



**Cooking Under Loadshedding: Assessing Household  
Cooking Practices**

**A Case of Garden Compound, Lusaka, Zambia**

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ZARENA

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## ACRONYMS

CDF	Constituency Development Fund
CDM	Clean Development Mechanism
ERB	Energy Regulation Board
GHG	Green House Gas
GRZ	Government of the Republic of Zambia
HAP/IAP	Household Air Pollution / Indoor Air Pollution
ICS	Improved Cookstove
IEA	International Energy Agency
LCMS	Living Conditions Monitoring Survey
LPG	Liquified Petroleum Gas
LWSC	Lusaka Water and Sewerage Company
kWh	Kilowatt hour
MOE	Ministry of Energy
PM	Particulate Matter
SDG	Strategic Development Goal
UNZA	University of Zambia
WDC	Ward Development Committee
WHO	World Health Organisation
ZABS	Zambia Bureau of Standards
ZAMSTATS	Zambia Statistical Agency
ZARENA	Zambia Renewable Energy Association
ZESCO	Zesco Limited

## DEFINITIONS

Biogas	A gaseous mixture consisting mainly of methane and carbon dioxide produced by the anaerobic decomposition of organic matter.
Biomass	An organic matter such as wood fuel (firewood and charcoal), agricultural wastes, forestry wastes, industrial/municipal organic waste, energy crops and products and animal waste that is available for conversion into energy.
Clean Cooking	Fuels and equipment that significantly limit or avoid the release of pollutants harmful to human health.
Energy	Any source of electrical, mechanical, thermal, nuclear or chemical power for any use.
Energy Efficiency	Method of reducing energy consumption by using less energy to attain the same amount of useful output.
Energy Poverty	A lack of access to adequate, affordable, and clean energy services,
Fuel Stacking	The use of different cooking means and fuels.
Gel Fuel	An energy source obtained from ethanol.
Improved Cookstove	An enclosed stove that burns solid fuel, but keeps heat from escaping and improves combustion, thereby reducing smoke.
Load Shedding	The intentional, temporary interruption of electricity supply to certain areas or sectors to prevent the entire power grid from collapsing when the demand for electricity exceeds the available supply
Mbaulta	A traditional metallic charcoal stove which is used for cooking and heating.
Renewable Energy	Non-fossil sources of energy capable of use for the generation of electricity including wind, solar, hydro, bio-mass and geothermal.
Solar Energy	Energy irradiated from the sun to the earth for thermal applications and electricity generation.

## **FOREWORD**

Nearly 70% of the fuel used for cooking in Zambia is wood fuel in the form of charcoal and firewood. The high usage of wood fuel, charcoal in particular, is detrimental to the environment and has been identified as one of the main drivers of deforestation and forest degradation in the country. Further, it contributes to indoor air pollution and impacts the health of millions of the end users around the world particularly women and children.

There are many renewable sources of energy in the country but the uptake has been low due to a number of factors. One of these factors is that of inadequate access to electricity and also the perceived high cost of electricity. The situation has been exacerbated by the periodic droughts which have resulted in reduced electricity generation and subsequent actions of loadshedding by the national utility. Frequent and prolonged load-shedding forces households to alternate between electric cooking and traditional biomass methods and often times to migrate to other energy completely.

However, despite national policies advocating for clean cooking, there is limited localized evidence on how electricity outages reshape fuel and technology choices as well as how households adjust to cope with these occurrences. Without understanding real world coping strategies, neither policy makers nor private innovators can design interventions that equitably accelerate adoption of clean, outage-resilient cooking solutions.

It is for this reason that ZARENA undertook this study with the aim of collecting evidence of the household cooking patterns in Lusaka's low-income areas with Garden Compound serving as a case study. It is my hope going forward that the evidence gathered and the recommendations of the study will support the government and other players in the sector in developing robust programmes to address the situation. It is also my hope that in the unfortunate event that loadshedding and or other energy crises should befall the energy sector, the country will be better prepared to handle the situation in terms of household cooking energy.

Dr. Kakoma Chilala Bowa  
Executive Director  
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## **EXECUTIVE SUMMARY**

### **Background**

In Zambia, households cook using woodfuel (charcoal and firewood), electricity, Liquefied Petroleum Gas (LPG or simply “Gas”) among other energy sources and technologies. The choice of cooking fuel is determined by factors such as household income, location (urban or rural), accessibility, ease of use and cost. Over the last decade (2015 to 2025), Zambia has experienced periodic droughts which have resulted in reduced electricity generation leading Zesco to put in place load management measures (load shedding) where electricity is rationed. Frequent and prolonged load-shedding forces households to alternate between electric cooking and traditional biomass methods. Studies show that this may push households to rely heavily on charcoal and are susceptible to increasing fuel costs and indoor air pollution (Mulima, Yuichiro, Gebre, & Sieber, 2025). Despite national policies advocating for clean cooking, there is no localized evidence on how electricity outages reshape fuel and technology choices as well as how households adjust to cope with these occurrences. Without understanding real world coping strategies, neither policy makers nor private innovators can design interventions that equitably accelerate adoption of clean, outage-resilient cooking solutions. The study thus aimed to assess the household cooking patterns in Lusaka’s Garden Compound and assess the impact that loadshedding has had on the dynamics of household energy use.

### **Methodology**

The study was a qualitative study that was conducted through a combination of literature review, household interviews, community focus group discussions and interviews with the local community leadership, as well as producers of cooking fuels and appliances. A total of 300 households in Garden Compound were interviewed. The data was analysed qualitatively using Content Analysis with the aid of the software QDA Miner.

### **General Household Characteristics**

Of the 300 households were interviewed, 244 females and 56 males. 62 percent of the households were male headed while 38 percent were female headed and the average family size per household was 5.4 people. The houses rented (61.5%), owned/family-owned (38.1%) or had caretakers (0.3%). For education levels of the heads of households – 28 of the respondents indicated having no formal education, 60 had attained various levels of primary education, 152 had secondary school level education and 60 had tertiary education.

Income generating activities included formal employment (18%), other employment such as mobile money booth attendants and domestic workers (15%), skills - bricklayers, plumbers, tailors, painters etc (15.3%), and businesses like *salaula*, food, charcoal, home shops etc which accounted for 42%. Other income sources were rental income, piece work and farming. As for monthly income, 22% earned K1,000 or less, 54% were between K1,000 and K5,000, 14.3% indicated having incomes of between K5,000 and K10,000. Only 2.6% of the respondents earned above K10,000 and 6.4% chose not to disclose their monthly income.

### **Household cooking energy use**

The study found that during pre-loadshedding times, households cooked using charcoal, electricity, LPG, pellets, firewood or a combination of two or more of the listed sources (energy stacking). Charcoal was the most predominantly used with 69 percent of the respondents indicating that they use charcoal for cooking. The reasons for the high use of charcoal included i. Charcoal being easily available; ii. Charcoal being cheaper than other sources; iii. It is faster to cook using charcoal; and iv. for households with shared electricity metres, landlords sometimes do not allow electric cooking.

For households using charcoal, 58.4 percent used Improved Cookstoves (ICS) and 41.6 percent used ordinary braziers (*mbaula*). Two types of ICS were observed - the locally assembled type (but with clay imported from Malawi) as well as the ECOA brand from Kenya. The prices were K80 – K150 for the ordinary ICS and K250 for the ECOA brand. Households attributed the relatively high usage of ICS to their similarity to the *mbaula* and also them using less charcoal. Other non charcoal based stoves found during the study were gasifier/pellet stoves LPG / Gas stoves, and the Save 80 Stove. Some respondents (less than 1%) indicated that they used firewood and in a case of demonstrated energy poverty, one household indicated that they could not afford any of the energy sources and cooked using waste plastic material on a 3 stone fire.

### **Effects of Loadshedding on household cooking**

Of the households interviewed, 94.3 percent indicated that they experienced loadshedding while 5.7 percent did not. The loadshedding hours ranged from 2 to 20 hours on a daily basis while some areas experienced loadshedding on specific days of the week only. The effects of loadshedding on household cooking were that more people were now exclusively using charcoal for cooking unlike the energy stacking of pre loadshedding times. 95% of the respondents who experienced loadshedding indicated that they used charcoal during times of loadshedding with other energy sources being minimal. Other changes in the household

cooking patterns attributed to loadshedding included i. Changes in the number of times that households cooked in a day; ii. Some households who were previously using electricity and charcoal for cooking (fuel stacking) were now using charcoal only; iii. Some households were now using more firewood due to the reported high cost of charcoal; iv. Some households stopped using electric stoves indicating that electricity was unpredictable and could go in the middle of cooking; v. On a positive note, some households switched to ICS and other alternatives like pellets in an effort to reduce the money spent on charcoal; v. The majority of the respondents who used charcoal (90%) indicated that the price of charcoal in the area had increased due to increased demand.

### **Awareness of alternative energy sources**

The following were the numbers of respondents aware of alternative energy sources and technologies - ICS (222), Pellets (69), Briquettes (39) and LPG (25). Other energy sources that respondents indicated being aware of were Biogas, Efficient Electric Appliances, Solar Cookstoves and Kerosene Stoves. The sources of information for this were community members (53%), salespeople (11%), family and friends (10%), radio and television (6%), places of work (4%), Energy companies and promoters (4%) and social media (3%). Other sources of information included church, social outings as well as marketplaces. As for household decisions making of what energy source or appliance to use, respondents indicated that this was often left to the women when it was within their household budgets. However, for bigger decisions where more money was required, decisions were made collectively.

### **Conclusion**

The 2024 – 2025 loadshedding had adverse impacts on household cooking in Garden Compound in that households migrated from stacking various energy sources to mostly using charcoal and changed their cooking times, number of times for cooking and even their diets as they could not store fresh food for long. Households also reported increased energy costs to the increased charcoal use as well increase in the charcoal prices in the community. Some of the recommendations include: i. The need for government to have contingency / emergency plans for such occurrences like loadshedding. This could include increased sensitisation of community members on available clean cooking technologies for use in the absence of electricity, utilising resources like the Constituency Development Fund to support alternative energy promoters to ensure the alternatives are more available in the community; ii. The community called for the need for consistency and communication of times of loadshedding to enable them to plan their activities.

# 1. INTRODUCTION

## 1.1 Background

In Zambia, households cook using a number of energy sources and fuels. These include woodfuel (charcoal and firewood), electricity, Liquefied Petroleum Gas (LPG or simply “Gas”) and others. The choice of cooking fuel is determined by a number of factors that include household income, location (urban or rural), accessibility, ease of use and cost. In urban areas, the energy sources mostly used are charcoal and electricity (Government of the Republic of Zambia, 2019).

Over the last decade (2015 to 2025), Zambia has experienced periodic droughts which have resulted in reduced electricity generation as the country is highly dependent on hydro power for its electricity. The reduced generation has resulted in the national utility, Zesco, putting in place load management measures that have resulted in load shedding, a situation where electricity is rationed and areas have no electricity for hours in a day.

Frequent and prolonged load-shedding occurrences force households to alternate between electric cooking and traditional biomass methods. Daily outages of 8–22 hours push households - especially women, who bear primary responsibility for cooking, to rely heavily on charcoal, increasing fuel costs, indoor air pollution, and forest degradation.

Despite national policies advocating for clean cooking, there is no localized evidence on (a) how electricity outages reshape technology choices. (b) who in the household makes these decisions; or (c) what technical, economic, or cultural barriers inhibit shifts to clean cooking energy sources. Addressing these gaps is critical for Zambia’s Just Energy Transition as without understanding real world coping strategies, neither policy makers nor private innovators can design interventions that equitably accelerate adoption of clean cooking solutions.

This study therefore aims to assess the household cooking patterns in Lusaka’s Garden Compound and in particular assess the impact that loadshedding has had on the dynamics of household energy use. As a densely populated, low-income informal settlement, Garden compound was selected as a case study and learning point whose results may be replicated or extrapolated to include other similar communities. The observations and findings will be helpful in determining what type of interventions to put in place for peri urban areas in the event that the country experiences loadshedding again or other risks that might result in reduced electricity access to the communities.

## **1.2 Aim**

The main aim of the study is to understand how load-shedding affects household fuel choices, cooking practices, and spending patterns in Garden compound of Lusaka.

## **1.3 Objectives**

The specific objectives of the study are as follows;

1. To map the cooking technology use and fuel-switching patterns under load-shedding in Garden Compound.
2. To analyse the intra-household decision-making processes - who chooses and acquires cooking appliances and fuels, and why.
3. To identify the technical, economic, and cultural drivers shaping adoption (or rejection) of clean energy sources.
4. To come up with community-validated recommendations for policy and market interventions to promote inclusive, resilient clean cooking.

## **1.4 Problem Statement**

Frequent and prolonged load-shedding in Lusaka's peri-urban areas forces households to alternate between electric cooking and traditional biomass methods. In Garden Compound, daily outages of 8–22 hours push households especially women, who bear primary responsibility for cooking, to rely heavily on charcoal thus increasing fuel costs, indoor air pollution, and forest degradation.

Despite national policies advocating clean cooking, there is no localized evidence on

- a) How outages reshape technology choices.
- b) Who in the household makes these decisions; or
- c) What technical, economic, or cultural barriers inhibit shifts to clean energy sources.

Addressing these gaps is critical for Zambia's just energy transition as without understanding real world coping strategies, neither policy makers nor private innovators can design interventions that equitably accelerate adoption of clean, outage-resilient cooking solutions.

## **1.5 Outputs**

The expected outputs of the study as follows;

1. Training materials developed for awareness campaigns on alternative cooking technologies.

2. Policy briefs to inform the government and other decision makers on interventions that can be undertaken regarding clean cooking particularly in crisis times like loadshedding.
3. Information dissemination workshops for stakeholders in the sector to guide future activities and interventions.

### **1.6 Outcomes**

The expected outcomes of the study and implementation of recommendations are as follows;

1. Increased awareness on clean cooking options
2. Increased adoption of clean cooking technologies in Garden Compound.

## **2. LITERATURE REVIEW**

### **2.1 Overview of Household Energy Use**

The International Energy Agency (IEA) (2023) , estimates that one in three people in developing countries cook over traditional stoves and open fires. The health impacts of cooking over traditional stoves and open fires and inhaling hazardous smoke every day are immense. The Household Air Pollution (HAP) due to a lack of clean cooking access contribute to around 3.7 million fatalities per year globally (International Energy Agency, 2023) . The IEA further goes on to state that basic cooking methods also contribute to increasing greenhouse gases emissions, both through their combustion and as trees cut for fuelwood or charcoal production contribute to environmental degradation and deforestation. The incomplete combustion of charcoal and fuelwood in traditional stoves releases methane, a potent greenhouse gas, in addition to other particles that effect climate changes.

This situation is also true for Zambia as it is estimated that 60.4 percent of the households depend on woodfuel (charcoal and firewood) for their household cooking needs (Zambia Statistical Agency, 2024) . Other energy sources in the country include electricity, petroleum and renewable energy such as solar, wind and geothermal energy among others (Government of the Republic of Zambia, 2019). Petroleum is the only energy source that is wholly imported while electricity supply is dominated by hydro generation which accounts for more than 90% of national installed capacity (Energy Regulation Board, 2025).

In 2024, however, Zambia's energy landscape experienced significant shifts, particularly in response to the severe drought that affected hydropower generation, leading to a national power deficit. This situation necessitated emergency interventions, including increased electricity imports and policy adjustments to ensure energy security (Energy Regulation Board, 2025). In addition, in order to address the imbalance in electricity generation sent out, the national electricity utility company, ZESCO, undertook load management measures which included load shedding.

Load shedding is defined as an intentionally engineered electrical power shutdown where electricity delivery is stopped for non-overlapping periods of time over different parts of the distribution region (Chimbaka, 2024). The process is usually done in stages and depending on the deficit, the utility company might decide to switch off some segments of the customers during this process. According to the ERB (2024), load shedding is a measure of last resort to prevent the collapse of the entire power system. When the demand, or load, from customers is

greater than the available supply, the electricity system becomes unbalanced, which can consequently result in country-wide power trips (a blackout) that could take days to restore.

It is worth noting that electricity is a prerequisite for proper functioning of nearly all sub-sectors of the economy. It is an essential service whose availability and quality determines success or failure of development endeavours. When it comes to households, supply of energy is used for cooking, lighting, refrigeration, phone charging and is even an input in the operations/production process for small household business ventures. Hence, a temporary stoppage of power can lead to many negative effects including a decrease in productivity or loss of revenue. This is particularly relevant in peri urban areas where lack of access to clean energy remains a challenge particularly for cooking.

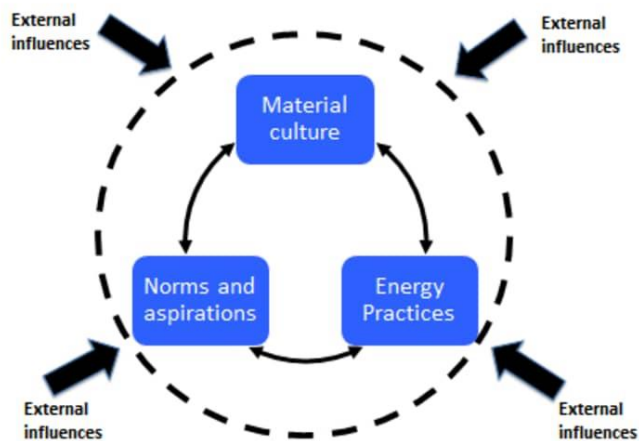
According to Mulima, Yuichiro, Gebre, & Sieber (2025), household energy choices for cooking are influenced by various demographic, economic, and non-economic factors. Among these factors, the age of the main fuel users, education level of the household head, monthly income, load shedding, cooking duration, and location. Lessons from previous studies such as that of Umar and Kunda - Wamuwi (2019), in a study aimed at assessing the general impact of loadshedding on poor urban households, noted that load shedding only served to increase household dependence on other energy sources which are often unclean further impacting the health of end users who are mostly women. However, research gaps remain for sector specific studies on the impacts of loadshedding. This study aims to highlight the impact of load shedding on household cooking practices in a low income area.

## **2.2 Conceptual Framework**

The study integrates the Energy Culture Model, emphasizing the role of cultural practices and coping mechanisms in shaping energy choices, when faced with external factors such as loadshedding thus offering a deeper, understanding of household energy transitions in crisis times. The Energy Culture Framework suggests that consumer energy behaviour can be understood at its most fundamental level by examining the interactions between cognitive norms (e.g. beliefs, understanding etc.), material culture (e.g. technologies) and energy practices (Stephenson, et al., 2010).

Figure 1 shows the Energy Culture Model and it suggests that the components of behaviour are highly interactive and are also susceptible to external influences. The framework characterises energy consumption behaviour as the interactions between cognitive norms, material culture and energy practices and that clusters of similarly interactive norms, material cultures and/or practices will be observable in any given population. Applying examples of

the application of external influences to this study, external influences could be: cognitive norms around home cooking appliances and fuels may be affected by such things as upbringing, demographics and education; choice of home cooking technologies may be impacted by such things as income level, availability of technologies, and law and regulations; while energy choices may may be impacted by such things as the energy price structure and social marketing campaigns.



*Figure 1: Energy Culture Model*

### 3. STUDY AREA

The study was conducted in Garden Compound of Lusaka. Garden Compound is a large informal settlement located on the northern part of Lusaka with the geographical coordinates 15°23'16"S 28°17'41"E. It is about 4.1km from the city centre east of Great North Road and 3.7km from the city centre north of Great East Road. The compound covers an area about 30km<sup>2</sup>. It is surrounded by the following areas: Chaisa, and Olympia Park. It is one of the largest compounds in the city, with a population of over 66,000 people (ZAMSTATS, 2022).

It is a mixed income (low, middle and high income) Compound. It is divided into four main areas being Chilulu, Gabon, Chimwansa (Site 3) and Cockpit (Site 4). Economic activities in the area revolve around informal, small-scale activities such as trading (charcoal, second hand clothing, vegetables, food stuff etc.), metal fabrication, and urban agriculture particularly near the sewerage ponds run by the Lusaka Water and Sewerage Company (LWSC). The area is also home to persons in formal employment including teachers, nurses, security personnel and others.

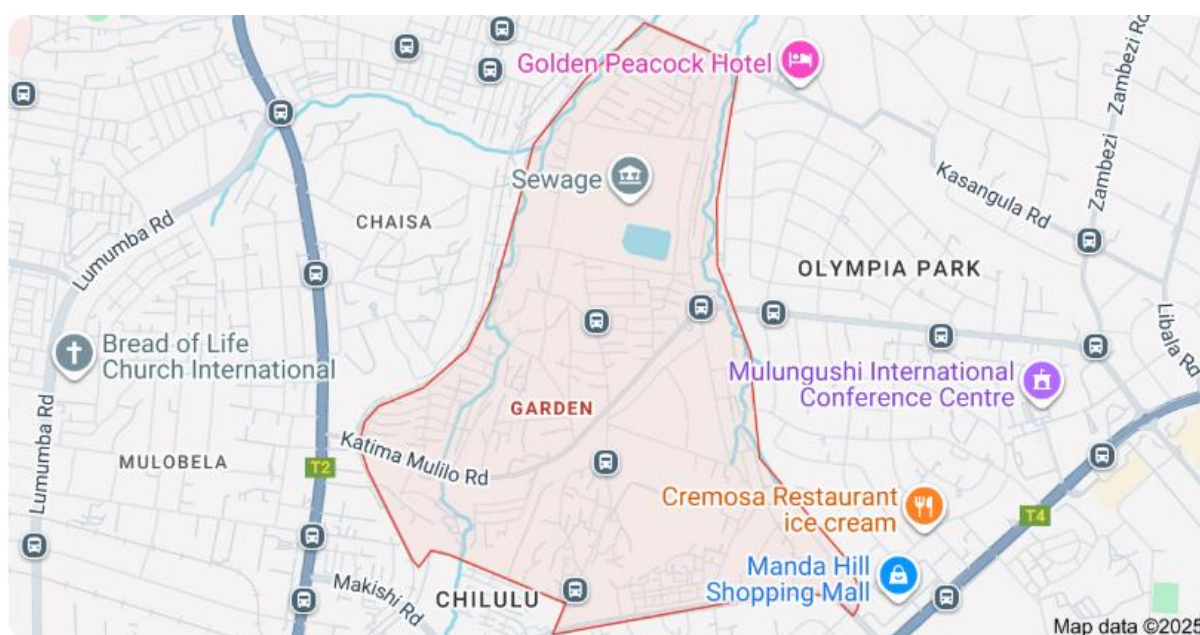


Figure 2: Map of Garden Compound

Source: Map data

## **4. METHODOLOGY**

The study was conducted through a combination of literature review, household interviews, community focus group discussions and interviews with the local community leadership, the Ward Development Committee (WDC) as well as producers of cooking fuels and appliances. These were followed by stakeholder validation processes.

### **4.1 Desk Top Study**

The literature review informed the preparation of Policy Briefs on strategic issues, opportunities and recommendations. The literature reviewed included national policies – National Energy Policy, National Forestry Policy, National Census Reports, Living Conditions Monitoring Survey as well other relevant research studies that have been conducted related to the same.

### **4.2 Data Collection**

A total of 300 households were surveyed during the study period. Structured interviews (Appendix 1) were administered to adult members of the sampled electrified households. The interviews were conducted in English and the local dialect Nyanja depending on the language the respondents were most familiar with.

In addition to this, Focus Group Discussions with groups of 7 to 8 people were held with the Ward Development Committee members as well as distributors of fuels and appliances in Garden Compound (Appendices 2 and 3).

The households were be sampled using interval sampling where households were sampled at an interval of five houses along transect lines. The 4 areas of Garden Compound, Chilulu Garden, Garden Phase 3, Garden Phase 4 and Gabon area were targeted and sampled equally. The first house at the beginning of each area was selected purposefully, and moving along transect lines, every fifth house (provided that it has electricity connection) was interviewed. If the house has no electricity connection or adult respondents were not available or unwilling to be interviewed, the next house was selected.

### **4.3 Data Analysis and presentation**

The data was analysed qualitatively using Content analysis with the aid of the qualitative data analysis software QDA Miner Lite. Categories were created and category names assigned based on the responses from the households. Frequencies for each category were then calculated and the results presented in the form of percentages, graphs and narrations.

## 5. RESULTS

The findings of the study revealed that Garden compound, like most other compounds in Zambia, had experienced loadshedding since 2024 and households responded and adjusted to the situation in various ways.

### 5.1 Household characteristics

A total of 300 households were interviewed, 244 females and 56 males. Of these, 62 percent were male headed while 38 percent were female headed. The average family size per household was found to be 5.4 people with 01 being the lowest number and 15 being the highest number of people found in one household. These lived in houses that were either rented, owned/family-owned or they were caretakers (a situation where one lives rent free in a house under construction and takes care of it until construction is complete or the owner is ready to use it or rent it out) (Figure 3). These houses were stand alone, flats and also several houses of varying sizes in one wall fence.

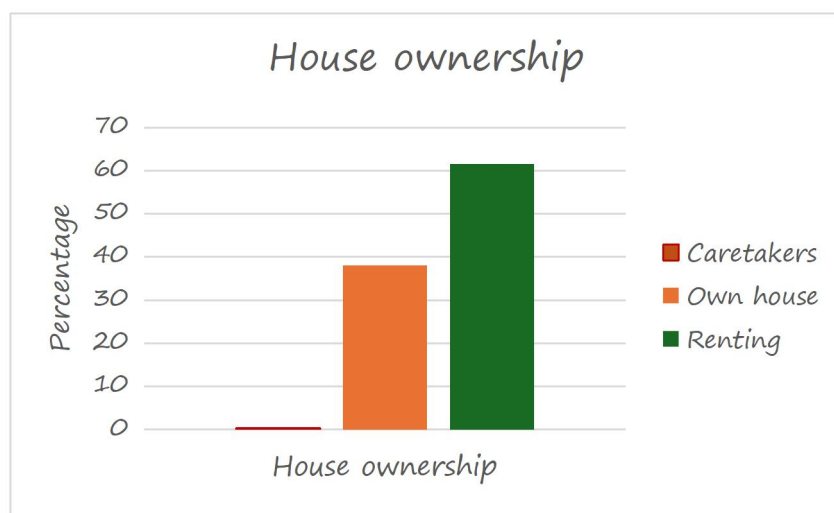


Figure 3: House ownership in Garden Compound

Table 1 below shows the education levels of the heads of the household.

Table 1: Education level of Heads of Households

S/N	Education level	Number of respondents
1	None	28
2	Primary level	60
3	Secondary level	152
4	Tertiary level	60
	Total	300

For the purpose of the study, income generation activities were classified as formal employment (nurses, teachers, accountants, policemen etc), other employment (mobile money booth attendants, domestic workers, security guards etc), skills (bricklayers, plumbers, tailors, painters etc), businesses (salaula, food, charcoal, home shops etc), and rental income among others. Figure 4 shows the distribution of these income generation sources while some of the businesses that were found being conducted in the area are shown in figures 5 and 6.

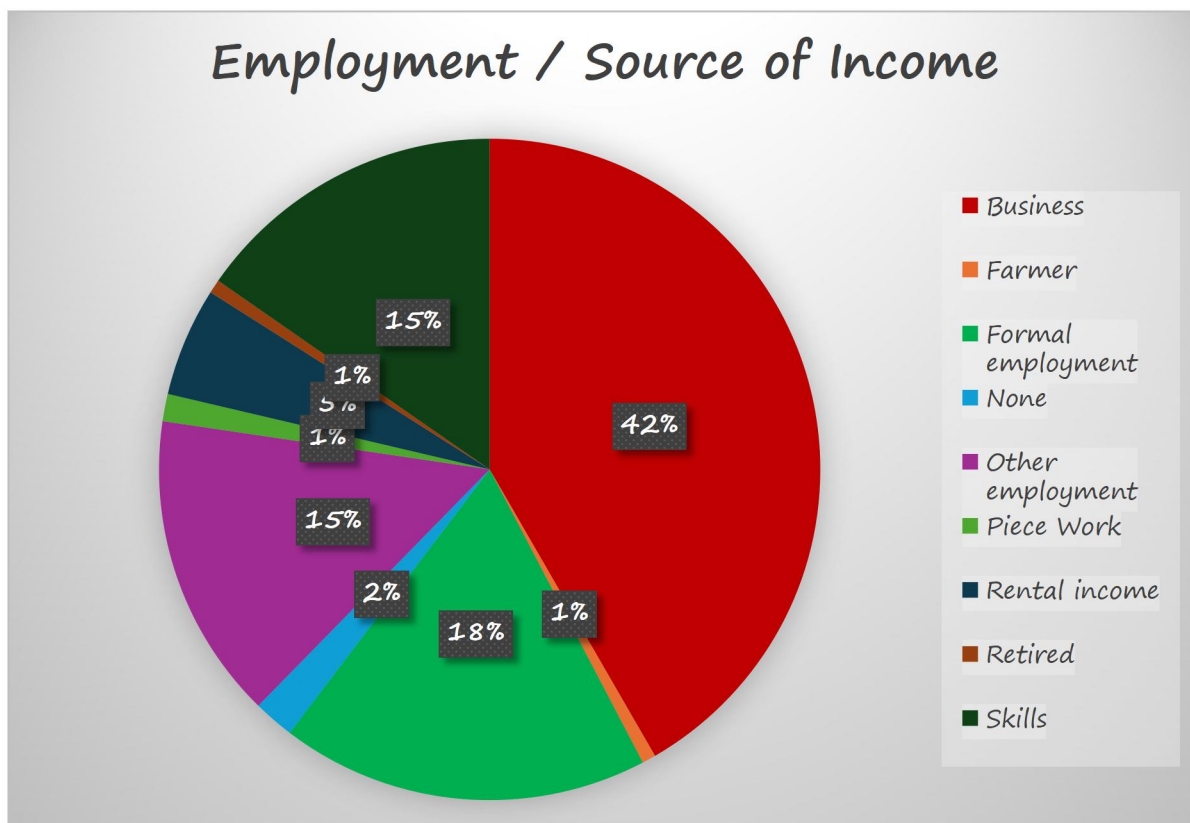


Figure 4: Sources of Income



*Figure 5: Business of repackaged charcoal*



*Figure 6: Popcorn business*

For the income levels, 22.% indicated that they made K1,000 or less in a month, 54.7% made between K1,000 and K5,000 and 14.3% indicated that they made between K5,000 and K10,000 on a monthly basis. Only 2.7% of the respondents earned above K10,000 and 6.3% chose not to disclose their monthly income.

## **5.2 Household cooking energy use**

The study found that when it comes to household energy for cooking (pre-loadshedding days), households used charcoal, electricity, LPG, pellets, firewood or a combination of two or more of the listed sources (energy stacking). Figure 7 shows the distribution of cooking energy.

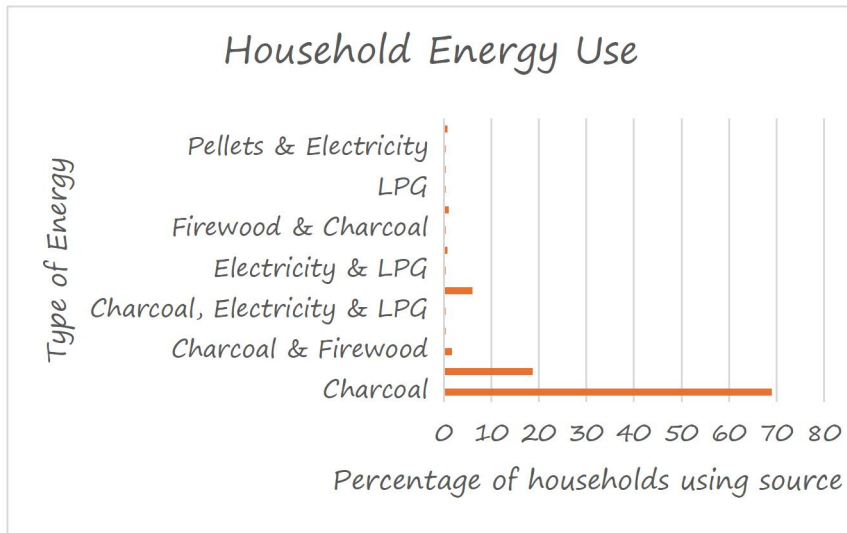
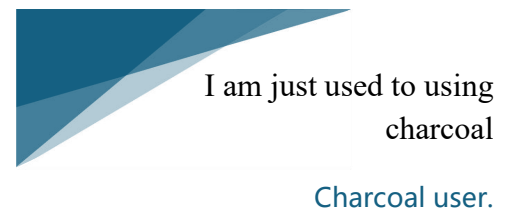


Figure 7: Types of Cooking Energy Used at Household Level

As can be seen, the use of charcoal is predominant with 69 percent of the respondents indicating that they use charcoal for cooking even under pre-loadshedding days. The reasons for the high use of charcoal were varied and included;

- i. Charcoal is easily available in the community
- ii. Charcoal is cheaper than other sources and some users cannot afford the upfront cost of alternatives
- iii. Charcoal cooks faster
- iv. For households with shared electricity metres landlords do not allow electric cooking.
- v. Electricity is expensive and as such is only used for lighting, phone charging and TV etc.
- vi. There are no other sources of energy readily available in the community.



Further to this, an analysis of the equipment used revealed that 58.4 percent of the respondents used Improved Cookstoves (ICS) while 41.6 percent used the ordinary *mbaula*. A *mbaula*, is a traditional metallic cookstove that is typically used among Zambian households that use charcoal. It has a typical efficiency of 12 – 29% (Atteridge, Heneen, & Senyagwa, 2013). This means that significant heat is lost to the atmosphere when cooking. Figures 8 and 9 show a typical *mbaula* cookstove and the typical fuel used, charcoal.



*Figure 8: 90kg bag of charcoal*



*Figure 9: Traditional cookstove - Mbaula*

An ICS is an enclosed stove that burns solid fuel, but keeps heat from escaping and improves combustion, thereby reducing smoke. These typically have efficiency levels of 30 percent to about 65 percent depending on the design (Atteridge, Heneen, & Senyagwa, 2013). There are many types of ICS, each with different performance standards. The ones that were found being used in the study area are as shown in the figures below.



*Figure 10: Improved Cookstove*



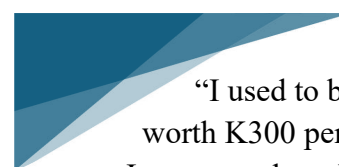
*Figure 11: Improved Cookstove - ECOA Brand*

The ICS in Figure 10 was found being sold by stove producers in the markets as well as from door to door in the community (Figure 12). During a Focus Group Discussion with the stove producers, they indicated that while the stoves were assembled in Lusaka, the clay lining was imported from Malawi as that particular clay was more durable and ideal for the stove than the clay found locally. The cost of the stoves ranged from K80 – K150 each depending on the size.



*Figure 12: ICS being sold on local market along with the traditional mbaula*

Another type of ICS found in the area was the ECOA stove by Burn Manufacturing from Kenya (Figure 11). The company had local distributors who promoted the stove in the area. The price of these stoves was K250 (previously K350). End users indicated that these stoves used even less charcoal than the local ICS although they could not quantify the amounts of charcoal saved. According to the promoters (Burn Manufacturing, 2025), has 40-65 percent more fuel savings compared to traditional charcoal stoves.



“I used to buy charcoal worth K300 per month, but I now use about K100 worth of charcoal per month when using the Improved Cookstove.”

User of ICS

The benefits of using ICSs as indicated by the end users were as follows;

1. They cook quickly
2. They use less charcoal / keeps charcoal for longer

3. They are easy to use and similar to the traditional *mbaula* that they are used to
4. They are readily available in the community as salesmen sell them within the community and at the market places.

Another type of stove that was found being used in the area was the gasifier stove. This stove was being promoted by the company Supamoto and uses pellets as a fuel. The company has offices in Chilulu area of Garden Compound. The sales model of the stove was that end users were given the stove for free but they had to commit to buying an amount of fuel per month. Figures 13 and 14 show the stove and the pellets used as fuel.



Figure 13: Gasifier Stove



Figure 14: Biomass Pellets used in gasifier stove

According to the end users, the following were the benefits / experiences of using the gasifier stove:

1. Pellets are clean to use and do not leave soot on the pots.
2. They are easy to ignite and cook very quickly.
3. There are no additional costs for transportation as they are delivered at their homes.
4. They use less money compared to charcoal as indicated by one respondent that a “30kg bag of pellets costs K130 and is enough to last the whole month while the same amount of charcoal costs above K200 and does not last the whole month.”

Gas stoves (Figures 15 and 16) were also found being used in the community. Although only about 2 percent of the interviewed households were using LPG on its own or in combination with other energy sources, the awareness levels regarding LPG were high compared to other sources (See Table 2). Those who were using LPG noted that it was fast in cooking, clean and convenient to use in that it was quick to ignite and could be used indoors. On the other hand, households expressed concerns regarding safety, high cost of purchase of the stoves and cylinders as well as inadequate refilling facilities in the area. Those who were found to be using LPG for cooking indicated that they refilled at Mt. Meru filling station at the bus station and Emmasdale area, both of which were more than 5km from the house holds. This brought in mobility issues in that if a household did not own a motor vehicle, they would have to book taxis thus adding to the cost of using the product.



*Figure 15: Two plate LPG stove*



*Figure 16: LPG Cylinder*

Another stove that was observed in the area was the *Save 80 Stove*. This stove was a Clean Development Mechanism Project promoted by the Climate Management Limited in Garden Compound and surrounding areas around the year 2010. The stove uses twigs as fuel and as the name suggests, was promoted as being able to save up to 80% of fuel compared to the mbaula.



*Figure 17: Save 80 Stove found with Figure 18: Full set of Save 80 Stove from Promoters Facebook Page*

A few households (5 counts) still had these stoves although they all indicated that they were no longer using them for cooking. The reasons that were forwarded for not using the stove included;

- i. They did not have access to twigs to use as fuel in the stove.
- ii. The users had safety concerns in that the outer cover of the stove got very hot when in use thus posing a hazard to the end users particularly children.
- iii. The twigs burned out very quickly hence the end user had to constantly feed the stove and as such they could not attend to other tasks like they did with other cookstoves.
- iv. Others indicated that the stove was taller than the typical cookstoves and as such the users had to constantly stand while using it.

### **5.3 Effects of Loadshedding**

Of the households interviewed, 94.3 percent indicated that they experienced loadshedding while 5.7 percent indicated that they did not experience loadshedding at all. The hours that households had no electricity ranged from 2 hours to 22 hours on a daily basis while some areas experienced loadshedding on specific days of the week only. The hours of loadshedding were either continuous or broken down into 6 hour time frames. However, during the time of data collection, some households indicated that there had been some changes in that there had been a government directive that low-income areas such as Garden Compound should not have load shedding during the day as this affected small businesses based in the community.

As such, some households were already experiencing this new schedule and had electricity from 07:00 hours until 17:00 hours and no electricity after that until the following day.

The effects of loadshedding on household cooking were varied. Figure 19 below shows the energy used during load shedding with 95% of the respondents who experienced loadshedding indicating that they used charcoal during times of loadshedding. The other sources were minimal.

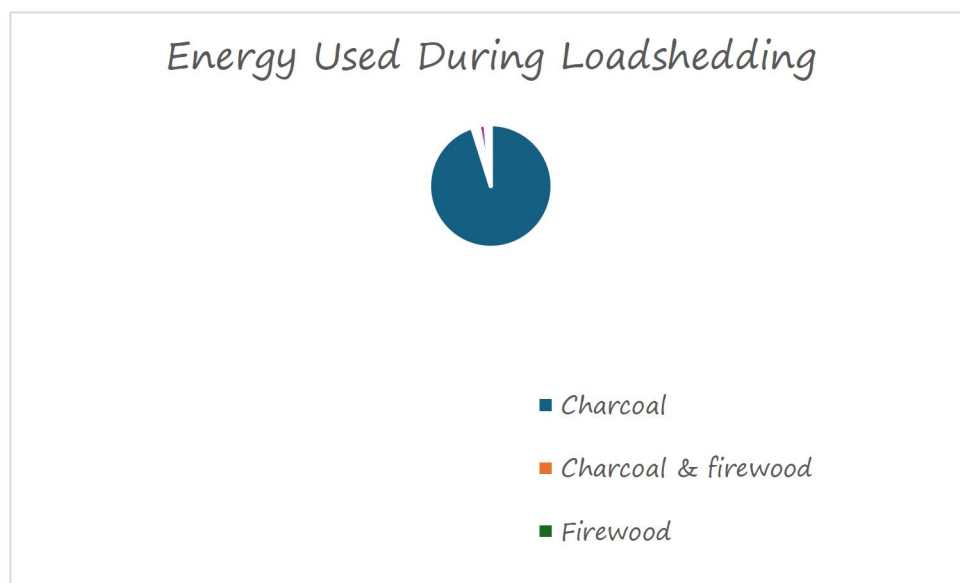


Figure 19: Energy Used During Times of Loadshedding

Specific effects of loadshedding on household cooking were as follows:

- i. There were changes in the number of times that households cooked in a day. One respondent noted – *“Load shedding has affected us in that we used to cook multiple times in one day but now just cook twice to preserve our charcoal.”*

*“It is very inconveniencing to use a mbaula early in the morning or after a long day at work as it takes time to be ready. When I have money, I prefer to eat out before coming home.”*

Others indicated that they did not cook at all during the times when there was no electricity and waited for power and that was when they cooked. One respondent indicated that they cooked in advance and were forced to eat cold meals later on.

- ii. Some households that were previously using electricity and charcoal for cooking (fuel stacking) were now using charcoal alone.

- iii. Some households were now using firewood for cooking (1%). The respondents indicated that previously, firewood had been used for productive uses like brewing local alcohol (*kachasu*), boiling bath water and occasions like funerals.
- iv. Some households stopped using electric stoves altogether as they indicated that electricity was very unreliable and unpredictable and would sometimes go while they were still cooking. To avoid this inconvenience, some households now cooked exclusively using charcoal (see Figure 19).
- v. Some households bought ICS and a few other alternatives like pellets in an effort to reduce the amounts of charcoal used and save money.
- vi. Some respondents indicated that loadshedding had affected their choice of food as they could not refrigerate food for long and as such were forced to buy food on a daily basis which was expensive for them.
- vii. The majority of the respondents (90%) who used charcoal also indicated that the price of charcoal in the area had increased due to the increased demand. For example, a 90kg bag of charcoal (locally called *Green Label*) cost K650 during the time of the study but was K450 before loadshedding. Further, the lowest amount of money one could spend on prepacked charcoal was K3. The same amount of charcoal was now costing K5.

Interestingly, some households (41.7%) indicated that apart from the rising cost of charcoal, they had not been affected by loadshedding in terms of cooking. Other ways in which households had adjusted their cooking energy are as shown in Figure 20.

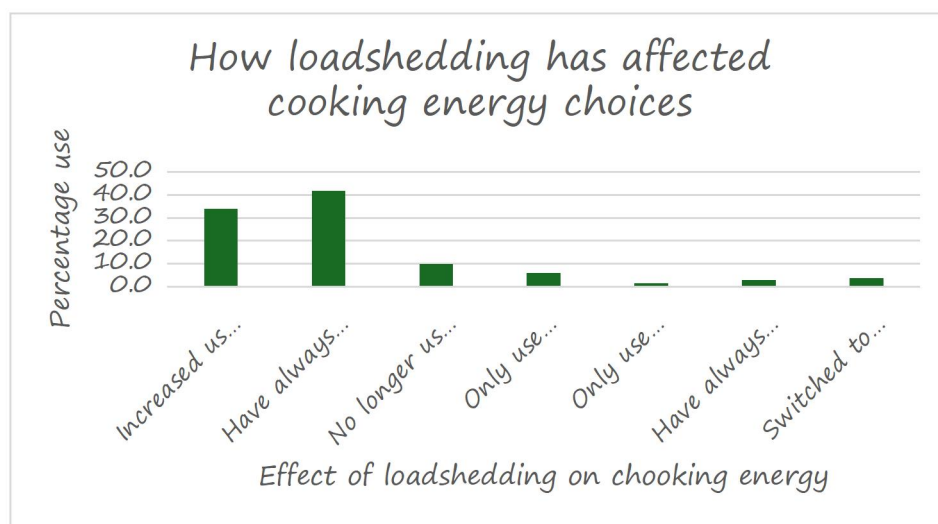


Figure 20: How households have adjusted their cooking energy

#### 5.4 Awareness of alternative energy sources and equipment

The awareness levels of alternative cooking fuels and technologies were as follows:

Table 2: Awareness of alternative energy and technologies

SN	Energy Source / Technology	No. of people aware
1	Biogas	5
2	Briquettes	39
3	Efficient Electric Appliances	4
4	Improved Cookstoves	222
5	Solar cookstoves	8
6	Kerosene stove	2
7	LPG	125
8	Pellets	69
9	Save 80 stove	5
10	Not aware of alternatives	11

The sources of information for this were community members (53%), salespeople (11%), family and friends (10%), radio and television (6%), places of work (4%), Energy companies and promoters (4%) and social media (3%). Other sources of information included the Agriculture and Commercial Show, church and other social outings as well as marketplaces.

#### 5.5 Household decision making regarding cooking appliances and fuels

The respondents interviewed (both male and female) indicated that on the most part, the decision of what energy source or appliance to use was left to the women. “Small decisions” such as migrating from using a *mbaula* to an Improved Cookstove were made by the women as this was usually within their household budgets. However, for bigger decisions, respondents indicated that these were made collectively (husband and wife) as the money for the change would be provided by the head of the household or sometimes through the women’s savings groups (*Chilimba*). Four (4 count) of the women interviewed indicated that they belonged to savings groups that they used to purchase high value household items and had used such funds to purchase the ECOA Improved Cookstove. Further, five (5 count) of the men interviewed indicated that they had introduced gas stoves to their homes and their wives had adopted these as part of their cooking practices. The men in question had used the gas stoves in their line of work (4 chefs and 1 truck driver) and having appreciated its use, introduced them to their households.

## **5.6 Community Recommendations**

The recommendations from the community included the need to reduce or end loadshedding and generally the need for more reliable loadshedding schedules so that they could plan for their cooking. Other recommendations include the following:

1. Increased promotion and distribution of alternative fuels and technologies. The most requested for were LPG, Improved Cookstoves, pellets and efficient electric appliances.
2. Involvement of the community when promoting alternatives to ensure sustainability and continuity.
3. The community noted that the prices of charcoal had been increasing ever since loadshedding had began, they requested that GRZ intervenes in this as had been done with the directive to have low income areas have electricity during the day.
4. Support of distributors of alternatives to ensure that the alternatives were closer to the community.

## **6. CONCLUSION AND RECOMMENDATIONS**

### **6.1 Conclusion**

This study highlights the challenges of clean cooking in peri urban areas and how crises like loadshedding can derail the gains achieved from years' efforts. Loadshedding basically eliminated one source of clean cooking - electric cooking, for large portions of the day and thus driving users to traditional fuels like charcoal and even firewood. It highlights the continued reliance on traditional fuels—particularly charcoal, for cooking in low, medium and high income households. Events like continued loadshedding can exacerbate energy poverty in that some low income households were observed to move from using charcoal to supplementing it with firewood and others completing replacing the use of charcoal with firewood and even burning plastic bags for energy.

While there was a notable adoption of Improved Cookstoves in the area, the adoption of modern fuels like LPG and pellets remains limited due to high upfront costs, inconsistent supply chains, and lack of awareness or familiarity among users. This is not helped by the fact that households noted a loss of income from their home based businesses like salons, barbershops, selling of ice-blocks and others that require electricity. This reduction in income further affected their ability to switch to cleaner fuels. This was consistent with the Energy Culture Framework suggesting that external factors such as loss of income among others affect household energy choices despite their many benefits particularly in times of crises.

The study recommends that in dealing with household cooking practices and particularly in line with challenges like loadshedding, a number of issues need to be taken into account including social economic characteristics of the end users such as income levels, cultural perspectives, housing conditions like ownership and availability of alternatives that are affordable and within the neighbourhood so that added costs of transportation.

### **6.2 Recommendations**

The following are the specific recommendations of the study;

1. There is need for the Government to have contingency plans for such occurrences as loadshedding and others. The end users called for consistency and communication of times of loadshedding to enable them to plan. Inconsistent and unreliable electrical supply leads to losses in terms of food and other perishables hence end users tend to consistently use charcoal where they are assured of consistency.

2. As observed in the study, there were huge disparities in the amounts of time that households had electricity. Some households reported having no electricity for up to 20 hours in one day while others experienced it only once a week for less than 2 hours. There is need to harmonise such in the event of load management in future so that some households are not more affected than others.
3. According to the IEA (2023), it is easier for households that are heavily reliant on charcoal to adopt improved cookstoves as a quick-to-deploy solution as the stoves are similar to what they are used to (*mbaulas*) and they can utilise the same fuel that they normally use (charcoal). This was true for the study area where it was observed that the demand for this efficient appliance was quite high and the stove was being used by a good number of households interviewed. There is thus need to design interventions to deploy and promote this particular product in other peri urban areas as a “quick win” solution to reduce charcoal use.
4. In line with the above, there is need to develop standards for Improved Cookstoves and other biomass based appliances. As the demand for these products increases, more stove producers are bound to produce the stoves and quality control is important. During the study, a few of the stoves were observed to not be as strong and the clay lining broke within one month of use. While this may partially be attributed to the care employed by the end user, ICS breaking down soon after purchase may pose the threat of discouraging end users from using the stoves if they are deemed to not be strong.
5. In line with the above, the clay being used in the stoves is imported from the neighbouring country of Malawi. Other designs such as the ECOA produced by Burn Manufacturing, are imported from Kenya. As such, there is need to engage the Zambia Bureau of Standards (ZABS) to ensure quality control among the products that are being brought into the country. A number of users indicated that their stove got damaged within a month of use which could indicate that the quality may have been compromised. Others did however indicate that they had used their stoves for years.
6. There is further need to have testing facilities to test the actual efficiency of the ICS locally. While the end users indicated that they used less charcoal when they used Improved Cookstoves, most of them could not provide actual numbers of the savings that they made per cooking event or even per month.
7. Garden compound presented an encouraging scenario where more than 50% of the interviewed households were using improved cookstoves. Further, the interviewed

households indicated that they had not received formal information dissemination activities within the community but had adopted the technology based on testimonies from their neighbours and stove producers who sold their product within the community. This model may be utilised in other areas to increase uptake of alternative energy and technologies.

8. In line with the above, there is a general need for increased sensitisation of the various energy sources available. Some households had indicated that their cooking practices had not been affected by loadshedding as they had been using charcoal before loadshedding and continued to do so even with loadshedding. There is need to shift households that are heavily reliant on charcoal to cleaner cooking fuels.
9. There is need for Zesco to embark on a metering exercise to ensure that households had electricity metres. This follows the fact that some houses shared a metre and the land loads would forbid them from using electricity for cooking and as result, the households tended to use charcoal for cooking.
10. There is need to conduct trainings of producers of Improved Cookstoves and support them to upscale so that they can supply larger areas. This will also ensure quality of the product and increase end user confidence. Revolving loans or grants could be provided to the producers from sources like the Constituency Development Funds (CDF) to enable them to scale up their businesses.
11. There is need to encourage companies that are engaged in alternative energy sources to have outlets in areas such as Garden compound and others. The study observed a number of gasifier pellet stoves in the area and the presence of the distributors (Supa Moto) in the area. This gave the end users easier access to the product and the users could further interact with the company when faced with problems with the product.
12. Further, Supa Moto uses a mechanism that leases out the stoves to the end users and all they have to do is buy the fuel on a monthly basis. This has historically been done in the LPG industry as well and helps to reduce the cost of the appliances which are usually a barrier to households switching to alternative energy sources. This may be explored to see how this may be applied to other fuels and equipment.
13. Given that the country is highly reliant on hydropower for its electricity production, there is need to have action plans on how to handle such situations (loadshedding) should the situation recur in future.

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**ANNEXES**

**Annex 1: Households Interview Schedule**

**SECTION A: PERSONAL DETAILS**

- 1. Ward/Section:.....
- 2. Sex
  - Male
  - Female
- 3. Age
  - Below 20
  - 20 - 35
  - 36 - 45
  - 45 - 50
  - Above 50
- 4. Head of Household
  - Male
  - Female
- 5. Education level of Head of Household
  - None
  - Primary Level
  - Secondary Level
  - Tertiary
- 6. Occupation: .....
- .....
- 7. Monthly income:
  - Below K1,000
  - K1,000 – K5,000
  - K5,000 – K10,000
  - Above K10,000
- 8. Number of people in household: .....
- 9. Do you own the house

**SECTION B: HOUSEHOLD ENERGY USE**

10. How often do you cook at this household (breakfast, lunch, supper, water heating)

.....

11. What energy/fuel do you use for cooking

.....

12. Do you cook all your meals using this energy source? Explain if you have multiple cooking appliances / fuels.

.....

13. Why do you prefer this/these particular energy source(s)

.....

14. What amount of energy do you use per month (e.g. amount of charcoal, electricity units etc)

.....

15. How much money do you spend on the energy

Below K100

K100 – K200

K200 – K500

Above K500

16. Where do you purchase the fuel / energy from:

.....

17. How far is this from your home (in response to Q16 above): .....

18. How much do you purchase at a time

Single meal use

Daily use

Weekly use

Monthly use

Other

19. If your answer to question 18 above is other, please explain:

.....

20. How are decisions regarding energy use and/or change made in the household?

.....

**SECTION C: KNOWLEDGE OF ALTERNATIVE ENERGY SOURCES**

21. What other energy sources are you aware of? (Let them list and you tick from the boxes)

- Briquettes
- Ethanol / Gelfuel
- Biogas
- Improved Cookstoves
- Gas / LPG
- Kerosene / Paraffin Stoves

- Efficient electricity appliances
- Other: .....
- None

22. Where did you hear about the alternatives from:  
.....

23. Have you used any of these alternative energy sources:

- Yes
- No

24. Do you still use these energy sources?

- Yes
- No

25. If your answer to question 21 is yes, please explain the benefits you have found in using these alternatives, and if no, please explain why you stopped using them;  
.....

**SECTION D: EFFECTS OF LOADSHEDDING**

26. Do you experience loadshedding in this area.

- Yes
- No

27. How many hours of loadshedding do you experience in a day:  
.....
28. Has loadshedding affected your energy use in terms of cooking
- Yes
- No
29. If your answer to question 26 above is yes, explain how your choice of cooking fuels and appliances has changed: .....
30. What do you use for cooking when you experience loadshedding:  
.....
31. What recommendations do you have for the policy / decision makers:  
.....

**Annex 2: Focus Group Discussion – Community**

1. Area:.....
2. What Energy Source is normally used for cooking in garden compound?  
 Charcoal  
 Electricity  
 Other (Please Specify): .....
3. Does your area experience Load shedding?  
 Yes  
 No
4. Has this affected the way in which people cook in your area? Please explain:  
.....
5. What energy sources are used in the area with the oncoming of loadshedding?  
.....
6. Apart from charcoal, what other cooking energy sources are there in the area?  
.....
7. How much do these alternative sources of energy cost?  
.....
8. How widely used are these alternatives?  
.....
9. How easy is it to access these energy sources?  
.....
10. Have you received any support from government or NGOs to cushion the effect of household cooking?  
.....
11. Do you have any recommendations for government and local leadership regarding the energy situation? .....




**Annex 3 : Focus Group Discussion – Ward Development Committee**




1. Area /  
Ward :.....  
.....
2. What Energy Source is normally used for cooking in garden compound?  
.....
3. Where do you buy it from?  
.....
4. Does your area experience Load shedding?  
 Yes  
 No
5. Has this affected the way in which people cook in your area? Please explain:  
.....
6. What energy sources are used in the area with the oncoming of loadshedding?  
.....
7. Apart from charcoal, what other cooking energy sources are available in the area?  
.....
8. How much do these alternative sources of energy cost?  
.....
9. How widely used are these alternatives?  
.....
10. How easy is it to access these energy sources?  
.....
11. Have you received any support from government or NGOs to cushion the effect of household cooking?  
.....




12. Do you have any recommendations for government and local leadership regarding the energy situation?



**Annex 4: Summary of cooking appliances and fuels in Zambia (domestic / household use)**




S/N	Stove	Description	Advantages	Disadvantages
1	<p>3 Stone Fire</p> 	<p>Traditional Cooking Stove mostly used in many rural Zambian populations.</p> <p>Uses 3 stones to support the pot and logs of varying sizes are placed in between the stones.</p>	<p>Very easy to ignite and use.</p> <p>Fuel is normally free in rural areas (depending on the location).</p> <p>Has multiple uses including space warming, traditional functions etc.</p>	<p>Very unhealthy as the end users breath in fumes and carbon monoxide particularly if the logs are not completely dry.</p> <p>Cannot be used outdoors during the rainy season.</p> <p>Affects women and girls who have to travel long distances to fetch firewood.</p>
2	<p>Fixed Mud Stove</p> 	<p>This is an improvement on the traditional 3 stone fire. It normally has a chimney or outlet that diverts smoke away from the Kitchen.</p>	<p>It can be used indoors</p> <p>Cheap to make as materials are available locally (a trained mason may be needed to ensure longevity).</p> <p>May have multiple cooking slots.</p> <p>Uses less firewood. Cracks and minor repairs can be done by user.</p>	<p>May need trained masons to ensure longevity.</p> <p>Needs strong clay to ensure that the stove is strong.</p>
2	Traditional Brazier (Mbaula)	Made of	Easily	Very inefficient and




		<p>metal (often scrap metal) and has holes on the sides for easier and faster combustion. Widely adopted in Zambia by charcoal users.</p>	<p>available and affordable</p> <p>Available in various sizes and can be used at domestic and institutional level.</p> <p>Can use a number of fuels including charcoal, briquettes and even maize cobs and other biomass based fuels (except for pellets).</p> <p>Multiple use including cooking, roasting, lighting and space heating.</p>	<p>loses heat to the environment.</p> <p>Health concerns for indoor use (Indoor air pollution). May even be fatal if room not ventilated.</p>
3	<p>Improved Cookstoves</p>  	<p>Based on traditional mbaula design but with “improvements” that may include outer casing without holes, inner lining made of clay or other insulative material to keep heat longer.</p>	<p>Uses less charcoal (30 – 80% less depending on design)</p> <p>Concentrated heat results in cooking faster.</p> <p>Multiple fuel use - charcoal or briquettes.</p>	<p>More expensive than traditional mbaula – (K60 to k500). Prices are noted to be reducing.</p> <p>Due to lack of holes, ignition times may be longer.</p> <p>Not as easily accessible and repair facilities not easily available.</p> <p>Durability issues – clay known to crack if not cared for properly.</p> <p>If using charcoal, Indoor Air Pollution</p>

				<p>concerns apply, particularly with poor ventilation.</p>
4	<p>Briquettes</p> 	<p>These are compressed and carbonised blocks that are made of biomass such as charcoal dust, sawdust and agricultural waste.</p>	<p>Very good alternative to charcoal as they do not need to cut down trees.</p> <p>Can be used in brazier or Improved Cookstoves just like charcoal.</p> <p>As they are heavier than charcoal, they burn longer hence less fuel is used.</p>	<p>Feedstock may be limited.</p> <p>Depending on binding material used, they may easily crumble.</p> <p>Takes a bit of time to light/fire.</p> <p>Briquetting machine is expensive (&gt;USD10,000). Manual ones are available but are labour intensive and volumes are low.</p>
5	<p>Gasifier Stoves</p> 	<p>Gasifier stoves use pellets made from biomass materials e.g. Saw dust.</p>	<p>Pellets are made from waste products hence environmentally friendly.</p> <p>Clean burning fuel with high heat content</p>	<p>Feedstock may run out.</p> <p>Limited suppliers.</p> <p>Stove is expensive compared to traditional cookstoves (&gt;K1,2000) hence may need financing mechanism.</p>

			<p>hence cooks very fast.</p>	<p>Stove is not produced locally hence subject to forex fluctuations and other challenges.</p> <p>Fans need charging hence need additional power point. Currently using solar but this adds the cost.</p>
6	<p>Ethanol / Gelfuel Stoves</p> 	<p>They utilise ethanol (alcohol) for cooking, as a liquid or gel form.</p>	<p>Very easy to use cooks very fast.</p> <p>May use rudimentary stoves as long as they have a holding space for the fuel. Stoves readily available in supermarkets</p> <p>Fuel can be reused.</p> <p>Fuel can be produced locally.</p>	<p>Ethanol currently taxed as an alcohol and as such the fuel is quite expensive.</p> <p>Apart from gel fuel in supermarket, ethanol is currently not readily available on the market or close to the end users.</p>
7	<p>Biogas</p> 	<p>Gas produced for anaerobic combustion of biomass materials (animal waste, food, sewer etc.)</p>	<p>Suitable for rural areas particularly animal rearing households.</p> <p>Fuel is free once digester is built.</p> <p>May be used in transport.</p> <p>Biogas lights and fridges available</p>	<p>Expensive to build biodigester.</p> <p>Compressed biogas in cylinders expensive but technology is improving.</p> <p>Biogas bags rather big and storage may be an issue.</p>

			Bioslurry is good natural fertiliser.	
8	<p>Liquified Petroleum Gas (LPG / Gas)</p> 	<p>Liquified Petroleum Gas / LPG / Gas</p> <p>Compressed gas used for cooking. One can cook directly on cylinder or connect to stove.</p>	<p>Cooks really fast.</p> <p>Easy to ignite.</p> <p>Potable.</p> <p>Very good alternative to charcoal for medium to high income households.</p>	<p>Prices doubled since INDENI closure (From K19/kg to ±K50/kg).</p> <p>Distribution points remain a challenge (though improving).</p> <p>Prone to shortages.</p> <p>Concerns about safety remain high.</p>
9	<p>Electric Stove</p> 	<p>Use electric energy to cook and bake.</p>	<p>Different sizes available from one plate to four plate cookers.</p> <p>Multiple uses (depending on design) including cooking, space heating, water heating and baking.</p> <p>Easily available and acceptable in Zambia.</p> <p>Very Clean in terms of GHG emissions, and general handling – no soot.</p> <p>Very easy to use and may</p>	<p>Inefficient (particularly the coil plates).</p>

			be used for quick or long cooking meals.	
10	<p>Pressure Cooker</p> 	Uses steam pressure to cook food.	<p>Very efficient and uses less electricity.</p> <p>Perfect for long cooking dishes like beans, dry fish etc.</p> <p>Can cook variety of foods.</p>	<p>Can only cook one meal at a time.</p> <p>Sizes are mostly on the small side and cannot cook for large families.</p> <p>On the expensive side – one stove is about K2,000 to purchase.</p>
11	<p>Induction Stove</p> 	An electric cooktop that uses electromagnetic fields to heat cookware directly.	Very energy efficient and use less electricity than normal electric stove.	<p>More expensive than normal stoves.</p> <p>Expensive to repair and replacement of parts is difficult.</p> <p>Not all pots work on these stoves (you need ferromagnetic cookware)</p>
12	<p>Solar Cookers (parabolic)</p> 	These use a parabolic reflector to concentrate sunlight onto a single focal point, achieving high temperatures for cooking.	No additional costs after initial purchase of stove.	<p>Cannot be used indoors or at night, when its cloudy or when it is raining.</p> <p>Tend to be quite big in size and need to be set up in area without obstacles.</p> <p>Still on the expensive side compared to charcoal and not readily available on the market.</p> <p>Limited to cooking and water heating.</p>
13	<p>Solar Cookers (Photovoltaic)</p>	They use solar panels to charge batteries and stove.	No additional fuel costs after initial purchase of stove.	Need considerable number of solar panels to generate enough energy for cooking.

			<p>Can be used indoors, at night and when raining depending on how charged the batteries are.</p>	<p>Currently quite expensive and not available on local market. Project in Southern Province procuring them from Norway at K20,000 a piece.</p>
	<p><b>OTHERS</b></p>			
<p>1</p>	<p>Kerosene / Paraffin Stoves</p> 	<p>Stoves that use paraffin for cooking. Very popular in the 1980s. Some promoters trying to promote this in peri urban areas.</p>	<p>Cheap and can easily be produced or adapted from other designs.</p> <p>Kerosene can be obtained from filling stations.</p>	<p>Very unclean in terms of GHG emissions and production of soot.</p> <p>Unsafe to use in that they are a fire hazard and not safe for children to use.</p>
<p>2</p>	<p>Save 80 Stove</p> 	<p>Metallic stove that uses twigs as fuel. Promoted by carbon projects across the third world countries. Project no longer there in Zambia.</p>	<p>Fuel (twigs) are free depending on where household is.</p> <p>Suitable for rural areas and farms with access to twigs.</p> <p>Has food warmer that can keep cooking once food is removed from stove.</p>	<p>Expensive compared to charcoal (last known price was K1,800).</p> <p>No longer available on Zambian market.</p> <p>Challenges in use such as twigs burning out quickly and needing constant feeding.</p> <p>Hazard to children and pets as casing may get very hot.</p>
<p>3</p>	<p>Methanol Stove</p>	<p>Promoted by GEI power in Zambia. Had planned for pilot in Garden Compound.</p>	<p>Clean and fast burning</p>	<p>Not yet readily available on Zambian Market (apart from GEI project).</p>

