However, the cardinal rule is that the beneficiaries of rural electrification must be able to use the electricity productively in income generating activities. It was found that households that used electricity in income generating activities, had a more than 50% increase in their incomes. Some actually reported more than 100% increase in their incomes.

Bakeries stopped functioning because of the shortage of firewood and wheat. It was indicated by interviewees that the bakery business can be revived because currently the bread that is sold in shops is too expensive for many people. More so, the establishment of an irrigation project in the Gutu district has necessitated the cultivation of wheat hence the bakery will be a viable business.

After using Z$ 400 000.00 to procure a bucket of maize and 15 kg of finger millet meal (*rapoko)*, one can brew more than 50 litres of beer. This will translate into Z$1.3 million when sold which means a Z$ 900 000.00 profit is accrued. It was however indicated that the shortage of firewood was hampering the production of beer. Interviewees indicated that they

needed assistance with electricity powered machines that brew beer.

Another viable income generating activity that was identified in Gutu District is that of banana irrigated plantations. Households that were engaged in this endeavour realised a lot of profits because Gutu is drought prone and bananas are very marketable. However, interviewees who are involved in this business indicated that there is need to add value to the bananas by packaging them.

Pottery is another viable income generating activity that was identified. This is largely because of the current changing consumption patterns that have been caused by the declining economy and the failure of the improved stoves project. The interviewees in this business indicated that pottery could be taken to a higher level if electric ovens could be attained.

5.3.4 RURAL ELECTRIFICATION, HEALTH AND EDUCATION

It was found that rural electrification played a significant role in the development of the rural education and health sector. This is very important because education is a key indicator for development in developing countries. Rural electrification made it possible for rural health centres to keep drugs that need refrigeration. Clinics can now operate in the evenings and electrification also enabled health centres to get safe water. Staff turn-over is also reduced significantly; the staff members indicated that there was no need for them to go to urban areas any more because all they wanted from urban areas was electricity.

Due to the escalating costs of commodities, the former 100% subsidy of school electrification is no longer possible. Schools are now expected to do the wiring of the buildings that they want electrified on their own. This has negatively affected rural electrification in schools because many rural schools can not afford wiring the buildings on their own. It was estimated that the wiring of one building costs about Z$ 4 million. Consequently, some rural schools which are close to the grid have not yet benefited from rural electrification. Headmasters at rural schools indicated that their schools had no capacity to

generate the wiring funds because, on average more than ten buildings (including teacher's houses) need to be wired. Primary schools are in a much worse position, because the school fees that are charged are very low. In 2005 rural primary and secondary schools charged between Z$ 100 000.00 and Z$ 600 000.00 respectively. School officials indicated that they could not burden school children with an electrification levy because, the school fees was already out of the reach of many parent─especially child-headed and female-headed households. Coupled with recurring devastating droughts, households in rural Zimbabwe are more concerned with bread and butter issues than anything else. Adding another variable to this problem will only result in more school drop-outs.

In terms of education many schools indicated that because of Rural Electrification their pass rate increased from below 30% to over 50% and more. This was mainly because school children were able to study for longer hours. The second major reason is that electrified schools are able to retain trained teachers because as mentioned above, electricity satisfied their needs. Moreover, electrified schools are able to lure qualified, experienced and performing teachers.

5.3.5 RURAL ELECTRIFICATION AS AN INCENTIVE FOR DEVELOPMENT

Although there are scattered projects that have been stimulated by rural electrification the evidence on the ground confirmed that rural electrification is not yet an incentive for development (see 5.3). Both REA and the people at grassroots level view electricity as an end in itself. Electricity is viewed as a magic potion which causes development automatically. As a result people at grassroots level do not use electricity beyond lighting. While REA has tried to offer products that can be used to generate incomes, these have not been popular with beneficiaries. Some interviewees stated that these packages and the rural electrification in general has been offered without engaging the rural populace in meaningful participation. The latter therefore often fail to use electricity beyond lighting. This has also been the case elsewhere in Africa. Rural people often do not get information about the success stories that are linked with electrification. It was found that political interference, inadequate funding, prioritization of projects, corruption and nepotism all prevent rural electrification to become

an incentive for development.

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 OBJECTIVES, RESEARCH AREA AND METHODOLOGY

Energy (particularly electricity) is increasingly being recognised as an incentive for development. However, very few scholars have been interested in exploring energy consumption patterns and how they affect development in rural areas. In addition, there is not much written about the link between rural electrification and development. Against this background, the study set out to investigate energy consumption patterns and the role of electricity in development. This chapter presents a brief summary of the findings as well as a number of conclusions and recommendations.

Very few scholars have written extensively about energy consumption patterns and the role of rural electricity as a development incentive. It is argued that there is conspicuous dearth in the literature regarding the aforementioned subject and that energy consumption patterns and the role of rural electrification is still clouded in mystery. Most of the data in the available literature were obtained through quantitative research methods which ignore the salient issues surrounding energy consumption patterns and the role of electricity in development. Against this background the general aim of this research was to investigate the energy consumption patterns of rural households in Zimbabwe with special reference to the role of electricity as a development incentive. The objectives (see 1.2) were to identify energy resources used in rural Zimbabwe, to analyse the current energy consumption patterns as part of life strategies, to expose the gender and power related nature of energy consumption and to determine the potential and actual role of electricity in the lives of rural people.

Gutu district which is located in the Northern part of Masvingo Province (Zimbabwe) was selected as the primary research area for this study, the district was chosen because the researcher is familiar with the area and speaks the local language fluently. In addition, Gutu

district is a major beneficiary of the rural electrification and improved stoves programme. The data that were gathered in Gutu District was verified in seven other districts (see table 2). Gutu district is inhabited by the Karanga speaking people of the *gumbo* totem (see 1.3.2). The communities in the district are patrilineally organised and divided into clans each with its own clan name (*mutupo*) (see 1.3.2). The socio-political affairs of rural communities and wards are administered by chiefs and councillors (see section 1.3.2, 4.2, 5.2.2). The relationship between chiefs and councillors is characterised by suspicion and antagonism (see 1.3.2, 4.2, 5.2.2). Such suspicion is also found at national level between the Ndebele and the Shona (see 5.2.2). It is irrefutable that Ndebele people are marginalised and are excluded in key development programmes (see 1.3.2).

A plethora of books, journal articles and internet documents were consulted. It was concluded that the issue of energy consumption patterns and the role of electricity as a development incentive in rural communities is treated superficially in the literature (see 1.4.2). In order to study the phenomena in the natural and context–specific setting at grassroots level, the qualitative design was used (see 1.5). The field research was conducted over a period of seven months, from September 2005 to March 2006. A mixture of research methods were utilised so as to triangulate the gathered data (see 1.4). Participant observation was used as the principal method for field research because it allowed the researcher to become an observer as well as a participant (see 1.5.2). Therefore, the researcher managed to observe and experience the finer details about energy consumption patterns and the role of electricity in development. For triangulation purposes, interviews, focus group discussions, time and movement studies, life histories and case studies were also conducted (see 1.5.1). In depth interviews were conducted with officials (junior and senior) from the Rural Electrification Agency, the Ministry of Energy and Power Development and Non Governmental Organisations (see 1.5.1). Interviews were also conducted with chiefs, village heads and the members of seventy households. The key units of analysis were both the household and the individual. Purposive sampling was utilised in selecting participating households and interviewees (see 1.6).

As a fundamental principle the researcher obtained permission to conduct field research from the Rural Electrification Agency, the Masvingo Provincial Administrator as well as the

Ministry of Energy and Power Development (see attached annexure A, B and C). On the local level permission was sought from chiefs, village heads, household heads, interviewees, guardians for child-headed households and the children themselves. Since the researcher came from the key research area and was also familiar with the language and cultures of the other researched districts, data collection was relatively easy.

6.2 THE AVAILABILITY AND UTILISATION OF ENERGY SOURCES

The research was carried out during a time when rural communities were going through a difficult time due to drought and the general harsh economic climate that characterised Zimbabwe in general (section 3.1). An exercise was done to rank energy against other key resources and services such as food, water, education, and health. It was found that energy was ranked the least important (see 3.2). Food, water and health were ranked higher than energy because of the prevailing conditions and also the obvious lack of knowledge about the potential and actual role of energy in development. The key energy sources that are currently being utilised in Zimbabwe include electricity, gas, solar, firewood, paraffin, bio-gel and dung (see 3.3). These energy resources are used for heating, lighting and cooking purposes.

In the research area electricity is mainly used for lighting and cooking purposes section (see 3.1). Interviewees concluded that previous energy programmes discussed in section 3.1 of this dissertation are not being implemented based on the energy consumption patterns of beneficiaries. It was found that rural people highly regard and have a positive view of electricity (see 3.3.1). However, due to culturally entrenched beliefs even electrified households still used firewood for cooking purposes. This is because many electrified households are still convinced that traditional dishes are better when cooked on the fire than on electric stoves (see 3.3.1, 3.4). The use of solar panels, gas and bio-gel is very low because of unavailability and myths (see section 3.3.2-.3.3.4).

Paraffin is used for cooking, lighting and heating purposes (see 3.3.5). However, during the period of the research paraffin was a scarce commodity due to the prevailing fuel

crises in Zimbabwe (see 3.3.5). As a result low grade paraffin is utilised in all households. Candles, tyres and rubber are utilised a substitutes for paraffin especially for lighting purposes (see 3.3.5).

Firewood is the major energy source used by rural communities. However, because of deforestation, this energy source is dwindling on a daily basis (see section 3.3.7). As a result households in deforested areas such as Gutu have resorted to dung as a substitute for firewood (see 3.3.8). As a result of the scarcity of firewood, gender roles have changed ─men are actively participating in firewood gathering which was traditionally part of women's roles. Child-headed households and female-headed households are affected more adversely by the shortage of firewood since they only have usufruct rights to the land and forests. It was proved that in response to firewood shortages households collect dead wood, chop branches from living trees, uproot stumps, burn animal dung and crop residues, cook fewer meals or buy firewood (3.3.8).

Rural Zimbabwe has been witnessing escalating levels of environmental degradation. The harsh economic environment has also provided a fertile ground for environmental degradation to continue unabated as people unsustainably use available natural resources. This research proved that there is a direct link between poverty and environmental degradation (see 3.5). However, rural communities showed a systematic apathy in dealing with environmental degradation and they have little incentive to mitigate the degradation.

6.3 THE GENDER AND POWER RELATED NATURE OF ENERGY CONSUMPTION

Patriarchy is still prevalent in Zimbabwe despite the fact that the government has instituted a number of legal frameworks to promote gender equality (see 4.1). Women are still excluded from key development issues such as electrification. The research proved that the introduction of the cash economy played a major role in exacerbating the inequalities that exist between men and women (see section 4.2). The issue of gender inequalities is not treated with

the energy and vigour it deserves, but is romanticised as part of '*traditional culture'*. The improved stove project, energy income generating activities and credit facilities are used as examples to show the inequalities between men and women. It was also found that gender inequalities are prevalent in the rural electrification process. More male headed households benefit from rural electrification than female and child-headed households (see 4.3).

Due to the unfortunate position of women in the society and the gender roles which they are supposed to satisfy, women end up bearing the brunt of indoor air pollution (see 4.4.2). They are consistently exposed to smoke as they do their daily household chores. Although indoor air pollution is affecting the public health of rural people, the government is not doing much to abet the problem (see 4.4.6).

Although scholars argue for the existence of indigenous knowledge systems in rural areas, this study found that indigenous knowledge systems in the area of indoor air pollution is non existent in rural Zimbabwe Therefore this study contests the argument of the universal existence of indigenous knowledge systems in rural areas. It was found that most rural dwellers are not aware of the effects of indoor air pollution other than the fact that it causes some mild headache and sore eyes. In addition, most rural dwellers do not take indoor air pollution as a serious health threat and thus they do not seek medical attention for respiratory problems caused by indoor air pollution. House ventilation is not considered important and households make no effort to ensure proper ventilation structures in their homes.

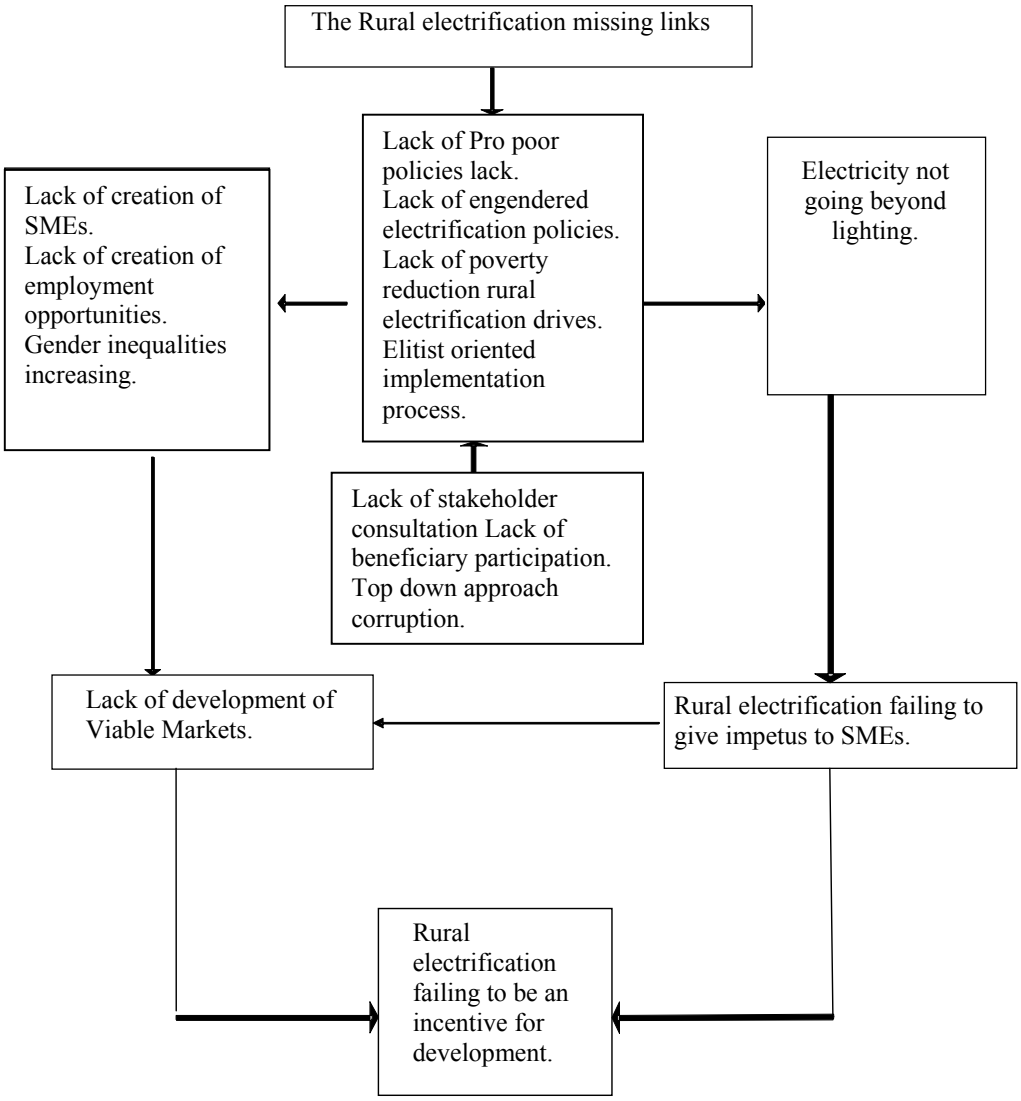
6.3 THE ROLE OF ELECTRICITY IN RURAL DEVELOPMENT

The government of Zimbabwe launched rural electrification as one of its many development programmes when it attained independence in 1980. However, the Rural Electrification Fund Act which was enacted in 2002 provided for the formation of the Rural Electrification Agency and the speeding up of the rural electrification process (see 5.2). The vision of the Rural Electrification Agency is '*the total electrification of rural Zimbabwe'*. The Rural Electrification Agency has three departments which are the operations department,

Finance and Administration Department and the Business development Department. There is no reliable data about the extent and impact of rural electrification. It is mentioned that REA has not yet assessed the impact of the rural electrification process (see 5.2). Tariffs charged by the Rural Electrification Agency are unrealistically low and highly unsustainable (see 5.2.3).

Figure 4:

Reasons why rural electrification has failed to develop rural communities and households



The positive effects of rural electrification in the health and education sector and in SME development cannot be over-emphasised. SMEs include freezit making, welding, sewing, irrigation, peanut butter making and soap making. It is however, pointed out that both the Rural electrification Agency and people at grassroots level fail to use electricity as a catalyst for development (see section 5.3.4). The failure of electricity to become a development incentive is because of lack of planning, a top-down approach, political interference and the apathy of beneficiaries. Figure 18 give a summative analysis why rural electricity is not yet an incentive for development in rural Zimbabwe.

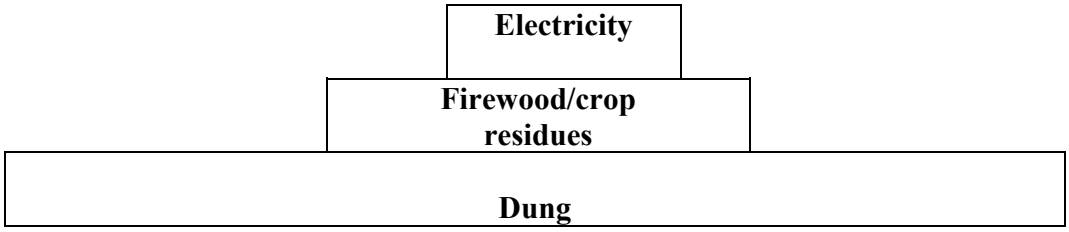
6.5 THE APPLICABILITY OF ENERGY THEORIES

Of all three major theories, only the energy transition theory is really significant in explaining the energy consumption patterns in rural Zimbabwe. Major differences were noted between the theoretical propositions and the reality in the researched areas. The 'ladder of preferences' that was proposed by some scholars applies to rural Zimbabwe (section 2.5.3.1). Households prefer to move from low order fuels to energy sources that are clean and efficient when their income increases. However, in rural Zimbabwe there is no clear progression of households moving directly from one energy source to the other.

Electricity remains at the apex of the energy pyramid in Zimbabwe. Its role in income generation as well as its cleanliness and efficiency makes it the preferred energy source.

Figure 5:

The current energy pyramid



The energy pyramid that currently applies to the rural areas of Zimbabwe is unique and different from the energy pyramid that has been proposed in the literature (see 2.5.3.1 and figure 5 above). The three fuel types indicated in the figure above are the only active fuels. Paraffin is as good as non-existent and several households reported that they had gone for more than seven months without paraffin. An insignificant number of households use gas. However, interviewees indicated that even if they get a lot of money gas is totally out of their energy options because of its propensity to explode. Coal is non-existent in rural areas of Zimbabwe.

Contrary to the conventional pyramid where crop residues are at the lowest level of the pyramid, it was found that crop residues are given the same value and rank as that of firewood (see figure 2). This is because the quality of firewood that is now used in rural Zimbabwe (especially in areas that are deforested like Gutu North and Zvimba) is the same as that of crop residues. Some interviewees (especially women) and children indicated that they sometimes preferred to use maize cobs rather than firewood that is not dry enough. This brings another side to the debate of the energy transition theory: that the ranking of energy sources is not universal because issues such as the quality of the energy source at a given moment is of outmost importance. Moreover the quality of energy sources are location specific.

In the conventional energy pyramid, dung is second from the bottom (see figure 2). In rural Zimbabwe, however, informants and participants, (especially women and children) emphasised that dung was the most inferior source of energy. In most households cooking is done in the kitchen and because these kitchens are not well ventilated indoor air pollution becomes a major problem when using dung.

While the transition pattern in rural Zimbabwe confirmed that electricity is the number one energy choice, the issue of income influencing the transition is contested. Although incomes does influence change from an inferior source to a more superior one, income is not the sole determinant of upward transition. Even when incomes increase, households do not move up the energy ladder and multiple fuel use is common. Issues such as the type of food

being cooked and the size of the pot determine whether to use electricity or not. It is believed that certain dishes such as *sadza*, and *mutakura* taste better when cooked on the open fire (see 3.4).

It was also found that the environmental condition of the area determines which fuel type is used. Households are forced to move to use dung because of the current shortage of firewood. Even when the income of households increased, they often use the money to buy firewood.

Gender and power relations rather than incomes determine the fuel source to be used (see 2.5.3.1). Intra household power struggles also have a bearing on the fuel type used. Men have the power to make decisions on the energy sources to be used, they decide whether to install electricity or not or whether to buy paraffin or not (see 4.2.1). Even when their income increase, women in male headed households, may not be able to make a decision to install electricity. There were cases where the researcher found male headed households using dung, not because they did not have money but because the male head of the family rejects the idea of using bio-gel or electricity. This shows that income is not always a common denominator in energy transition and that energy transition processes are still culture bound.

In a nut shell, there are a number of points that need to be borne in mind regarding the relevance of the energy transition theory:

- Electricity is at the apex of the pyramid and all things being equal, it is the number one energy choice.
- Households in Zimbabwe do not follow a clear movement from one energy source to the other. Some of the movements are non-directional. Reverse movements in energy transition are also common.
- Income is not the sole determinant of energy consumption patterns. Gender, power relations and the type of food being cooked play a major role.
- Multiple fuel uses are common in electrified households.

- Not all the fuel sources that are indicated on the energy pyramid are found in all the areas. Transition can happen among three fuel types *viz* electricity, firewood and dung.
- The economic situation of the country determines the direction of the energy transition.
- Crop residues and wood may be placed on the same level in view of deforestation.

6.6 RECOMMENDATIONS

Against the backdrop of the findings of this study, it is recommended that all role players in the energy sector need to recognise that energy consumption patterns are central in understanding rural energy issues. In this regard there is need for the Rural Electrification Agency to view rural electrification as more than an engineering activity. It is suggested that the energy policy formulation process be accelerated so that the Ministry has a policy reference point. In addition the Ministry of Energy should also mainstream gender issues into the energy policy.

The Rural Electrification Agency needs to adopt pro-poor policies so that it may facilitate real change in the lives of the poorest of the poor. Moreover, they need to ensure that its programmes are gender sensitive and that all the data are gender disaggregated. There is also a need for the correction of gender imbalances at the top level. Credit facilities should be accessible for Small and Medium Enterprises in a gender sensitive manner, and capacity building programmes should be put in place.

The Ministry of Energy needs to conduct a national energy needs assessment and the Rural Electrification Agency should facilitate comprehensive data to capture all the information on rural electrification on a regular basis. The Ministry of Energy and REA should monitor and evaluate energy programmes more often. Statistics on rural electrification should indicate the number of individual households that have benefited from rural electrification. In this regard, statistics should show the number and specific names of institutions that have been electrified

against the number of those that are unelectrified. Further, REA should establish a vibrant, multidisciplinary research unit to undertake all the above and other necessary research.

Regarding tariff regimes it is recommended that Zimbabwe Electricity Supply Authority should charge realistic and sustainable tariffs and do away with cosmetic tariff regimes. In doing this, REA will be able to sustain the rural electrification programme and to reach out to more rural dwellers. Rural electrification should be integrated into the mainstream rural development strategies and the private sector should actively participate in energy programmes. Also, rural electrification and other energy programmes should be implemented through popular participation in order to enhance the ownership of the projects or programmes. A bottom-up approach should replace the current top-down approach.

Bio-gel presents an opportunity for Zimbabwe to solve indoor air pollution (see section 3.3.4). Therefore research in this regard is imperative. It is also recommended that education on the effects of smoke should be initiated and ways of reducing the effects of smoke should be communicated to rural dwellers. The government should also consider indoor air pollution as a public health issue and give it the commitment and resources that it deserves. Overall, the government of Zimbabwe and its development partners also need to work towards uplifting the status of energy so that it can be recognised as a basic need.

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Annexure A: Permission received from the Provincial Administrator of Masvingo Province

-OCT-2005 08:44 FROM:SAMSUNG 65968 TO:04771908 P.1

FROM : VISIONARY BUSINESS CONSULTANTS FAX NO. : 00 263 4 771908 Sep. 19 2005 12:10PM P1

Attention the Provincial Administrator

2005-08-22 fax 065968 No objection

Attn Davidzo Muchawaya Fax to 04-771908

Provincial Administrator
Local Government, Rural & Urban Development
20 SEP 2005
P.O. Box 595
MASVINGO

University of Pretoria
Pretoria 0002 Republic of South Africa
Department of Anthropology and Archaeology

TO WHOM IT MAY CONCERN

Re: Request on behalf of Miss Davidzo Muchawaya

Miss Davidzo Muchawaya is a Zimbabwean citizen (Passport Nr AN 662666). She also has a valid permit to study in South Africa and is enrolled as a postgraduate student at the University of Pretoria (Student nr. 25494572). Miss Muchawaya presented her research proposal at a seminar of the Department of Anthropology and Archaeology of the University of Pretoria on the 12th of July 2005. The staff of this department (including the departmental research committee) were extremely positive about the feasibility of Miss Muchawaya's intended field research and extremely impressed by her well-structured proposal. They have therefore unanimously accepted her proposal and her enrolment was henceforth upgraded from the Master's Preparatory Programme to the MSocSci specialising in Community Development (Code 01253002).

I have worked very close with Miss Muchawaya during the past six months. In this period she had to prepare several assignments and we had weekly discussions. She achieved a standard of performance that had been equalled by only a limited number of the students who worked under my supervision during the past five years. She is a very amicable and diligent person who has outstanding mnemonic and oratorical abilities and she is a rational and innovating thinker. Her mature outlook on life and her respectful attitude toward both her seniors and juniors have been noted. She is notably purpose oriented and I have no doubt that she will make a success of her studies.

In partial fulfilment of the above Master's degree miss Muchawaya has to perform field research in the rural areas of Zimbabwe until at least the end of January 2006. Her research will be conducted with my full knowledge and support. The proposed title of her dissertation as well as a summarised version of the aim and objectives of her research and her research methodology and protocol appears overleaf.

It is expected of Miss Muchawaya to obtain permission from all relevant authorities and institutions before she commences with her research in any area in Zimbabwe. She has identified you, your colleagues and your assistants or councillors as one of these authorities and/or institutions.

I therefore request you to grant her permission in writing to conduct her intended research and to assist her in any way that you deem appropriate. If you need any additional information or wish to comment on her behaviour, please feel free to ask her any questions or to contact me at any time.

Yours faithfully

Prof. Dr. J.D Kriel (Organizer : Community Development Degree Packages)
Phone: +27 12 4202598/6 **E-mail:** johann.kriel@up.ac.za **Fax:** +27 12 4202698

Annexure B: Permission received from the Ministry of Energy and Power Development

FROM :HRD ENENGY FAX NO. :263+4+727524 Sep. 26 2005 03:59PM P1

Telephone: 791760/9,733095/9
Fax: 721967

ZIMBABWE

Reference:

MINISTRY OF ENERGY & POWER DEVELOPMENT
Private Bag 7758,
CAUSEWAY, Zimbabwe

26 September, 2005

Prof Dr J. D. Kriel
Organizer : Community Development Degree Packages
University of Pretoria

FAX : 27 12 4202698

REQUEST ON BEHALF OF MISS DAVIDZO MUCHAWAYA

Your fax dated 20 September 2005 on the above subject matter refers.

Please be advised that the Ministry of Energy and Power Development has no objection to Miss Muchawaya carrying out her research. In fact we would only be too pleased to assist her.

However, we would expect her to pay us a courtesy call before she embarks on her study.

E. C. Gapara
ACTING SECRETARY FOR ENERGY AND POWER DEVELOPMENT

/pj

Annexure C: Permission from the Rural Electrification Agency (REA)

20

RURAL ELECTRIFICATION AGENCY

Internal Correspondence

From: Chief Executive **At:** Megawatt

To: Addresses Below **At:** Various

Date: 26th September 2005 **Ref:** 58/2/EM/pm

Subject: **REQUEST FOR INFORMATION ON REA AND PERMISSION TO CARRY OUT INTERVIEWS WITH REA STAFF**

Miss D Muchawaya is a student with the University of Pretoria, RSA. She is studying for a Masters degree specialising in Community Development.

In partial fulfilment of her studies she wishes to research on the topic "Energy Consumption Patterns with special reference to the role of electricity as a development incentive". The topic is relevant to REA and we should therefore assist in her research. I request all Executive Directors, Managers, Project Coordinators' and staff to respond to interviews and questionnaires she may present.

E. MIDZI
CHIEF EXECUTIVE

Addresses: REA Directorate
Head Office Managers & staff
Provincial Rural Electrification Managers & Staff

cc: Executive Director (Business Development) – *Miss Muchawaya may carry with her a copy of this internal correspondence as proof of authority to research within the organisation.*

cc: Miss D. Muchawaya - *You have the REA's permission to carryout your research. We will appreciate a copy of your report once you have completed your research.*

Annexure D: Consent form (English translation)

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Dept. of Anthropology & Archaeology
www.up.ac.za/aa
Tel: +27 12 420-2598/6/5

Research Title: Energy consumption patterns in rural Zimbabwe with special reference to the role of electricity as development incentive.

My name is Davidzo Muchawaya, I am a graduate student in the Department of Anthropology and Archaeology (Faculty of Humanities) at the University of Pretoria. I am conducting out a research on Energy consumption patterns with special reference to the role of electricity as a development incentive.

I am kindly asking you to participate in my research project. Participation in this research is voluntary. I will do my utmost to ensure your anonymity in all my written reports and I will not divulge any information that might compromise you in any way. All information that you give to me will be treated in a confidential manner. In addition, you can withdraw from participating in this research project at any time without any consequences.

I will provide you, upon request with any additional information about my research project and answer any questions about my studies, my research methods and myself. You may contact me on the following number: 0027 73 072 7443. Alternatively you can contact me via the following email address dmuchawaya@yahoo.com

I, the undersigned, have read the above and understand the nature of the research project of Davidzo Muchawaya and my potential role in it. I voluntarily consent to participate in the research project.			
Full name of participant	Signature of participant	Witness' signature	Date

Annexure E: Consent form (Shona version).

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Dept. of Anthropology & Archaeology
www.up.ac.za/aa
Tel: +27 12 420-2598/6/5

Kukumbira mvumo yekuita tsvagiridzo iri maringe nezvemagetsi nebetsero yawo papundutso yamaruwa emu Zimbabwe.

Zita rangu ndinonzi Davidzo Muchawaya ndiri mudzidzi kubazi reArchaeology neAnthropology payinivhesiti yePretoria kuSouth Africa. Ndirikuita tsvagiridzo pamusoro pemoto nekushandiswa kwawo mumaruwa emuZimbabwe uye basa remagetsi mubudiriro. Ndine mvumo yamudzviti weguta reMasvingo, Mudzviti wedunhu rekwaGutu, uye madzishe masabhuku nemakurukota avo. Tsvagiridzo yangu negwara richashandiswa mutsvagiridzo iyi, zvamungatarisira kuwana kubudikidza netsvagiridzo uye kodzero dzenyu mutsvagiridzo iyi .

Munokumbirwa kutora chikamu mutsvagiridzo iyi kupfurikidza nekuita nhaurirano uye kupindura mibvunzo yandichakubvunzai. Ndichaita zvose zvandinogona kusabudisa mazita enyu muzvinyorwa zvangu zvose. Ndinokukurudzirai kuti musandipa umbowo hungazokukanganisai imi kana magariro enyu. Ndichachengetedza zvose zvamuchakurukurirana neni pasi pehana yangu. Ndichanyora mubhuku nhaurirano dzandichaita nemi.

Ndichakupamhidzirai humwe umbowo, kana muchiona zvakakodzera pamusoro petsvagiridzo yangu uye gwara randichashandisa uyevo neumbowo pamusoro pangu.Munokwanisa kundiridzira panhamba dzinotevera 0027 73 072 7443 kana kundinyorera pakero yepacomputer inoti dmuchawaya@yahoo.com

Ini nyakusaina pagwaro rino ndaverenga zvinoudzamu ndikanzwisisa zvose zvakayorwa maererano netsvagiridzo yaDavidzo Muchawaya. Ndinozvipira nekuda kwangu pasina kumanikidzwa kutora chikamu munhaurirano nekupindura mibvunzo iri maererano netsvagiridzo iyi.			
Zita raparticipant	**Siginecha yaparticipant**	**Siginecha yemufakazi**	**Dheti**

Annexure F: Interview checklists

CHECKLIST FOR KEY INFORMANTS

Development
What is the role of energy in development?
How do you define development?
What is the role of energy in development?
Have you ever carried out a national assessment of local needs for energy planning purposes?
How do you ensure sustainability in energy programmes
What is the primary concern / need of the rural people

Energy and rural poverty
Is energy crucial in reducing poverty in this country?
Are you integrating energy issues into national poverty reduction strategy papers (PRSPs)
If you are integrating, how are you integrating, if you are not, why are not integrating energy issues in PRSPs?

Energy Consumption Patterns
How do you perceive the subject of energy consumption?
Is the subject of energy consumption patterns important to your ministry / department?
What are the determinants of energy choices in rural areas?
Which fuel types are used in rural areas of Zimbabwe (especially in Gutu District) and why
Who normally collects firewood in rural areas and why
Are there any legislations that exists regarding environmental conservation in rural areas

Energy and rural health
Do you have information with regards to indoor air pollution?
Are there any programmes in place to educate rural people on the effects of smoke?
Do you consider the impact of smoke on rural people a serious health issue?

Rural Energy Policies
Is there an energy policy for rural areas?
Are rural people consulted in formulation of such policies?
Which department is responsible for rural energy planning?
What is involved in rural energy planning?
Are there any energy subsidies and what is their effect on rural energy service provision?

Gender and Energy Consumption
Is there a gender energy policy in this country?
Are there differences in which men and women perceive energy?
How do you ensure gender sensitivity of energy programmes

Energy and Income generating activities
What are the income generating activities done in rural areas?
Which are the income generating activities that utilise energy?

Are there any funding mechanisms in place to assist and encourage rural people engage in income generating activities?
What is the role of the private sector in the rural energy sector and in enhancing rural household initiatives?
Are there any investments that the private sector is making in rural energy?

Rural Energy technologies
What is your view of rural energy technologies?
How has been outcome of previous energy technology dissemination in rural areas?
What are the current rural energy technologies that you are implementing?
Are there any donors that are assisting the government in disseminating rural energy technologies?
Are there any initiatives to pursue the south to south technological transfer?
Are there any efforts to encourage rural people to participate in energy technology inventions?
What lessons were learnt on improved stoves programme

Energy and rural inequalities
How do you make sure that energy service provision does not exacerbate inequalities in the community?

Rural Electrification
Is there a policy for rural electrification?
Who derives rural electrification?
What is your view for rural electrification?
How is rural electrification implemented?
Who is involved and why
How much is the connection fee
What are the terms of payment?
What is the average tariff per month?
Are rural people educated on rural electrification before during or after electrification?
How many households have benefited from rural electrification so far?
Have you ever done a research on the effect of rural electrification?

Energy service provision in the current economic and political context
What is the impact of current fuel shortages on energy consumption patterns and rural electrification
What is the impact of the current political and economic situation on the energy field as a whole in the country?

CHECKLIST FOR PARTICIPANTS.

Energy and development
What is your conceptualisation of development and poverty?
How many people stay in your house hold?

What is your monthly income?
How do you get the income?
Where you ever consulted on energy issues in this community / household

Poverty and energy
Rank our problems ad explain why you have ranged them in that way
Is energy a pressing need in your community and household?
Can energy provision alleviate poverty in your household or community?
Wealth rank households in this village
How did you arrive at such a ranking method?

Energy Consumption patterns
What is your view and perception of energy consumption patterns?
Do you value the subject of energy consumption patterns and why
How do you consume energy?
Who collects firewood and why
How long does it take to collect firewood?
Which energy sources do you use and why
Who chooses the type of energy that is used?
How long does it take to cook different meals?
Which species do you normally use?
What methods do you use to collect firewood?

Rural energy cooperatives
Are there any energy cooperatives in this community?
Do you think such cooperatives are effective?
Would you want to initiate them?
How would you want them to be run?

Energy and health
Are there any health implications that are caused by smoke in the kitchen?
Do you know anything about indoor air pollution?
Where you ever educated about the effects of smoke in the kitchen
How do you ensure that your kitchen is well ventilated?

Analysis of different energy sources
What are the different energy sources that you use?
What are the problems that are associated with different fuel types?
Which energy source do you consider the best for your household and why

Energy and labour
Give a break down of division of labour in your household
Who collects firewood and why
Is firewood collection a taxing task?

Energy and income generating activities

Do you engage in any income generating activities?
Did you ever receive credit/ loan to start energy income generating activities?

Gender and Energy
Who makes fuel choices in your household and why
How is decision making power allocated in your household?
What is the role of men and women in energy provision in the household and at community level?
Is there division of labour along gender and why

Energy conservation and household coping strategies
How do you conserve energy?
What do you do if you do not have adequate energy?
Is energy a basic need to you?

Energy and basic needs
What asserts do you have?
Does your household have access to safe drinking water, school, community health centre?
How many meals do you cook per day and who cooks in this household and why
What is your household income?

Energy and environmental conservation
Are there any legislative laws or local laws that pertain to environmental conservation
What causes deforestation in this community?

Rural energy technologies
Did you benefit from any energy technology programme
What is your view of energy technologies?
Are energy technologies important to your community / household?

Rural electrification and poverty reduction
What is was your income before electrification and after electrification
Is electricity important in poverty reduction?
Was electricity your priority energy option?

Rural electrification
How much was the connection fee
How much do you pay per month?
Which fuel types do you use and why
What is your fuel preference?

Rural electrification conscientisation
Where you educated on rural electrification
What is your view on rural electrification?
How long do bundles of wood last
How do you consume electricity?

Energy service provision in the current economic and political context

How are you surviving under the current political and economic situation?
What is the effect of current political and economic situation on energy provision to the community and the household?
What is the impact of fuel shortages on energy consumption patterns in your household?

Annexure G: Electrification by district

National Statistics on Electrified Rural Institutions in all Provinces (1980 to August 2005)

Province	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole / Dam Points	Other	Total electrified to date
Manicaland	202	122	156	83	46	20	29	105	16	7	35	821
Mash Central	123	59	73	45	35	16	79	24	6	15	35	510
Mash East	123	80	83	36	17	17	69	52	27	3	58	565
Mash West	107	59	54	21	26	15	165	43	7	6	18	521
Masvingo	139	114	126	69	35	18	23	50	9	6	14	603
Mat North	101	50	64	32	34	17	7	12	7	4	11	339
Mat South	109	58	83	37	16	18	10	41	9	3	9	393
Midlands	104	65	75	33	24	27	53	34	4	1	9	429
TOTAL	1008	607	714	356	233	148	435	361	85	45	189	4181

MIDLANDS PROVINCE: 1980 TO MAY 2005												
District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Chirumhanzu	8	10	5	2	4	1	5	6	0	0	4	45
Gokwe North	16	9	22	8	4	0	1	5	1	0	1	67
Gokwe South	12	9	22	3	3	4	1	7	1	0	0	62
Mberengwa	12	15	3	6	0	4	0	3	0	0	0	43
Runde	9	4	6	3	0	2	3	3	0	0	0	30
Tognogara	19	12	9	6	4	3	5	6	0	0	0	66
Vungu	15	7	5	4	4	4	14	4	0	0	0	57
Zibagwe	13	4	4	1	5	7	24	0	2	0	2	63
TOTAL	104	70	76	33	24	25	53	34	4	0	9	433

MATABELELAND SOUTH PROVINCE: 1980 TO MAY 2005

District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Beitbridge	15	9	14	9	8	2	2	8	6	1	1	75
Bulilima	5	2	5	1	1	1	1	9	1	1	1	28
Mangwe	13	7	8	7	2	2	2	2	0	0	1	44
Gwanda	28	14	20	7	0	3	2	5	0	0	2	81
Insiza	23	11	15	4	4	3	3	10	2	0	1	76
Matobo	14	10	17	6	1	4	0	1	0	1	3	57
Umuzingwane	11	5	4	3	0	3	0	6	0	0	0	32
TOTAL	109	58	83	37	16	18	10	41	9	3	9	393

MATABELELAND NORTH PROVINCE: 1980 TO MARCH 2005

District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Binga	11	5	7	5	0	2	0	0	0	0	3	33
Bubi	11	6	2	2	2	1	0	5	0	0	0	29
Hwange	18	8	14	5	3	5	0	0	2	0	2	57
Lupane	20	5	15	2	9	1	0	3	0	1	0	56
Nkayi	14	8	13	8	7	4	0	2	2	0	0	58
Tsholotsho	19	7	11	5	13	2	0	1	3	1	5	67
Umuguza	8	11	2	5	0	2	7	1	0	2	1	39
TOTAL	101	50	64	32	34	17	7	12	7	4	11	339

MASVINGO PROVINCE: 1980 TO MAY 2005

District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Bikita	14	11	16	8	3	2	0	3	0	1	2	60
Chiredzi	10	7	6	8	3	2	4	2	0	0	3	45
Chivi	15	19	19	13	4	2	1	9	0	3	0	85
Gutu	39	28	37	12	6	3	4	7	2	1	4	143
Masvingo	28	17	15	14	6	4	14	21	4	0	2	125
Mwenezi	11	12	10	7	8	4	0	0	1	0	1	54
Zaka	22	20	23	7	5	1	0	8	2	1	2	91
TOTAL	139	114	126	69	35	18	23	50	9	6	14	603

MASHONALAND WEST PROVINCE: 1980 TO MAY 2005

District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Chegutu	33	14	17	7	2	4	50	4	1	0	1	133
Hurungwe	29	23	25	5	11	5	20	17	3	4	5	147
Kadoma	15	7	4	2	2	2	10	10	0	0	2	54
Kariba	8	2	4	4	7	2	0	2	0	1	4	34
Makonde	6	3	2	1	2	1	73	5	1	0	0	94
Zvimba	16	10	2	2	2	1	12	5	2	1	6	59
TOTAL	107	59	54	21	26	15	165	43	7	6	18	521

MASHONALAND EAST PROVINCE: 1980 TO MAY 2005

District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Chikomba	19	1	13	8	3	3	6	1	0	0	5	69
Goromonzi	12	7	5	1	0	3	12	16	1	0	6	63
Hwedza	13	10	10	4	3	1	5	2	2	0	2	52
Manyame	5	2	5	2	0		3	19	2	0	3	42
Marondera	25	17	9	2	0	2	30	8	5	0	5	103
Mudzi	5	5	13	5	2	2	0	1	1	1	9	44
Murewa	10	7	8	3	0	1	7	3	6	0	5	50
Mutoko	18	12	12	3	2	3	6	2	9	2	19	88
UMP	16	9	8	8	7	1	0	0	1	0	4	54
TOTAL	123	80	83	36	17	17	69	52	27	3	58	565

MASHONALAND CENTRAL PROVINCE: 1980TO MAY 2005												
District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Bindura	13	6	10	6	1	0	14	5	1	2	5	63
Guruve	25	12	13	9	8	2	3	7	2	4	5	90
Mazowe	12	5	0	1	2	3	51	9	0	4	4	91
Mt Darwin	32	19	32	11	7	3	0	0	1	2	8	115
Muzarabani	14	5	5	7	5	2	11	1	1	2	8	61
Rushinga	11	6	9	7	10	2	0	0	1	0	0	46
Shamva	16	6	4	4	2	4	0	2	0	1	5	44
TOTAL	123	59	73	45	35	16	79	24	6	15	35	510

MANICALAND PROVINCE: 1980 TO JULY 2005												
District	Primary Schools	Secondary schools	Business Centres	Rural Health Centres	Govt Ext. Offices	Chiefs	Small scale farms	Villages	Irrigation Schemes	Borehole/Dam Points	Others	Total electrified to date
Buhera	25	15	21	8	5	4	0	4	1	2	8	93
Chimanimani	27	15	12	13	5	4	0	20	1	0	3	100
Chipinge	51	30	27	20	7	3	1	22	2	1	2	166
Makoni	40	21	37	17	9	5	19	12	1	0	6	167
Mutare	28	18	26	12	10	2	5	23	6	4	4	138
Mutasa	12	7	13	6	4	1	3	14	4	0	5	69
Nyanga	19	16	20	7	6	1	1	10	1	0	7	88
TOTAL	202	122	20	83	46	20	29	105	16	7	35	821