REPUBLIC OF ZAMBIA
MINISTRY OF ENERGY

Rural Electrification Authority

ZAMBIA STATISTICS AGENCY
"Quality Statistics for Development"

2023 NATIONAL ENERGY ACCESS SURVEY

OFFICIAL STATISTICS OF ZAMBIA
Republic of Zambia

REPUBLIC OF ZAMBIA
MINISTRY OF ENERGY (MOE)

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NATIONAL ENERGY ACCESS BASELINE SURVEY

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2023 NATIONAL ENERGY ACCESS SURVEY

FOREWORD

In August 2023, the **Ministry of Energy (MoE) and the Rural Electrification Authority (REA)** in collaboration with the **Zambia Statistics Agency (ZamStats)** as the agent mandated to conduct surveys undertook the National Energy Access Survey (NEAS) as a baseline in all the ten (10) provinces of Zambia.

Prior to the Baseline Survey, MoE depended on various statistics drawn from studies conducted by ZamStats and international organizations to determine access to energy. Most of these studies tended to take a binary approach of measuring access to energy such as connected or not connected, cooking with biomass or not, thus leaving out vital information. This gap necessitated the undertaking of the 2023 NEAS.

The survey collected information on many aspects of the household such as demographic and general household characteristics, energy access, cost and affordability of various sources of energy, household expenditure on energy, safe sources of energy and energy utilization among others.

This report provides information on energy access rates and other key attributes of energy such as affordability, reliability, quality, capacity and safety of energy sources in the country. Further, the report provides information on the possibility of using modern and alternative sources of energy. The results in this report will bridge the energy statistics gap experienced in the sector.

Survey results contained in this report are by no means exhaustive on the topics covered in the survey, but only highlight the salient aspects. Upon request, users can access anonymized data to do further analysis and tabulations.

I would like to take this opportunity to thank the Government of the Republic of Zambia (GRZ) for providing funding to successfully conduct and publish the 2023 NEAS. My sincere appreciation goes to all the respondents for providing feedback to the inquiry. I also thank all the staff involved in the survey for ensuring its successful undertaking.

It is my sincere hope that the results contained in this report will find use among policy makers, programme managers, researchers and other stakeholders for the betterment of the Energy Sector in Zambia.

Hon. Makozo Chikote, MP
MINISTER OF ENERGY

NOVEMBER, 2024

ACKNOWLEDGEMENTS

The Ministry of Energy would like to acknowledge all stakeholders for their contributions towards the **2023 National Energy Access Survey (NEAS)** for Zambia.

In this regard, special gratitude is extended to the **Zambia Statistics Agency (ZamStats)** both at national and provincial levels who worked tirelessly in providing technical support throughout the entire process.

Appreciation also goes to the **Rural Electrification Authority (REA)**, for the resource management which was key to the successful implementation of the project.

Special thanks go to the provincial administrations, the local authorities and traditional leaders throughout the country for their cooperation and support during the survey process.

The Ministry of Education played a vital role by allowing their facilities to be used to accommodate enumerators during field work which is highly appreciated.

This survey would not have been successfully completed without the participation of the public. Their willingness to share time and information on issues reflected in this report was the greatest asset we needed and got from them. Further, we sincerely thank the enumerators for their total commitment to the exercise.

Lastly, we commend the staff from the **MOE, ZamStats, REA, ZESCO Limited and ERB** for their participation and dedication throughout the process.

Dr. Chisangano Francesca Zyambo
PERMANENT SECRETARY
ADMINISTRATION

Peter Mumba
PERMANENT SECRETARY
TECHNICAL SERVICES

NOVEMBER, 2024

STATEMENT BY THE RURAL ELECTRIFICATION AUTHORITY CHIEF EXECUTIVE OFFICER - (REA)

The 2023 National Energy Access Survey (NEAS) represents a major milestone in Zambia's pursuit of universal access to electricity by 2030. It highlights our continued commitment to the attainment of **Sustainable Development Goal 7 (SDG 7),** which seeks to ensure affordable, reliable, sustainable, and modern energy for all Zambians.

The Government of the Republic of Zambia (GRZ), through the Rural Electrification Authority (REA) has made considerable strides in expanding electricity access through the Rural Electrification Program (REP) and by actively encouraging private sector participation in the energy landscape. Despite these efforts, rural communities remain significantly underserved compared to urban areas, emphasizing the critical importance of our mandate and the need for a holistic and inclusive definition of energy access. In recognising this disparity, the Ministry of Energy (MoE), in collaboration with REA, initiated a comprehensive and consultative process to refine the definition of electricity access. This revised definition, built on the Multi-Tier Framework (MTF), offers a more accurate measurement of electricity access by considering multiple energy sources and service levels. This approach enables us to capture the real extent of electricity access across Zambia, reflecting the diversity of supply options and the actual energy experience of households.

The NEAS aims to establish a comprehensive national baseline for energy access, assess the progress of household connections, and track the uptake of off-grid solutions such as solar home systems and mini-grids. These insights are invaluable in enhancing our capacity to plan, implement, and monitor electrification projects with precision.

We believe that the data and findings from the NEAS report will be instrumental in driving Zambia closer to the goal of delivering sustainable and inclusive energy solutions. As we continue on this path, we acknowledge and celebrate the collective efforts of a broad spectrum of stakeholders including government agencies, energy regulators, project developers, civil society, development partners, international organisations, and academia. Your contributions have been vital to this accomplishment, and your partnership will be crucial as we continue to advance toward a brighter energy future for Zambia.

Eng Linus Chanda
Chief Executive Officer
RURAL ELECTRIFICATION AUTHORITY (REA)

NOVEMBER, 2024

STATEMENT BY THE ACTING STATISTICIAN GENERAL

The National Energy Access Survey (NEAS) provides indicators of the national energy situation both in rural and urban areas of the country. The collaboration of Zambia Statistics Agency with the Ministry of Energy and The Rural Electrification Authority is a testament to the enhancement of the **National Statistical System (NSS).**

Energy access is not only a fundamental human right but also a key driver of economic growth, improved livelihoods, and social well-being. It powers industries, enhances increased business activities, supports educational outcomes, and is essential for delivering health services. Despite the progress made in recent years, a large portion of Zambia's population continues to face challenges of access to reliable, affordable and clean energy.

The 2023 NEAS results provide an updated and comprehensive picture of energy access across Zambia. The survey collected data from households, businesses, and institutions to assess the extent of access to electricity, alternative energy sources and challenges faced in ensuring consistent energy supply. It covers various dimensions, including: rural and urban disparities in access to electricity, household usage of solar, biomass, and other renewable energy sources as well as affordability and reliability of energy services. Survey results are a critical tool for informing government policy, guiding investment decisions, and shaping development strategies aimed at improving access to clean and modern energy in Zambia.

By understanding the needs and gaps in energy access, the government will be better equipped to implement policies and programs that promote universal energy access and align with our national development goals, as well as international commitments such as the **United Nations Sustainable Development Goal 7:** *"Ensure access to affordable, reliable, sustainable, and modern energy for all."*

I would like to take this opportunity to express our appreciation for the support provided by our partners, particularly the **Ministry of Energy (MoE) and Rural Electrification Authority (REA).** I wish to thank the dedicated teams that worked hard to see to the success of this endeavor.

Sheila S. Mudenda
Acting Statistician General
ZAMBIA STATISTICS AGENCY

NOVEMBER, 2024

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- AES - Adult Equivalent Scale
- CAPI - Computer Assisted Personal Interview
- CSA -Census Supervisory Area
- EA - Enumeration Area
- GAR - Gross Attendance Rate
- GDP - Gross Domestic Product
- IPPs - Independent Power Producers
- LCMB - Living Conditions Monitoring Branch
- LCMS -Living Conditions Monitoring Survey
- LPG- Liquid Petroleum Gas
- NAR - Net Attendance Rate
- NAS - Non-Agricultural Stratum
- PPES - Probability Proportional to Estimated Size
- PSU - Primary Sampling Unit
- REA – Rural Electrification Authority
- SAP - Structural Adjustment Programme
- SDGs - Sustainable Development Goals
- ZamStats – Zambia Statistics Agency

NATIONAL ENERGY ACCESS BASELINE SURVEY

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The Ministry of Energy in collaboration with Zambia Statistics Agency (ZamStats) conducted the 2023 National Energy Access Survey (NEAS) designed to provide several national indicators to inform policy design and implementation. An estimated 20.8 million people were living in Zambia in 2023. Of this total population, 59.2 percent resided in rural areas while 40.8 percent were living in urban areas with 73.3 percent of the households being male-headed while 26.7 percent were female-headed.

At national level, 53.6 percent of the households at national level had access to electricity. Furthermore, 34.0 percent of the households in rural areas compared to 80.3 percent of the households in urban areas had access to electricity. Lusaka Province had the largest percentage share of households with access to electricity at 84.8 percent followed by Copperbelt and Central provinces at 81.7 and 59.9 percent, respectively. Northern and Western provinces accounted for the least percentage shares of households with access to electricity at 33.0 and 24.8 percent, respectively.

Almost all the households (95%) that did not have any source of electricity at the time of the survey were willing to be connected.

At national level, the most common source of energy used by households was that from the National grid at 34.4 percent, followed by dry batteries at 24.3 percent while 18.6 percent of the households cited using a solar home system. Only 0.2 percent of the households cited using a local mini-grid as their source of energy.

The average number of hours without electricity from the national grid per day during the dry season was less than an hour (0.52 hours). In rural areas, the average number of hours without electricity from the National grid per day during the dry season was almost double that of urban areas (i.e. Rural: 0.84 hours vs 0.46 hours: Urban). Western Province, on average, experienced the longest number of hours from the National grid per day without electricity at 2.72 hours followed by Northern Province at 1.39 hours and Southern Province at 1.02 hours. When asked about reliability of power from the national grid, 82.4 percent were of the view that the quality of power supply during the dry season was regular compared to 17.6 percent who held the view that power was Irregular over the same period.

At national level, 0.15 percent of households encountered a problem using electricity from the national grid. Of these households, 82.3 percent reported having had one of its household members experience a body injury representing the largest proportion, followed by 9.8 percent that had one of its household members suffer permanent limb damage while 7.9 percent of the households experienced death of a household member arising from use of electricity from the national grid.

In case of a fault, 29.2 percent reported that the fault is rectified in less than a day representing the largest proportion followed by 24.8 percent who reported that it takes more than one day but less than 7 days to have the fault rectified while 17.7 percent of the households said it takes a day to have the fault sorted out.

For households that reported accessing power from a local mini-grid, 11.4 percent reported that they were not getting enough hours of electricity from their supplier, 5.9 percent cited high voltage, 0.9 percent cited high frequency of unscheduled electricity supply interruptions. In case of a fault, 56.7 percent of the households at national level reported that the fault is rectified in less than a day, 26.4 percent in one day while 5.9 percent indicated that it takes more than one day but less than 7 days to have the fault rectified by the Local mini-grid service provider. Further, 36.4 percent of the households were of the view that power from their Local Mini-grid supplier was Irregular relative to 63.6 percent with a contrary view.

Results also show that 0.4 percent of the households in Zambia in 2023 used a generator as an alternative source of electricity. Of these households, the largest proportion did not have a backup source in case of generator failure at 44.4 percent while 17.7 percent used LPG and 37.9 used other alternatives such as firewood, charcoal, etc.

Survey findings also show that 8.9 percent of the households used a solar home system as a source of energy. Further, 4.2 percent of the households used a solar lantern as a source of energy for lighting.

At national level, 57.6 percent of the households were using charcoal for various purposes, while 1.0 percent of the households countrywide used LPG. Results further show that 0.05 percent of the households used biogas while 0.04 percent of the households countrywide used ethanol.

At National level, results show that the most commonly used type of cooking equipment (appliance) was a three-stone open fire place (48.0%) followed by brazier at 38.2 percent. The least commonly used type of cooking equipment by households was an ethanol stove at 0.01 percent.

In terms of energy used for lighting by households, 36.5 percent of the households used solar as a source of energy for lighting reflecting the largest proportion followed by those who used dry batteries at 23.6 percent with 22.2 percent of the households having reported using electricity as their source of energy for lighting while 3.6 percent of the households used a rechargeable battery as a source of energy for lighting.

REPUBLIC OF ZAMBIA
MINISTRY OF ENERGY (MOE)

ZAMBIA STATISTICS AGENCY

Rural Electrification Authority

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER ONE

GLOBAL AND REGIONAL ENERGY SECTOR OUTLOOK (ACCESS)

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER 1:

GLOBAL AND REGIONAL ENERGY SECTOR OUTLOOK (ACCESS)

1.1. Introduction

Zambia, a landlocked country in Southern Africa, plays a significant role in the regional energy landscape. As the global energy sector continues to evolve, Zambia finds itself at the forefront of a transitioning energy landscape. With an abundance of renewable energy resources, including hydro, solar, and wind power, Zambia has the potential to become a clean energy hub in Southern Africa.

Regionally, Zambia is a key player in the **Southern African Development Community (SADC)** energy sector with significant opportunities for cross-border energy trade and co-operation. The country's energy sector is also closely tied to the global energy market, with fluctuations in international energy prices and trends having a direct impact on Zambia's energy landscape.

Currently, Zambia's energy sector is dominated by hydropower, which accounts for over 80% of the country's electricity generation. However, the country aims to diversify its energy mix and increase the share of renewable energy sources in its energy portfolio. This shift is driven by a growing demand for electricity, driven by population growth, urbanization, and economic development.

1.2. Connection to the Grid

In 2007, only 3 percent of the households had connection to electricity in rural areas relative to 47.8 percent in urban areas, which on average, translates into 18.5 percent at national level (ZDHS 2007). In 2015, the proportion of households with connection to electricity in rural areas increased marginally by 1.4 percentage-points to 4.4 percent while 67.3 percent of the households in urban areas were similarly connected to electricity reflecting 31.4 percent at national level (LCMS, 2015). Further, 5.6 percent of the households in rural areas relative to 74.5 percent of the households in urban areas had connection to electricity in 2022 translating into a national average of 33.9 percent (LCMS, 2022).

Thus, at national level, analytically, the proportion of households with connection to electricity, on average, increased by 1.8 percentage-points each year between 2007 and 2022, from 18.5 percent in 2007 to 33.9 percent in 2022. This annual increase in the rate of electricity connection was less than the annual population growth rates of 2.8 percent over the period 2000-2010 and 3.4 percent over the period 2010-2022 (Census, 2022).

Analysing annual increase in electricity connection by rural/urban over the period 2007 to 2022, on average, connection to electricity in rural areas went up by 1.9 percent each year compared to the 1.6 percent in urban areas. Clearly, these annual increases in electricity connection both in rural and urban areas were less than the annual population growth rates of 2.8 and 3.4 percent, respectively, between 2000-2010 and 2010-2022.

1.3. Cost and Affordability

In an effort to meet the cost of providing electricity services, electricity tariffs in Zambia have been adjusted upwards 11 times between 2000 and 2019. The largest upward adjustment was effected in 2019 of 113 percent while the least tariff adjustment was in 2003 at 5 percent. Overall, the average annual tariff adjustment between 2000 and 2019 was 38.7 percent (**Refer to Table 1.2**).

Table 1.1: Tariff Adjustments in Percent from 2000 to 2019

Year	2000	2003	2005	2007	2009	2010	2014	2017	2019
Increase in Percent	41	5	11	26	35	26	16	75	113

Zambia, like many countries in the sub-Sahara African region, has had to deal with the challenge of ever-increasing demand for electricity amidst low electricity tariffs that do not reflect the cost of electricity supply. For instance, 39 power utilities across sub-Saharan Africa in 2014, on average, charged $0.27/kWh even though 25 percent of these utilities should have been charging at least $0.40/kWh to meet the cost of electricity provision. Further, 25 percent of these utilities required a tariff of less than $0.20/kWh while the remaining 50 percent required a tariff of $0.20–$0.40/kWh [Trimble et al, (2014); Kojima and Trimble (2016).

1.4 Energy uses: 2007 - 2022

In 2007, about 19 percent of the households in Zambia had connection to electricity. With this low proportion of households having connection to electricity, many households resorted to using other sources of energy to meet their various energy needs. Further, 59.4 percent of the households representing the largest proportion used firewood for cooking, followed by 15.9 percent who used electricity for cooking, 4.5 percent charcoal, 0.2 percent coal and 0.1 who reported using straw/shrubs/grass. Of all the sources of energy used by households for cooking, only those households who used electricity for their cooking constituted a clean fuel.

At the global level, the percentage of the population with access to clean cooking fuels increased from 57 percent in 2008 to 71 percent in 2021 showing an annual average increase of 1.08 percent. Of the 29 percent or 2.3 billion people still using polluting fuels and technologies for cooking, the majority are in sub-Saharan Africa and Asia (2023 World Bank Report, Tracking SDG#7 {Energy Progress Report}).

In 2015, at national level, 31.4 percent of the households had connection to electricity (LCMS, 2015). Analysed by type of energy used for cooking by households, 50.7 percent used firewood for cooking representing the largest proportion, followed by 32.9 percent who used charcoal, 16 percent electricity, 0.1 percent gas and a combined 0.1 percent households who used coal, kerosene, solar and livestock/ crop residues. This implies that only 16.1 percent of the households used clean fuels (electricity and gas) for cooking reflecting a 0.2 percentage-point increase in the proportion of households who used clean fuels relative to 2007.

According to 2022 LCMS, 33.9 percent of the households had connection to electricity at national level. Analysed by type of energy used for cooking by households, 51.4 percent used firewood representing the largest proportion, followed by 39.2 percent who used charcoal, 8.5 percent electricity, 0.2 percent solar, 0.1 percent used LPG while each of the remaining households used cow dung, crop residue and wood pellets at 0.1 percent. Thus, only 8.8 percent of the households used a clean fuel for cooking, a reduction of almost half the proportion of households who used clean fuel to prepare their meals relative to 15.9 percent in 2015.

In terms of lighting, there was an increase in the proportion of households who used electricity as their main source of energy for lighting from 21.6 percent in 2010 to 31.2 percent in 2015. Further, 33.9 percent of the households in 2022 used electricity as their main source of energy for lighting reflecting a 2.7 percentage-point increase relative to 2015. Further, 46.7 percent of the households in 2015 compared to 31.1 percent of the households in 2022 used a torch for lighting.

According to the report, households using traditional biomass spend upto 40 hours a week gathering firewood and cooking, and since this is an activity which is mainly carried out by women and children, it prevents them from pursuing employment opportunities or participating in local decision-making bodies and prevents children from going to school.

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER TWO

OVERVIEW OF ZAMBIA

CHAPTER 2:

OVERVIEW OF ZAMBIA

2.1 Introduction

Zambia is a landlocked sub-Sahara African country sharing boundaries with eight countries, namely, Malawi and Mozambique to the east; Zimbabwe, Botswana and Namibia to the south; Angola to the west; and the Democratic Republic of Congo and Tanzania to the north. The country lies between latitudes 8° and 18° south and longitudes 22° and 34° east. It covers 752,612 square kilometres. About 58 percent of Zambia's total land area of 39 million hectares is potentially good for agricultural production although most of this arable land is yet to be fully exploited for the purpose of increasing the contribution of the Agricultural sector to the National economy. Zambia`s agricultural activities are mainly rain-fed despite having large water bodies that can easily be tapped for irrigation purposes. Zambia`s economy primarily depends on Copper and Cobalt exports to generate most of its foreign exchange revenue. As a result, the country remains susceptible to the high risk of external commodity price fluctuations.

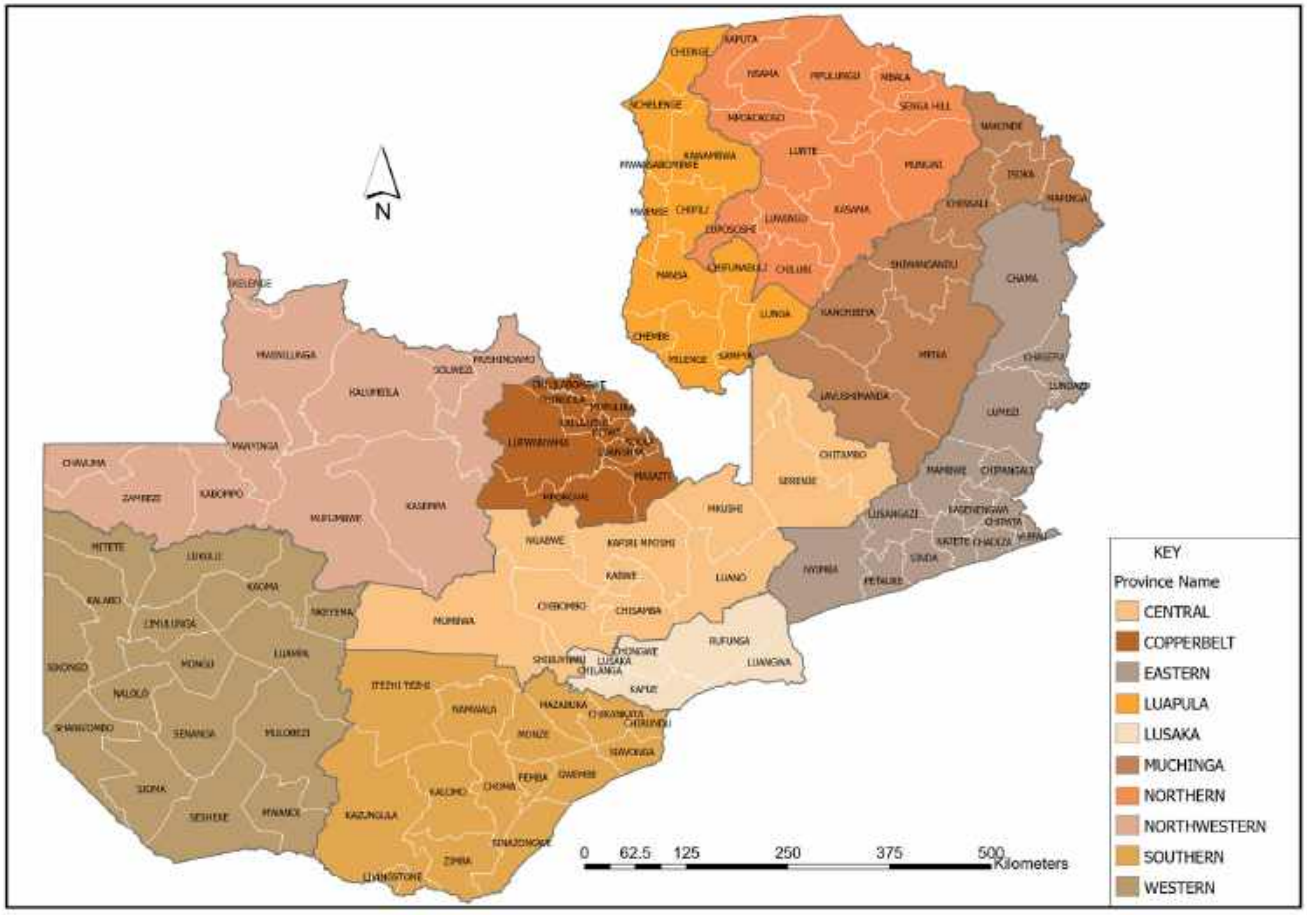
2.2 Land and the People

The population of Zambia increased from 5.7 million in 1980 to 19.6 million in 2022. Between 2010 and 2022, the population increased from 13.1 to 19.6 million representing an increase of 49.8 percent. The country's average population density has increased to 26.2 from 17.4 persons per square kilometre between 2010 and 2022 while Lusaka Province has the highest density of 141.1 persons per square Kilometre. There are 73 ethnic groupings in Zambia with seven major languages used officially besides English language. The seven major languages are Bemba, Kaonde, Lozi, Lunda, Luvale, Nyanja and Tonga.

2.3 Politics and Administration

Zambia got its independence from Britain in 1964. Politically, the country has gone through the era of multi-party democracy, 1964-72- and one-party rule, 1972-1991and later multi-party democracy since 1991. Administratively, the country is divided into 10 provinces namely Central, Copperbelt, Eastern, Luapula, Lusaka, Muchinga, Northern, North-Western, Southern and Western. These provinces are further subdivided into districts, constituencies and wards.

Figure 2.1: Administrative Map of Zambia showing Districts and Provinces.



2.4 Economy

During the period 2017-2021, the country's economy declined with the real growth rate averaging 1.4 percent largely due to unfavorable weather conditions which negatively impacted the Agriculture and Energy sectors in the earlier years of the period. In 2020, the economy contracted to 2.8 percent, registering the first recession since 1998.

In 2021, the country's economy picked up amidst slow global economic activity and commodity prices. (**8th NDP, Ministry of Finance and National Planning, 2022**).

Zambia's economic growth in 2022 was estimated at 5.2 percent (**National Accounts, ZamStats, 2022**). Most of the population in Zambia (60.0 percent) live in rural areas and are dependent on agriculture for their livelihood. Thus, addressing basic challenges faced by the agricultural community would not only improve household food security but also help quicken the process of poverty reduction. Further, Zambia's GDP in constant 2010 prices was recorded at K154,026.4 billion in 2022, an increase from K97,215.9 billion recorded in 2010. Zambia's GDP per capita increased from K7,425.2 in 2010 to K7,860.4 in 2022 registering a 5.9 percentage increase. The average annual inflation rate was recorded at 11.1 percent in 2022 from 8.2 percent in 2010.

Table 2.1: Gross Domestic Product (GDP), Inflation and Exchange Rates, Zambia 2000-2022

Year	GDP at Current Prices (K' billions)	GDP at constant 2010 prices (K' billions)	Per capita GDP at current prices (K'000)	Per capita GDP at constant 2010 prices (K'000)	GDP growth rate %	Average Annual LME Copper Price	Average annual Inflation rate %	Average exchange rates
2000	11,201.00	47,404.9	1,143.86	4,841.0	3.9	-	25.9	3,112
2001	14,748.80	49,925.3	1,461.72	4,948.0	5.3	-	21.7	3,611
2002	18,447.00	52,174.9	1,772.11	5,012.2	4.5	1,552.48	22.2	4,307
2003	23,201.90	55,798.5	2,159.41	5,193.2	6.9	1,779.15	21.5	4,911
2004	29,729.90	59,722.5	2,680.86	5,385.4	7.0	2,864.94	18.0	4,846
2005	37,189.30	64,043.7	3,250.43	5,597.6	7.2	3,678.89	18.4	4,562
2006	45,964.20	69,105.6	3,896.00	5,857.5	7.9	6,722.14	9.1	3,698
2007	56,263.00	74,877.5	4,627.00	6,157.8	8.4	7,118.53	10.7	4,078
2008	67,088.70	80,698.5	5,536.00	6,659.0	7.8	6,955.88	12.4	3,777
2009	77,348.30	88,139.1	5,997.00	6,833.6	9.2	5,148.74	13.5	5,079
2010	97,215.95	97,215.9	7,425.00	7,425.2	10.3	7,534.78	8.2	4,816
2011	114,029.71	102,630.1	8,311.56	7,480.6	5.6	8,820.99	6.4	4,872
2012	131,271.88	110,427.3	9,280.14	7,806.3	7.6	7,949.95	6.6	5,170
2013	151,330.80	116,012.2	10,379.25	7,956.4	5.1	7,326.17	7.0	5,377
2014	167,052.44	121,456.9	11,119.54	8,084.5	5.0	6,859.14	7.8	5,910
2015	183,381.06	125,003.5	11,850.98	8,078.3	2.9	5,501.69	10.0	8.86
2016	216,098.08	129,698.0	13,562.17	8,125.0	3.6	4,863.2	18.2	10.23
2017	246,251.73	134,270.6	15,010.56	8,184.6	3.7	6,162.7	6.6	9.55
2018	275,174.38	139,688.1	16,294.35	8,271.5	4.0	6,525.3	7.5	10.47
2019	300,449.77	141,701.5	17,285.87	8,152.5	1.4	6,005.1	9.1	12.91
2020	332,720.85	137,755.0	18,575.08	7,702.0	-2.8	6,168.5	15.7	18.32
2021	442,336.84	146,343.9	24,095.05	7,830.7	6.2	9,314.7	22.1	19.91
2022	493,964.30	154,026.4	25,188.42	7,860.4	5.2	8,814.8	11.1	16.90

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER THREE

SURVEY BACKGROUND AND SAMPLE DESIGN METHODOLOGY

CHAPTER 3:

SURVEY BACKGROUND AND SAMPLE DESIGN METHODOLOGY

3.1 Survey Background

The Ministry of Energy in collaboration with the Zambia Statistics Agency (ZamStats) undertook a household-based National Energy Access Survey (NEAS) in 2023. Although energy access is a multi-dimensional concept, most of the documents available in Zambia have tended to take a binary approach of measurement of access to energy: connected or not connected, cooking with biomass or not cooking with biomass, etc. For instance, the 2015 LCMS results show that 31.4 percent of the households in Zambia were connected to electricity relative to 68.5 percent not connected (LCMS Report, 2015).

3.2 Objectives of the 2023 National Energy Access Survey

The key objectives of the survey were:

- To establish a benchmark for measurement of Energy Access at national level.
- To evaluate achievement of the set national energy access development targets and
- To provide reliable data on the energy sector that can meet the needs of multiple stakeholders, including government, regulators, public services, project developers, civil society organizations, development agencies, financial institutions, appliance manufacturers, international programs, and academia.

The survey was designed to provide several national indicators to inform Energy Sector policy design and implementation. The following were some of the indicators:

a) Percentage of households with access to electricity
b) Number of people with access to electricity
c) Percentage of the business enterprises with access to electricity
d) Average number of days it takes getting connected to the grid and/or other forms of access
e) Percentage share of electricity consumption per sector,
f) Number or Percentage of Rural Growth Centres (RGCs) reached/electrified
g) Percentage of households' main energy source for cooking,
h) Percentage of households' main source for lighting,
i) Customer Average Interruption Duration Index (CAIDI)
j) Dry Season (DS) System Average Interruption Duration Index (SAIDI)
k) National installed electricity generation capacity (MW)
l) Load factor (Percentage electricity actually generated versus installed generation capacity

m) Load shed/energy deficit (GWh)
n) Energy not served (GWH)
o) Total electricity generated in the country
p) Percentage of renewable energy in the total national installed electricity generation capacity
q) Percentage of renewable mix
r) Percentage share of biofuel in petroleum products and cooking fuel
s) Percentage of households/business with access to renewable energy
t) Percentage of energy switch from fossil fuel to renewable energy
u) Percentage of final energy conception for cooking
v) Traditional biomass consumption total/per head of population
w) Percentage of households using improved cooking stoves
x) Percentage of electricity system losses
y) Percentage of private investment in the electricity sub-sector

The following topics were covered in the NEAS Questionnaire:

1. Demographic characteristics
2. Education
3. Household assets
4. Economic activities
5. Energy Access and Utilization
6. Household amenities and Housing conditions
7. Income
8. Household expenditure and Consumption

3.3 Sample Design and Coverage

The survey covered the whole country and was conducted in Enumeration Areas (EA's) drawn from the 2022 Census of Population and Housing frame. A sample of 426 Enumeration Areas (EAs) involving 8520 households was drawn country wide. The 2023 NEAS was designed to produce reliable results at national, rural/urban and province levels.

3.4 Estimation Procedure

Due to disproportionate allocation of the sample points to various strata, sampling weights are required to correct for differential representation of the sample at the national and sub-national levels. The weights of the sample in this case are equal to the inverse of the product of the two selection probabilities employed at each stage of selection.

Therefore, the probability of selecting an EA was calculated as follows:

$$P_{hi}^{1} = \frac{a_h M_{hi}}{\sum_i M_{hi}}$$

Where:

P_{hi}^{1} = the first selection probability of EAs

a_h = The number of EAs selected in stratum h

M_{hi} = The size (in terms of the population count) of the ith EA in stratum h

$\sum_i M_{hi}$ = The total size of the stratum h

The selection probability of the household was calculated as follows:

$$P_{hi}^{2} = \frac{n_{hi}}{N_{hi}}$$

Where:

P_{hi}^{2} = the second selection probability of selecting households

n_{hi} = the number of households selected from the ith EA of h stratum

N_{hi} = Total number of households listed in an EA

Therefore, the EA specific sample weight was calculated as follows:

$$W'_{hi} = \frac{1}{P_{hi}^{1} x P_{hi}^{2}}$$

W'i is called the PPS sample weight. In the case of rural EAs which have more than one second stage stratum, the first selection probability is multiplied with separate stratum specific second stage selection probabilities. Therefore, the number of weights in each rural EA depends on the number of second stage strata available.

In order to correct for differential representation, all estimates generated from the survey data were weighted. Therefore, if yhij is an observation on variable Y for the jth household in the ith EA of the hth stratum, then the estimated total for the hth stratum is expressed as follows:

$$Y_{hT} = \sum_{i=1}^{a_h} w_{hi} \sum_{j=1}^{n_h} y_{hij}$$

Where:

YhT = the estimated total for the hth stratum
i = 1 to ah: the number of selected clusters in the stratum
j = 1 to nh: the number of sample households in the stratum
The national estimate will be obtained using the following estimator:

$$YT = \sum_{k=1}^{20} Y_{hT}$$

Where:

YT = the national total estimate
Where:

^Y= the national total estimate
n = the number of strata in a domain

3.5 Data Collection

Data collection for the NEAS was done using computer-aided personal interviewing (CAPI) technique employing the World Bank developed application software Survey Solutions. To enhance the quality of data collected, the dataset was concurrently subjected to extensive consistency and validation checks during the data collection process to minimize errors.

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER FOUR

GENERAL CONCEPTS AND DEFINITIONS

CHAPTER 4:

GENERAL CONCEPTS AND DEFINITIONS

4.1 Introduction

The concepts used in this report conform to the standard used in households' surveys. These definitions are the same as those used in many surveys including the Living Conditions Monitoring surveys at ZamStats.

4.2 General Concepts and Definitions

Demographic characteristics:	refers to socio-economic status of a population expressed statistically, such as age, sex, education level, marital status, average household size, etc.
Enumeration Areas (EAs):	refers to geographically demarcated areas by ZamStats specifically for purposes of conducting censuses and surveys. They have in most cases clearly identifiable boundaries using land physical features such as roads, rivers, power lines, rail-lines, streams etc.
Household:	is a group of persons who normally cook, eat and live together. These people may or may not be related by blood, but make common provision for food or other essentials for living and they have only one person whom they all regard as the head of household. Such people are called members of the household.
Housing Unit:	refers to an independent place of abode intended for habitation by one household. It should have direct access to the outside such that the occupants can come in and go out without passing through anybody else's premises. The housing unit should have at least one door which directly leads to the outside into the open or into a public corridor or hallway.
Head of Household:	refers to the person all members of the household regard as the head. He/she is the one who normally makes day-to-day decisions governing the running of the household. In cases of one member households, the member will be the head of the household. The head of the household can either be male or female.
Urban Area:	ZamStats defines an urban area mainly based on two criteria: • Population size and • Economic activity Thus, an urban area is one with a minimum population size of 5,000 people. In addition, the main economic activity of the population must be non-agricultural, such as wage employment. The area must also have basic modern facilities, such as piped water, tarred roads, post office, post post/station, health Centre, etc. and dominantly having permanent structures.

Rural area:	is one with a population size of less than 5,000 people. In addition, the main economic activity of the population must be agricultural. The area must have minimal access to basic modern social facilities and pre-dominantly having non-permanent structures.
Asset:	an asset is a store of value representing a benefit or a series of benefits accruing to the economic owner by holding or using the entity over time.
Access to electricity:	a household is said to have access to electricity, if by any technology source, receives at least 4 hours of electricity per day (or at least 1 hour of electricity per evening) or has a primary source of energy with capacity to provide the task of lighting, phone charging or powering a (3-49)w device [World Bank MTF,2019].

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER FIVE

GENERAL DEMOGRAPHIC CHARACTERISTICS

CHAPTER 5:

GENERAL DEMOGRAPHIC CHARACTERISTICS

5.1 Introduction

The demographic characteristics provide background information and the framework necessary for better understanding of aspects of the population, including economic activity, poverty and food security. For instance, information on all aspects of energy access of the population become more useful when disaggregated by demographic characteristics such as age, sex and geographical areas.

The 2023 NEAS collected data on the following demographic characteristics:

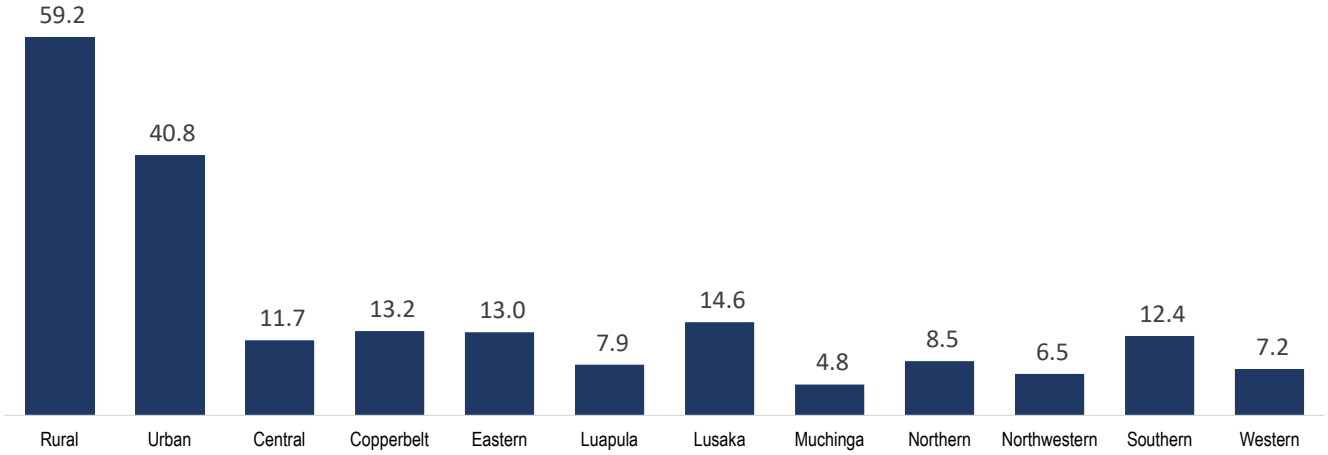
- Population size, age, sex and geographical distribution
- Household size and headship
- Marital status
- Disability
- Orphanhood
- Deaths in households

5.2 Population Size and Distribution

Figure 5.1 shows the percentage distribution of the population in Zambia by rural/urban and province in 2023. Survey results show that an estimated 20.8 million people were living in Zambia in 2023. Of this total population, 59.2 percent resided in rural areas while 40.8 percent were living in urban areas.

Analysing population distribution by province, results show that Lusaka and Copperbelt provinces accounted for the largest proportions of the population at 14.6 and 13.2 percent, respectively. On the other hand, Muchinga and North-western provinces accounted for the least percentage shares of the population at 6.5 and 4.8 percent, respectively.

Figure 5.1 Percentage Distribution of Population by Rural/Urban and Province, Zambia 2023.



5.3 Population Distribution by Age Group and Sex

Table 5.1 shows the percentage share of the population by age-group and sex in 2023. Results show that the age-groups below 20 years accounted for 54.8 percent of the population with those in the age range 5-9 years representing 14.8 percent, followed by those aged 10-14 years at 14.6 percent while the age-group above 64 years accounted for 2.7 percent of the population. Thus, 64.1 percent of the population in Zambia at the time of the survey were below 25 years.

Table 5.1: Percentage Distribution of the Population by Age-group and Sex, Zambia 2023.

Age-group	Persons	Percent Share	Male	Percent Share	Female	Percent Share
Total	**20,892,631**	**100.0**	**15,944,005**	**76.3**	**4,948,626**	**23.7**
0 - 4	2,653,283	12.7	2,119,622	79.9	533,661	20.1
5 - 9	3,091,159	14.8	2,339,583	75.7	751,575	24.3
10 - 14	3,058,035	14.6	2,280,029	74.6	778,006	25.4
15 - 19	2,650,013	12.7	1,933,882	73.0	716,131	27.0
20 - 24	1,943,341	9.3	1,467,811	75.5	475,530	24.5
25 - 29	1,544,630	7.4	1,231,019	79.7	313,610	20.3
30 - 34	1,259,230	6.0	1,021,017	81.1	238,214	18.9
35 - 39	1,204,641	5.8	963,784	80.0	240,857	20.0
40 - 44	938,918	4.5	734,650	78.2	204,268	21.8
45 - 49	763,557	3.7	604,768	79.2	158,789	20.8
50 - 54	552,407	2.6	418,705	75.8	133,702	24.2
55 - 59	369,429	1.8	287,512	77.8	81,917	22.2
60 - 64	294,041	1.4	197,190	67.1	96,850	32.9
65 - 69	215,389	1.0	142,856	66.3	72,533	33.7
70 - 74	142,778	0.7	80,382	56.3	62,395	43.7
75 - 79	107,817	0.5	59,269	55.0	48,548	45.0
80 - 84	51,209	0.2	29,096	56.8	22,114	43.2
85 - 89	30,349	0.1	18,480	60.9	11,869	39.1
90 - 94	18,434	0.1	12,107	65.7	6,327	34.3
95 +	3,971	0.0	2,241	56.4	1,730	43.6

5.4 Relationship to Household Head

Table 5.2 shows the percentage distribution of the population by relationship to the head of the household. Results show that there were 4,119,848 heads of household representing 19.7 percent of the total population. Own child and spouse accounted for 48.6 and 13.5 percent of the total population, respectively.

Table 5.2: Percentage Distribution of the Population by Relationship to the Household Head, Zambia, 2023.

Type of Relationship	Population	Percent
Zambia	20,892,631	100
Head	4,119,848	19.7
Spouse	2,824,456	13.5
Own child	10,153,885	48.6
Step child	273,981	1.3
Adopted	25,573	0.1
Grand child	1,743,672	8.3
Brother/Sister	437,344	2.1
Cousin	67,826	0.3
Nephew/Niece	727,103	3.5
Brother/Sister-in-law	206,362	1.0
Parent	80,978	0.4
Parent-in-law	46,330	0.2
Other relatives	123,659	0.6
Maid/Nanny/House-servant	13,975	0.1
Non-relative	47,638	0.2

Table 5.3 shows the percentage distribution of household heads by sex, rural/urban and province in 2023. At national level, results show that 73.3 percent of the households were male headed while 26.7 percent were female headed.

By rural/urban, 73.9 percent of the households in rural areas were male headed while 26.1 percent were female headed. Further, 72.6 percent of the households in urban areas were male headed while 27.4 were female headed.

Analyzed by province, results show that Northern Province had the highest percentage of male headed households at 78.9 percent followed by Muchinga with 77.2 percent. On the other hand, Western and North-western provinces had the largest proportions of households that were female headed at 43.9 and 28.6 percent, respectively.

Table 5.3: Percentage Distribution of Household Heads by Sex, Rural/Urban and Province, Zambia 2023.

Residence	Total	Male	Female	Total
Total	**4,119,848**	**73.3**	**26.7**	**100.0**
Rural	2,375,655	73.9	26.1	100.0
Urban	1,744,193	72.6	27.4	100.0
Province				
Central	467,331	75.8	24.2	100.0
Copperbelt	536,681	75.1	24.9	100.0
Eastern	566,687	74.7	25.3	100.0
Luapula	300,198	74.1	25.9	100.0
Lusaka	629,890	74.1	25.9	100.0
Muchinga	212,415	77.2	22.8	100.0
Northern	348,518	78.9	21.1	100.0
North-western	256,981	71.4	28.6	100.0
Southern	484,680	72.7	27.3	100.0
Western	316,467	56.1	43.9	100.0

5.5 Marital Status

Table 5.4 shows the percentage distribution of the population aged 12 years or older by marital status. Survey results show that 71.4 percent of the population aged 12 years or older were married reflecting the largest proportion while 10.9 percent had lost their spouse. Further, 7.5 of this population had never been married while 0.3 percent were co-habiting.

Similar to the pattern at national level, the proportions of the population that were married accounted for the largest percentage shares regardless of residence at 73.8 and 68.2 percent in rural and urban areas, respectively.

Further, across all the 10 provinces, the percentage share of the population aged 12 years or older that were married in each province was higher with Western Province reflecting the minimum at 53.2 percent.

Table 5.4: Percentage Distribution of Household by Marital Status Rural/Urban and Province, Zambia 2023.

Residence	Total	Never Married	Married	Separated	Divorced	Widowed	Co-habiting
Total	**4,119,848**	**7.5**	**71.4**	**3.8**	**6.2**	**10.9**	**0.3**
Rural	2,375,655	5.6	73.8	3.6	6.2	10.5	0.3
Urban	1,744,193	10.0	68.2	4.1	6.2	11.4	0.2
Province							
Central	467,331	6.0	75.6	3.5	4.6	9.7	0.5
Copperbelt	536,681	8.1	67.7	4.0	6.5	13.2	0.4
Eastern	566,687	4.8	74.1	3.3	7.4	10.4	0.1
Luapula	300,198	5.2	73.5	4.2	6.3	10.8	0.0
Lusaka	629,890	10.2	70.8	3.0	5.7	9.9	0.4
Muchinga	212,415	5.8	77.5	5.0	1.7	9.8	0.2
Northern	348,518	3.6	76.2	5.3	5.2	9.6	0.1
Northwestern	256,981	10.1	66.0	4.5	8.8	10.4	0.2
Southern	484,680	7.0	76.3	2.4	4.5	9.8	0.1
Western	316,467	14.2	53.2	5.4	11.4	15.4	0.5

CHAPTER SIX
ENERGY ACCESS

CHAPTER 6:

ENERGY ACCESS

Access to electricity in this report is defined using the basic Multi-Tier Framework (MTF) Approach (World Bank, 2019). The MTF approach goes beyond the traditional binary measurement of energy access. It reflects the multidimensional nature of energy access through the various ranges of technologies and sources. This approach measures access to energy based on 7 attributes: capacity, availability, reliability, quality, affordability, formality, and health and safety.

There are six tiers used to measure the characteristics of energy supply that affect the user experience i.e. ranging from Tier 0 (no access) to Tier 5 (full access) along a continuum of improvement. Thus, a household is said to have access to electricity if by any technology source, receives at least 4 hours of electricity per day (or at least 1 hour of electricity per evening) or has a primary source of energy with capacity to provide the task of lighting, phone charging or powering a (3w-49w) device [World Bank MTF,2019].

6.1 Access to Electricity

Figure 6.1 shows the percentage share of households with access to electricity by rural/urban in 2023. Results show that 53.6 percent of the households at national level had access to electricity translating into an estimated 2,208,284 households. Further, 34.0 percent of the households in rural areas relative to 80.3 percent households in urban areas had access to electricity. Thus, the proportion of households without access to electricity in rural areas was more than three times that of households without access to electricity in urban areas (Rural: 66% vs 19.7%: Urban).

Figure 6.1: Percentage Share of Households with Access to Electricity by Rural/Urban, Zambia 2023.

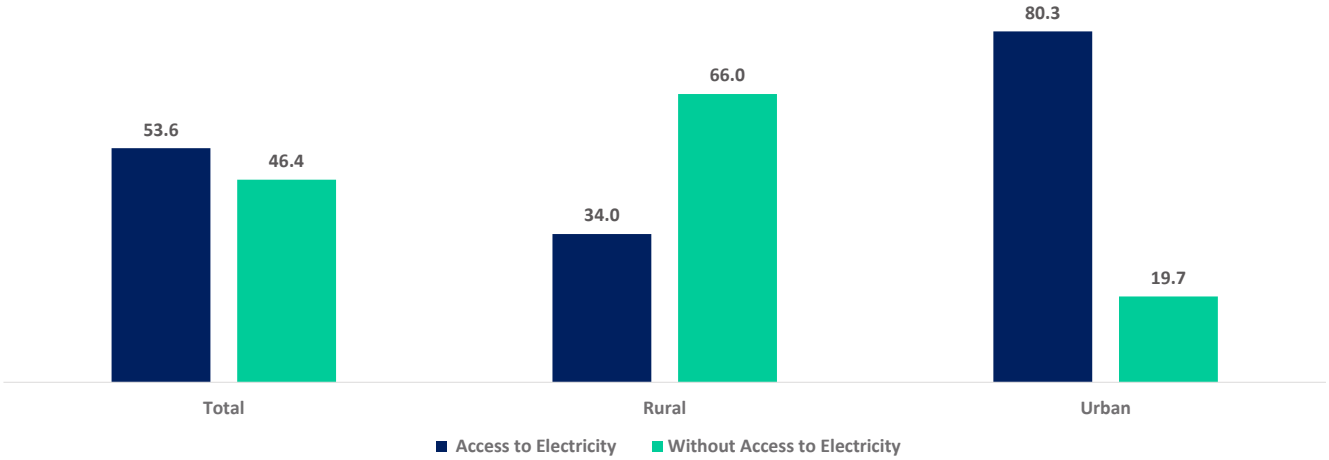
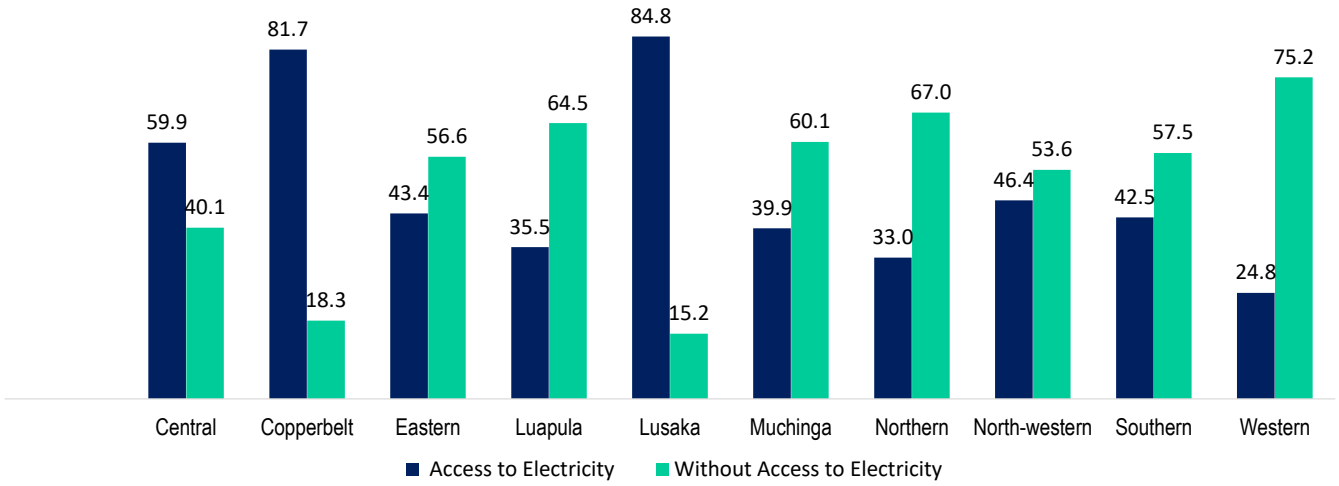


Figure 6.2 shows the percentage share of households with access to electricity by province in 2023. Lusaka Province had the largest percentage share of households with access to electricity at 84.8 percent followed by Copperbelt and Central provinces at 81.7 and 59.9 percent, respectively, while Northern and Western provinces accounted for the least shares at 33.0 and 24.8 percent, respectively.

Figure 6.2: Percentage Share of Households with Access to Electricity by Province, Zambia 2023.



6.2 Access to Electricity by Mode of Technology

Figure 6.3 shows the percentage share of households with access to electricity by mode of technology in rural and urban areas in 2023. At national level, results show that 34.0 percent of the households had access to electricity through the Grid (i.e. National and Local mini-grid), while 19.6 percent had access using Off-grid technological solutions.

Further analysed by rural/urban, of the 34.0 percent with access to electricity among the rural households, 7.6 percent accessed it through the grid while 26.3 percent were accessing electricity by utilizing Off-grid technological solutions.

In urban areas, out of 80.3 percent that had access to electricity, 70.0 percent were accessing electricity through the Grid relative 10.3 percent using Off-grid technological solutions. This implies that the proportion of households with access to electricity via off-grid technologies in rural areas was more than double that of households in urban areas (i.e. Rural: 26.3% vs 10.3%: Urban).

Figure 6.3: Percentage Share of Households with Access to Electricity by Technology Type, Zambia 2023.

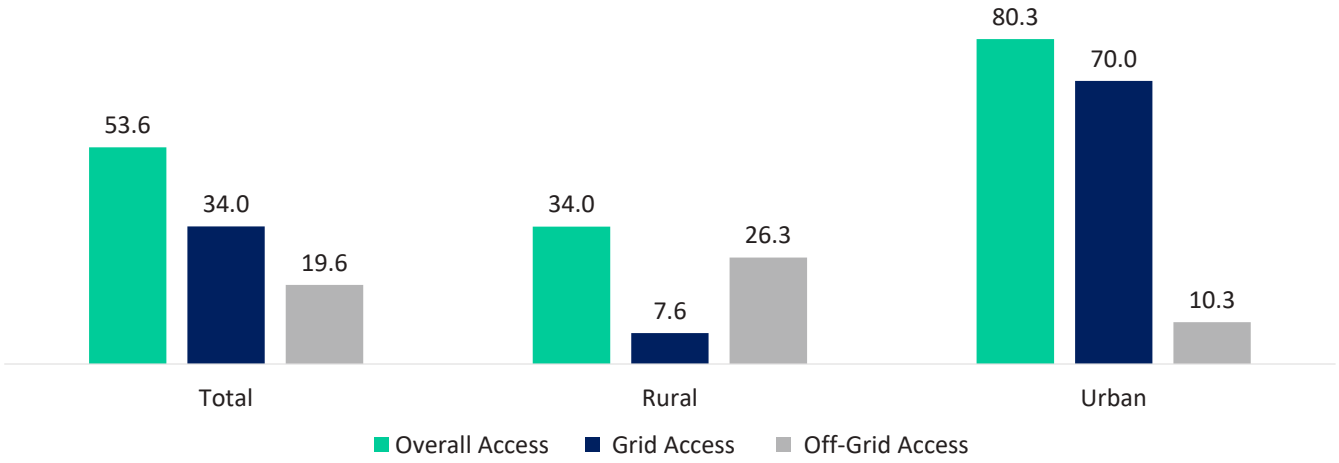


Table 6.1 shows the percentage share of households with access to electricity by type of technology used to access electricity in each province in 2023. Results show that Lusaka Province had the largest percentage share of households with access to electricity at 84.8 percent. Of the households with access to electricity in Lusaka Province, 78.9 percent accessed it through the grid representing an estimated 495,723 households, while 5.9 percent accessed electricity using Off-grid technological solutions. Copperbelt Province had the second largest share of households with access to electricity at 81.7 percent with 64.2 percent accessing it through the Grid while 17.5 percent accessed their electricity supply through off-grid technological solutions.

Western Province had the least percentage share of households with access to electricity among the 10 provinces in Zambia at 24.8 percent. Of these households, 12.3 percent were accessing electricity through the Grid while 12.5 percent were using other technological solutions to access electricity.

On the other hand, Western, Northern and Luapula provinces had larger shares of households without access to electricity at 75.2; 67 and 64.5 percent, respectively.

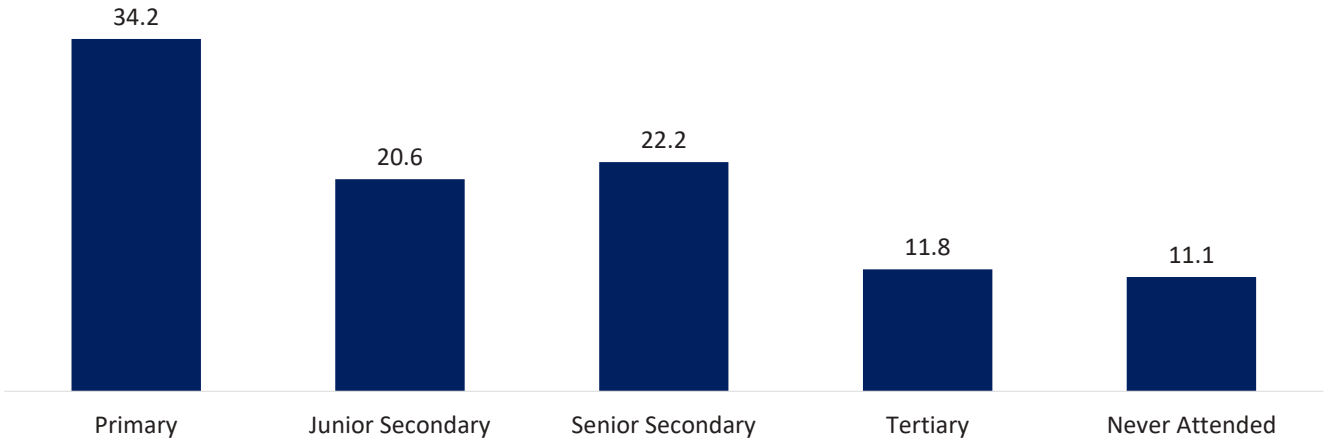
Table 6.1: Percentage Share of Households with Access to Electricity by Technology Type & by Province, Zambia 2023.

Province	Total House-holds	National with Access	National Grid		Local Minigrid		Grid Access	Solar Lantern		Rechargeable Battery		Solar Home System		Generator		Off-Grid Access	National without Access
Total	**4,119,848**	**53.6**	**1,396,628**	**33.9**	**6,812**	**0.2**	**34**	**8,559**	**0.2**	**97,456**	**2.4**	**683,225**	**16.6**	**16,658**	**0.4**	**19.6**	**46.4**
Rural	2,375,655	34	178,174	7.5	4,441	0.2	7.6	7,741	0.3	78,957	3.3	527,151	22.2	11,708	0.5	26.3	66
Urban	1,744,193	80.3	1,217,447	69.8	2,371	0.1	70	817	0	18,500	1.1	156,074	8.9	4,950	0.3	10.3	19.7
Central	467,331	59.9	155,154	33.2	1,606	0.3	33.5	0	0	14,643	3.1	105,606	22.6	3,308	0.7	26.4	40.1
Copperbelt	536,681	81.7	342,939	63.9	1,655	0.3	64.2	633	0.1	5,175	1	83,500	15.6	4,449	0.8	17.5	18.3
Eastern	566,687	43.4	44,202	7.8	0	0	7.8	5,409	1	21,579	3.8	173,624	30.6	834	0.1	35.5	56.6
Luapula	300,198	35.5	61,240	20.4	0	0	20.5	0	0	6,542	2.2	38,553	12.8	0	0	15	64.5
Lusaka	629,890	84.8	495,723	78.7	841	0.1	78.9	0	0	2,538	0.4	30,064	4.8	4,437	0.7	5.9	15.2
Muchinga	212,415	39.9	42,483	20.0	0	0	20	0	0	4,890	2.3	36,974	17.4	389	0.2	19.9	60.1
Northern	348,518	33	35,549	10.2	971	0.3	10.5	0	0	26,813	7.7	51,308	14.7	544	0.2	22.6	67
North-western	256,981	46.4	61,418	23.9	985	0.4	24.3	2,517	1	5,090	2	49,308	19.2	0	0	22.1	53.6
Southern	484,680	42.5	117,808	24.3	754	0.2	24.4	0	0	7,391	1.5	77,932	16.1	2,176	0.4	18.1	57.5
Western	316,467	24.8	38,925	12.3	0	0	12.3	0	0	2,795	0.9	36,356	11.5	522	0.2	12.5	75.2

6.3 Access to Electricity by Level of Education of Household Head

Figure 6.4 shows the percentage distribution of households with access to electricity by level of education of the household head in 2023. Overall, results show that the largest proportion of households with access to electricity had a household head who had completed primary school at 34.2 percent, followed by those whose household head had completed senior secondary school at 22.2 percent, junior secondary at 20.6 while 11.8 percent of the household had a head who had completed tertiary education level. However, 11.1 percent of the households with access to electricity were headed by a household head who had never attended school.

Figure 6.4: Percentage Distribution of Household with access to Electricity by level of Education of the Household Head, Zambia 2023.



6.4 Willingness to get Connected

Table 6.2 shows the proportional distribution of households willing to be connected to a source of electricity by type, rural/urban and province in 2023. Of the households not connected to any electricity source at the time of the survey, 95 percent were willing to be connected to any electricity source regardless of type.

Households willing to be connected to any electricity source were further asked to state the source by type. Results show that 87.7 percent were willing to be connected to the national grid, 15.2 percent to the solar home system, while 5.6 and 4.5 percent preferred being connected to the local mini-grid and solar lantern/lighting system, respectively. Only 0.2 percent of the households were willing to be connected to a pico hydro source of electricity.

Analysed by province, results generally show that the largest proportion of households across the 10 provinces were willing to be connected to the national grid with 55.8 percent of the households in Western Province reflecting the least proportion in this category. Further, households in Western, Southern and Central provinces accounted for higher proportions of households willing to be connected to a solar home system.

Table 6.2: Proportional Distribution of Households Willing to be Connected to a Source of Electricity by Type, Rural/Urban and Province, Zambia 2023.

Residence	Households	Households willing to get connected	National grid	Local mini grid	Solar lantern and lighting	Recharge-able battery	Diesel/ Petrol genset	Pico hydro	Solar home system	Other Specify
Total	2,332,782	95.0	78.7	5.6	4.5	0.6	0.4	0.2	15.2	0.2
Rural	1,908,906	94.9	74.9	6.4	5	0.6	0.4	0.2	17.6	0.2
Urban	423,876	95.7	95.7	2	2.4	0.4	-	-	4.1	
Province										
Central	267,068	94.4	72.4	3	7	0.6	0.4	0.3	21.1	1
Copperbelt	170,606	93.9	89.3	7.1	2.5	1.1	-	-	6.5	
Eastern	448,383	92.6	85.3	3.6	3.1	0.4	0.5	-	15.1	
Luapula	216,603	97.5	73.8	15	4.4	-	-	-	9.4	
Lusaka	95,042	95.1	99.4	0.5	1.9	0.1	0.5	-	2.9	
Muchinga	153,051	91.7	88	10.9	3.8	0.6	-	1.1	4.7	
Northern	257,412	96.9	81.5	4.7	3.9	1.5	0.2	-	11.1	0.2
North-western	174,866	96.6	84	7.7	3.8	0.2	0.4	-	7.3	
Southern	318,547	96.7	73.9	0.3	6.7	0.4	0.5	0.4	21.3	0.3
Western	231,204	95.6	55.8	7.8	5.6	0.6	0.6	-	33.9	

6.5 Preferred Method of Payment

Table 6.3 shows the percentage distribution of households by preferred method of paying a connection fee, if ever, electricity was made available, by rural/urban and province in 2023. Of the 95 percent of the households willing to be connected to electricity, if ever made available, 43.9 percent preferred paying the connection fee using cash instalments reflecting the largest proportion followed by 39.7 percent who would rather make an outright cash payment, 8.6 percent through the electricity bills while 0.7 percent preferred direct deduction from their salaries, 7.1 percent of the households preferred using in-kind payments such as farm products, assets, labour, etc.

In rural areas, 43.0 percent of the households preferred paying an electricity connection fee using cash instalments and 40.4 percent preferred outright cash payment, while 8.2 percent favoured paying through electricity bills and 7.9 percent in-kind payments. In urban areas, 47.7 percent of the households preferred cash instalments, 36.6 percent outright cash payment, 10.3 percent through electricity bills while 3.8 percent prefered in-kind payments and 1.6 percent preferred direct deduction from their salaries. Thus, about 84 out of every 100 households countrywide preferred either cash instalments or outright cash payment methods to get connected to the national grid.

Analysed by province, except for Luapula, Muchinga and western provinces, the largest proportion of households in the remaining provinces preferred paying the connection fee using cash instalments with Copperbelt Province accounting for the largest percentage share at 58.3 percent. Among the households that preferred outright cash payment method, Luapula Province had the largest share of households at 56.9 percent while North-western Province accounted for the largest share of households who preferred payment through electricity bills at 16.8 percent with Muchinga Province having the largest share of households preferring in-kind payment at 10.5 percent

Table 6.3: Percentage Distribution of Households by Preferred Method of Payment, Rural/urban and Province, Zambia 2023.

Residence	Households	Outright cash payment	Cash instalments	Through the electricity bill as part payment	In-kind payment(eg farm produce, assets, labour etc)	Direct deduction from your monthly salary	Percent Total
Total	**2,328,219**	**39.7**	**43.9**	**8.6**	**7.1**	**0.7**	**100**
Rural	1,906,332	40.4	43.0	8.2	7.9	0.5	100
Urban	421,887	36.6	47.7	10.3	3.8	1.6	100
Province							
Central	267,068	35.7	39.7	13.7	9.6	1.4	100
Copperbelt	169,175	30.6	58.3	3.9	5.3	1.9	100
Eastern	447,448	39.9	45.0	3.7	10.4	1.0	100
Luapula	215,479	56.9	32.0	8.4	2.7	0	100
Lusaka	95,042	32.8	53.3	11.6	2.0	0.2	100
Muchinga	153,051	41.6	39.1	8.8	10.5	0	100
Northern	257,412	27.7	49	15.4	7.6	0.2	100
North-western	174,866	36.3	38	16.8	7.4	1.5	100
Southern	317,476	42.9	44.3	5.1	7.3	0.5	100
Western	231,203	48	44.4	4.9	0	0.4	98

6.6 Main Reason for willingness to connect to Electricity

Table 6.4 shows the percentage distribution of households by main reason cited for wanting to be Connected to an electricity source, rural/urban and province in 2023.

Results show that 53.3 percent wanted better lighting within their home as the main reason representing the largest proportion followed by 10.8 percent who cited entertainment purposes, 10.5 percent wanted to improve their home income while 7.7 percent wanted to have access to news and or information. Further, 4.9 percent of the households wanted to enhance safety in their homes, 4 percent wanted to be connected to electricity for the sake of education of their children while 3.5 percent were of the view that electricity was cheaper than any other source.

Analysed by province, the largest proportion of households in each province wanted to be connected to electricity for better lighting within the home with Copperbelt Province reflecting the minimum percentage share at 36.9 percent.

Table 6.4: Percentage Distribution of Households by Main Reason cited for wanting to be Connected to Electricity, Rural/Urban and Province, Zambia 2023.

Residence	Households willing to get connected	For entertainment	For information and/or the news	For better lighting within the home	For better safety outside the home	To improve income	Because electricity is cheaper than other fuels	For education of children	Other specify	Percent total
Total	**2,215,830**	**10.8**	**7.7**	**53.3**	**4.9**	**10.5**	**3.5**	**4.0**	**5.3**	**100**
Rural	1,811,241	10.1	7.3	55.7	4.8	10.6	3.0	3.9	4.5	100
Urban	405,649	14.1	9.4	42.5	5.1	10.1	5.2	4.5	9.0	100
Province										
Central	252,112	12.9	10.3	41.4	4.5	16.3	2.0	5.0	7.5	100
Copperbelt	159,890	16.6	6.8	36.9	3.1	14.6	8.7	1.7	11.4	100
Eastern	415,203	9.5	9.1	57.8	4.1	6.5	2.4	4.4	6.1	100
Luapula	211,188	10.5	3.2	68.7	2.2	10.1	1.4	1.4	2.5	100
Lusaka	90,385	11.6	10.1	51.7	8.6	6.3	4.1	2.5	5.1	100
Muchinga	140,348	12.6	7.3	54.7	7.6	5.9	5.4	4.6	1.9	100
Northern	249,432	14.2	7.5	55.1	2.0	12.2	3.3	1.6	4.2	100
North-western	168,921	8.9	9.2	57.0	3.4	6.4	3.2	9.8	2.1	100
Southern	308,035	9.4	5.6	44.8	6.0	18.6	2.9	4.5	8.4	100
Western	221,031	5.1	8.4	62.7	10.1	4.0	4.4	3.7	1.5	100

6.7 Main Reason for unwillingness to Connect to Electricity

Table 6.5 shows the percentage distribution of households not willing to be connected to electricity by main reason cited disaggregated by rural/urban and province in 2023. At national level, 5.0 percent of the households without electricity were not willing to be connected. Of these households, the main reason cited by 68.9 percent was that they could not afford the connection fee representing the largest percentage followed by those who indicated that they could not afford to buy units/monthly payments at 9.8 percent, 5.7 percent who could not afford the cost of wiring and 3.5 percent who said they could not afford to buy electricals. On the other hand, 0.4 percent of the households were of the view that electricity was of no use representing the least percentage.

Analysis by rural/urban, results show that the main reason cited by households for not being willing to get connected to electricity in rural and urban areas was that they could not afford the connection fee at 69.4 and 68.8 percent, respectively, representing the largest percentage shares.

Analyed by province, results show that the largest proportion of households in each of the 10 provinces indicated that they could not afford the connection fees with Copperbelt having the highest percentage at 87.8 percent followed by Central province at 83.0 percent. Eastern Province accounted for the smallest percentage of households citing the same reason at 50.0 percent.

Table 6.5: Percentage Distribution of Households not willing to be connected to electricity by Main Reason cited, Rural/Urban and Province, Zambia 2023.

Residence	Households not connected to any electricity source	Percent Share not willing to be connected	Percentage Distribution of Households not willing to be connected to electricity by main reason cited							
			Count not willing to be connected	Cannot afford connection fee	Cannot afford units/ monthly payment	Cannot afford cost of wiring	Cannot afford to buy electrical appliances	We do not see any use of electricity	Others, specify	Percent total
Total	**2,332,782**	**5.0**	**115,597**	**68.9**	**9.8**	**5.7**	**3.5**	**0.4**	**11.7**	**100**
Rural	1,908,906	5.1	97,379	68.8	11.6	5.7	2.4	-	11.6	100
Urban	423,876	4.3	18,218	69.4	-	6.1	9.6	2.4	12.4	100
Province										
Central	170,606	8.7	14,913	83	6.6	-	5.2	-	5.2	100
Copperbelt	448,383	2.2	10,001	87.8	-	8.9	-	-	3.3	100
Eastern	216,603	15.4	33,301	50	12.6	11.2	5.8	-	20.4	100
Luapula	95,042	5.7	5,454	72.8	12.6	6.2	-	-	8.5	100
Lusaka	153,051	3.1	4,696	78.2	12.5	3.8	2.1	-	3.4	100
Muchinga	257,412	5	12,764	72.3	4	3.5	4.8	-	15.3	100
Northern	174,866	4.5	7,931	63.6	12.4	13.1	-	5.5	5.5	100
North-western	318,547	1.9	5,905	80.5	7.4	-	-	-	12.2	100
Southern	231,204	4.5	10,453	76.4	4.9	-	6	-	12.7	100
Western	316,467	3.2	10,178	70.5	23.9	-	-	-	5.7	100

6.8 National Grid Connection Expectations

Table 6.6 shows the percentage distribution of households by length of time a household is expected to wait to get connected to the national grid by rural/urban and province in 2023. Survey results show that 6.7 percent of the households expected to be connected to the national grid within 14 days, 8.8 percent within 15-30 days, 9.1 percent within 31-60 days and 18.4 percent beyond the 60-day period while 56.9 percent did not know when they were going to be connected.

By rural/urban, results show that the majority of the households that were waiting to be connected to the national grid were residing in urban areas reflecting 69.9 percent of the total urban households relative to 7.5 percent of the total households in rural areas. Further, a slightly higher percentage of households in rural areas (8.2%) compared to 6.5 percent in urban areas expected to be connected to the national grid within 14 days following payment of the connection fee. Compared to rural households, higher proportions of households in the categories 15-30 days and 31-60 days in urban areas expected to be connected to the national at 9.1 and 9.6 percent relative to 6.7 and 5.8 percent in the corresponding period. Notably, regardless of residence, more than half the proportion of households both in rural and urban areas did not know how long they were going to wait before getting connected to the National Grid.

Analysed by province, Western had the largest proportion of households that expected to be connected within 14 days at 15.8 percent followed by Luapula Province at 14.1 percent while Lusaka and Eastern provinces accounted for the least proportions of households that expected to be connected within 14 days at 3.9 and 1.1 percent, respectively.

Further, more than half the proportion of households in Central, Copperbelt, Eastern, Lusaka and Southern provinces did not know how long they were going to wait before being connected to the National Grid.

Table 6.6: Percentage Distribution of Households by Length of Time a Household Expected to Wait before Connection to the National Grid once the Connection Fee has been Paid, by Rural/Urban and Province, Zambia 2023.

	Households	Percent Share	Once connection fee is paid, how long does it take to be connected to the nation grid?						
			Count	within 14 days	15-30 days	31-60 days	60+ days	Don't know	Percent Total
Total	**4,119,848**	**33.9**	**1,396,628**	**6.7**	**8.8**	**9.1**	**18.4**	**56.9**	**100**
Rural	2,375,655	7.5	178,174	8.2	6.7	5.8	18.4	61	100
Urban	1,744,193	69.8	1,217,447	6.5	9.1	9.6	18.4	56.3	100
Province									
Central	467,331	33.2	155,154	6.2	4.3	5.6	17.6	66.3	100
Copperbelt	536,681	63.9	342,939	7.8	9.5	8.3	21	53.3	100
Eastern	566,687	7.8	44,202	1.1	11.9	7.9	14.7	64.4	100
Luapula	300,198	20.4	61,240	14.1	13.5	9.4	26.9	36.1	100
Lusaka	629,890	78.7	495,723	3.9	6.2	8.8	12.9	68.2	100
Muchinga	212,415	20	42,483	8.4	13.2	15.2	35.2	28	100
Northern	348,518	10.2	35,549	7.3	12.5	11.5	35.5	33.2	100
North-western	256,981	23.9	61,418	10.1	11.1	16.6	29	33.2	100
Southern	484,680	24.3	117,808	9.3	9.2	7.7	14.9	58.8	100
Western	316,467	12.3	38,925	15.8	30.1	19	19.7	15.4	100

6.9 Local Mini-Grid Connection Expectations

During the Survey, households were asked to indicate how long it took the local mini-grid Service provider to have the household connected following a successful application. Table 6.7 shows the percentage distribution of households by length of time taken to connect their housing unit to the local mini-grid following successful application by rural/urban in 2023. Of the 0.2 percent households connected to the local mini-grid, 23.6 percent indicated that it takes 14 working days to get connected to the local mini-grid, 15.5 percent said it takes 15-30 working days, 24.3 percent cited 3-5 months as the period required for the household to be connected to the local mini-grid, 4.6 pecent indicated 6 months while 32 percent of the households said it takes a period of more than 6 months to get connected.

In rural areas, 49.1 percent of the households indicated that a household has to wait for a period of more than 6 months to be connected to the local mini-grid reflecting the largest proportion followed by 36.2 percent who said a household is expected to be connected within 14 working days and another 14.8 percent who said a household is expected to be connected within 15-30 working days. Notably, none of the sampled households said a household is expected to wait for 3-6 months to be connected to the local mini-grid.

In urban areas, the largest proportion of households (69.8%) said it takes 3-5 months to be connected to the local mini-grid,followed by 16.9 percent who indicated 15-30 working days and 13.3 percent citing 6 months as the period it takes to get connected to the local mini-grid once a household successfully file its application with the local mini-grid electricity service provider. Notably, none of the sampled households said a household could be connected to the local mini-grid within 14 working days and beyond the six month period.

Table 6.7: Percentage Distribution of Households by Length of Time Taken Before being Connected to the Local Mini-grid Following a Successful Application, Rural/Urban, Zambia 2023.

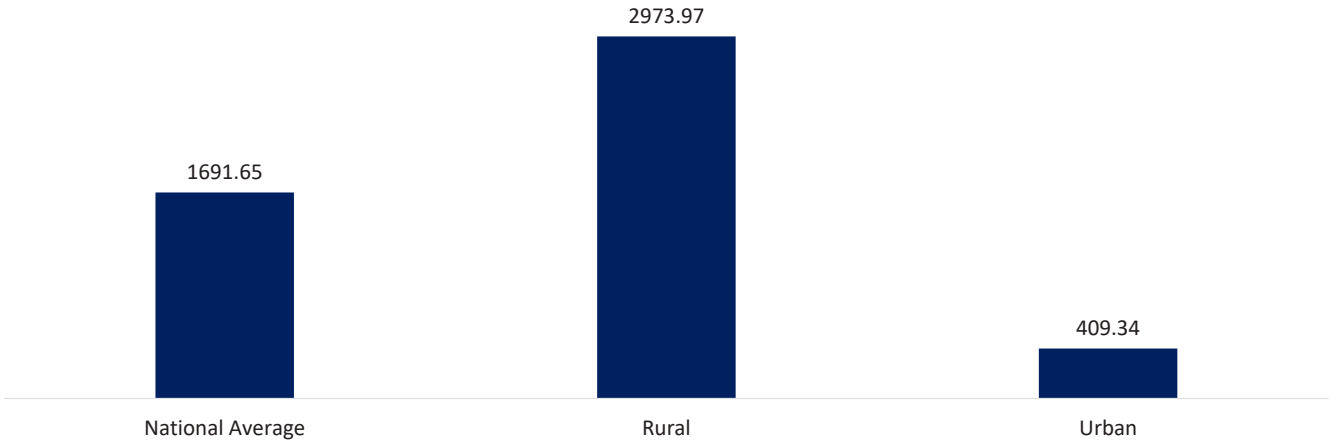
Residence	Houseolds	Percent Share	Mini-grid Users	within 14 working days	15 - 30 working days	3 - 5 months	6 months	Above 6 months	Percent Total
Total	4,119,848	0.2	6,812	23.6	15.5	24.3	4.6	32.0	100
Rural	2,375,655	0.2	4,441	36.2	14.8	0.0	0.0	49.1	100
Urban	1,744,193	0.1	2,371	0.0	16.9	69.8	13.3	0.0	100

6.9.1 Cost to Connect to Local Mini-Grid

Figure 6.5 shows the average amount paid by a household to get connected to the local mini-grid by rural/urban in 2023. Overall, results show that a household on average paid K1,691.65 to get connected to the local mini-grid.

In rural areas, households on average paid K2,973.97 to get connected to the local mini-grid relative to an average of K409.34 paid by their urban counterparts. This implies that households in rural areas paid 7 times more than their urban counterparts to get connected.

Figure 6.5: Average Amount Paid (in Kwacha) by Households to get Connected to the Local Mini-grid by Rural/ Urban, Zambia 2023.



6.10 Availability and Reliability of Electricity from the Grid

During the 2023 NEAS, households were asked to indicate how reliable their source of electricity supply was during the dry and rain seasons. Additionally, the survey went further to ask households how long it took the grid (National/Local mini-grid) electricity service provider to resolve reported faults. Further, households were asked to state the main channel used to contact the grid service provider in case of an electrical fault.

6.10.1 Availability and Reliability of Electricity from the National Grid

Dry Season

Figure 6.6 shows the average number of hours without electricity from the national grid per day during the dry season by rural/urban in 2023. Overall, the average number of hours without electricity from the national grid per day during the dry season was less than an hour (0.52 hours). In rural areas, the average number of hours without electricity from the national grid per day during the dry season was almost double that in urban areas (i.e. Rural: 0.84 hours vs 0.46 hours: Urban).

Figure 6.6: Average Number of Hours without Electricity from the National Grid per Day during the Dry Season by Rural/Urban, Zambia 2023.

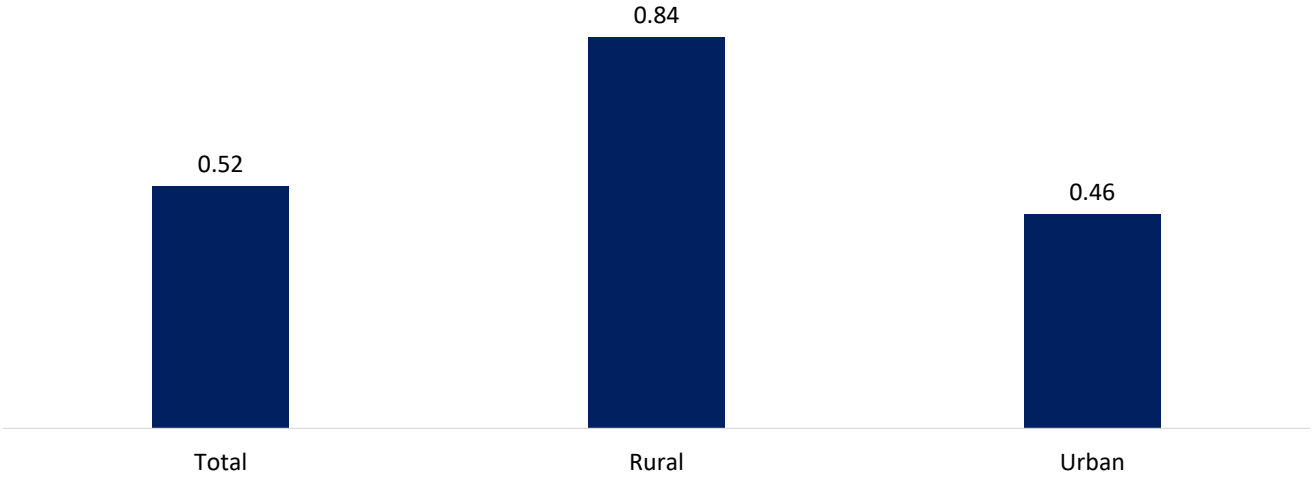
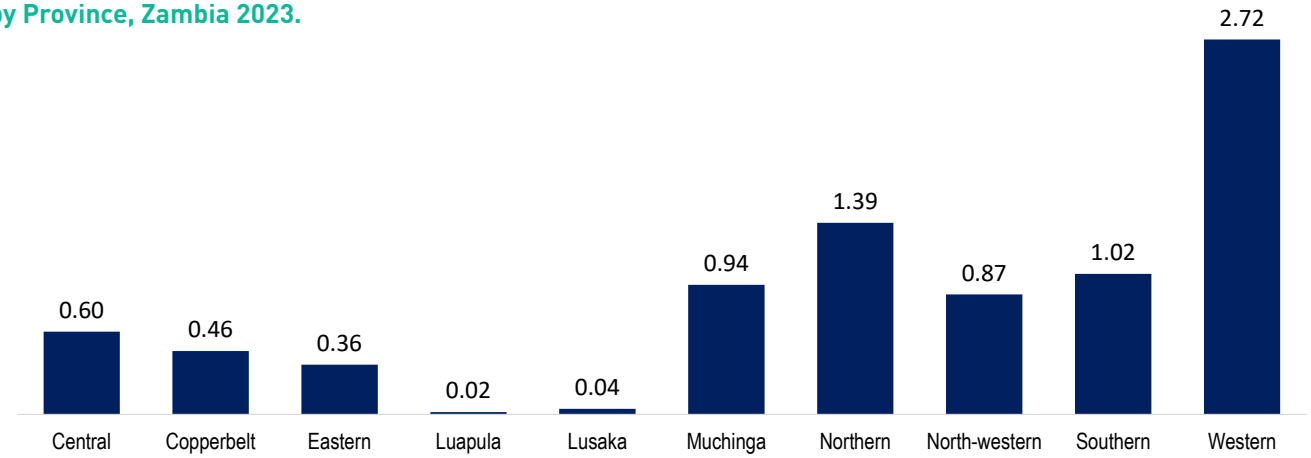


Figure 6.7 shows the average number of hours without electricity from the national grid per day during the dry season by province in 2023. Western Province, on average, experienced the longest number of hours without electricity from the national grid per day at 2.72 hours followed by Northern Province at 1.39 hours and Southern Province at 1.02 hours.

However, Lusaka and Luapula provinces experienced the shortest periods without electricity from the National grid per day at 0.04 and 0.02 hours, respectively.

Figure 6.7: Average Number of Hours without Electricity from the National Grid per Day during the Dry season by Province, Zambia 2023.



6.11 Availability of Electricity from the National Grid each Evening from 18:00 to 22:00 hours

During the Survey, households were further asked to state how many hours of electricity were available from the national grid each evening [From 18:00 to 22:00 hours] in the last 7 days preceding the survey day. Figure 6.8 results show that, on average, electricity was available for 5.08 hours at national level.

In rural areas, on average, electricity was available each evening for 5.16 hours over the 7-day period relative to 5.07 hours in urban areas.

Figure 6.8: Average Number of Hours of Electricity Availability from the National Grid each evening from 18:00-22:00 Hours in the Last 7 Days by Rural/Urban, Zambia 2023.

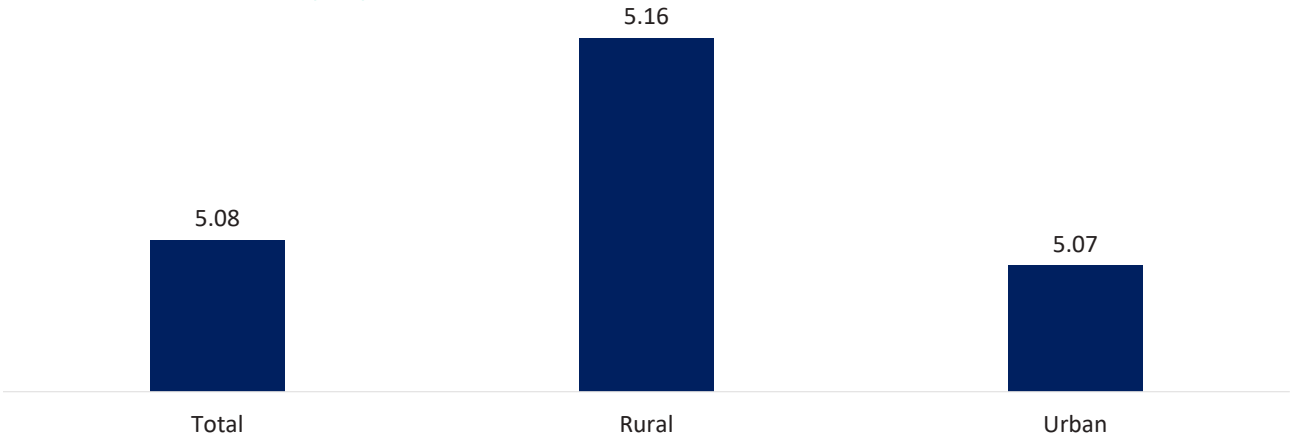


Table 6.8 shows the average number of hours electricity from the national grid was available each evening from 18:00 hrs to 22:00hrs in the last 7 days prior to the survey and the percentage share of power available in 28 hours by rural/urban and province in 2023. As already indicated in Figure 6.8, regardless of residence, on avergage,5.08 hours of electricity were available each evening.

Further analysed by province, results show that households in Northern Province, on average, had 7.53 hours of electricity supply over the period under consideration representing the longest time followed by the Copperbelt Province whose average was 5.63 hours while Luapula Province had the shortes time period of 3.67 hours.

Further, over the 28-hour period, electricity was available each evening from 18:00 – 22:00 hours representing 18.1 percent of the time countrywide.

Table 6.8: Total Number of Hours Electricity is Available from the National Grid each Evening from 18:00-22:00hrs in the Last 7 days and Percentage Share of Power Available in 28 Hours, Rural/Urban and Province, Zambia 2023.

Residence	Total Households	Percent share	Households on Grid	Average Hours electricity is available from 18hrs-22hrs	Percentage share of power available in 28 hours
Total	**4,119,848**	**33.9**	**1,396,628**	**5.08**	**18.1**
Rural	2,375,655	7.5	178,174	5.16	18.4
Urban	1,744,193	69.9	1,217,447	5.07	18.1
Province					
Central	467,331	33.2	155,154	4.71	16.8
Copperbelt	536,681	63.9	342,939	5.63	20.1
Eastern	566,687	7.8	44,202	5.05	18.0
Luapula	300,198	20.5	61,240	3.67	13.1
Lusaka	629,890	78.7	495,723	5.04	18.0
Muchinga	212,415	20.0	42,483	5.24	18.7
Northern	348,518	10.2	35,549	7.53	26.9
North-western	256,981	23.9	61,418	4.33	15.5
Southern	484,680	24.3	116,808	4.66	16.6
Western	316,467	12.3	38,925	3.72	13.3

6.12 Households sharing an Electricity Meter

Households on the national grid were further asked whether the metre they were using was a shared one or not. Table 6.9 shows the share of households that reported sharing the electricity metre by rural/urban and province in 2023.

Results show that 12.3 percent of the households countrywide were using a shared electricity metre. Further, 1.1 percent of the households in rural areas compared to 27.6 percent of the households in urban areas were using a shared metre. Further, 5.3 percent of the households that were using a shared metre were located in rural areas while 94.7 percent were in urban areas.

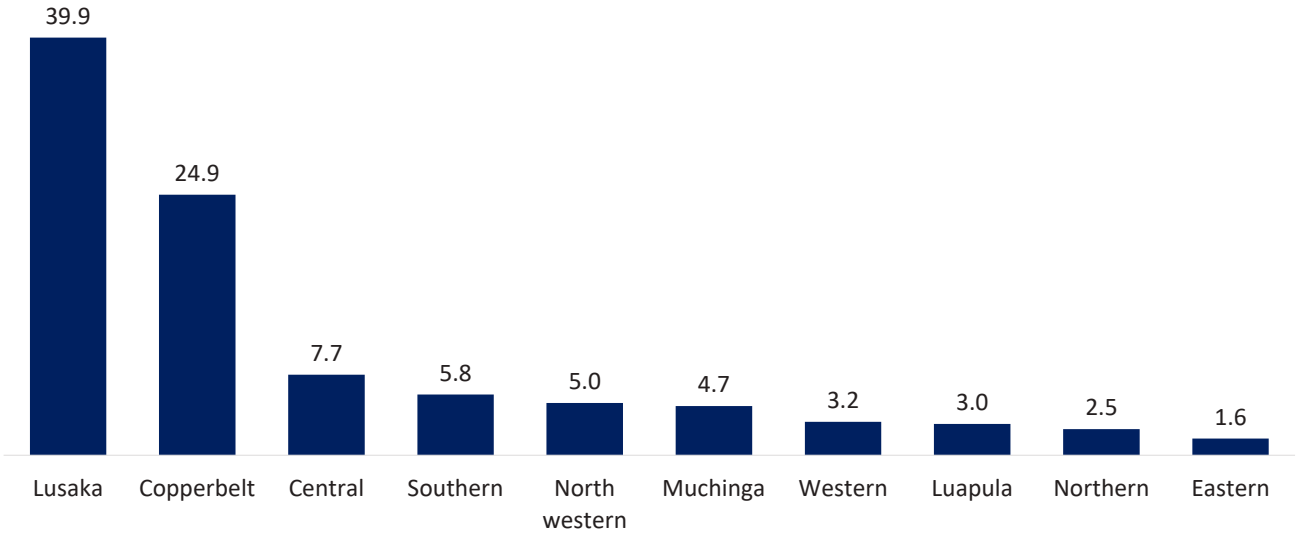
Analysed by province, Lusaka and Copperbelt provinces had the largest percentage shares of households sharing a metre at 39.9 and 24.9 percent, respectively. Eastern Province had the smallest percentage share of households sharing a metre at 1.6 percent.

Table 6.9: Percentage Share of Households on the National Grid whose Housing Units were Sharing an Electricity Metre, Rural/Urban and Province, Zambia 2023.

Residence	Total HHs National	% Share	Metre-sharing Households	% Location
Total	**4,119,848**	**12.3**	**507,936**	**100.0**
Rural	2,375,655	1.1	27,003	5.3
Urban	1,744,193	27.6	480,933	94.7
Province				
Central	467,331	7.7	35,959	7.1
Copperbelt	536,681	24.9	133,422	26.3
Eastern	566,687	1.6	8,840	1.7
Luapula	300,198	3.0	9,104	1.8
Lusaka	629,890	39.9	251,203	49.5
Muchinga	212,415	4.7	9,943	2.0
Northern	348,518	2.5	8,817	1.7
North western	256,981	5.0	12,747	2.5
Southern	484,680	5.8	27,881	5.5
Western	316,467	3.2	10,019	2.0

Figure 6.9 shows the percentage share of households on the national grid that were using a shared electricity metre in 2023. Results show that Lusaka Province had the highest percentage of households that were using a shared metre at 39.9 percent, followed by Copperbelt at 24.9 percent, while Eastern Province had the least percentage share at 1.6 percent.

Figure 6.9: Percentage Share of Households on the National Grid with a shared Electric Meter by Province, Zambia 2023.

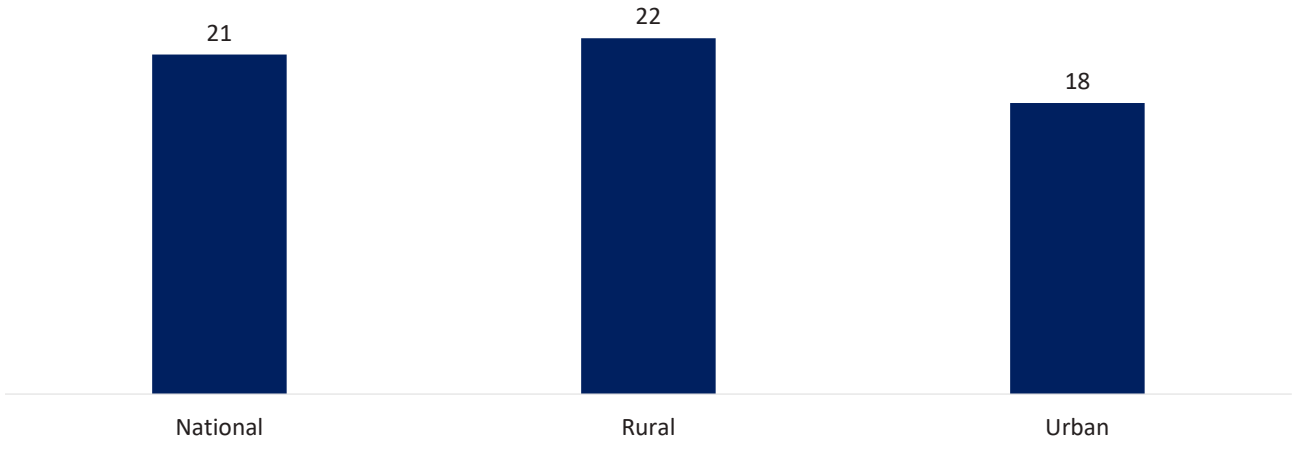


6.13 Availability and Reliability of Electricity from the Local Mini-grid

Availability of Electricity per Day

The Survey also collected data from households on the average number of hours electricity was available per day from the local mini-grid. Figure 6.10 shows the average number of hours electricity from the local mini-grid was available per day by rural/urban in 2023. At national level, results show that households connected to the local mini-grid, on average, had power for 21 hours per day. Further, the average number of hours electricity from the local mini-grid was available per day for households in rural areas was 3 hours more than that of households in urban areas (i.e. Rural: 22 hours vs 18 hours: Urban).

Figure 6.10: Average Number of Hours Electricity is Available per Day from the Local Mini-grid, by Rural/Urban, Zambia 2023.



The NEAS survey also asked households who reported using electricity from the local mini-grid if at all there were any restrictions on the load/appliance that they could power using this source of supply.

Table 6.10 shows the percentage share of households who said either there was a restriction or no restriction on the load/appliance that could be allowed to be powered from the local mini-grid by rural/urban and province in 2023. Of the 0.2 percent households that were using the local mini-grid translating into an estimated 6,812 households, 12.6 percent said there were restrictions while 87.4 percent said there were no restrictions.

In rural areas, 19.3 percent of the households said there were restrictions relative to 80.7 percent who said there were no restrictions. Further, none of the sampled households in urban areas indicated that there were restrictions.

Table 6.10: Percentage Distribution of Households who said either there were Restrictions or No Restrictions on the Load/ Appliance that could be Powered from the Local Mini-grid by Rural/Urban, Zambia 2023.

Is there a limit to the load and/or appliances you are allowed to power from the local mini-grid						
Residence	Survey Households	Proportion using Local Mini-grid	Total count	Percent Distribution		
				Yes	No	Percent Total
Total	4,119,848	0.2	6,812	12.6	87.4	100.0
Rural	2,375,655	0.2	4,441	19.3	80.7	100.0
Urban	1,744,193	0.1	2,371	0.0	100.0	100.0

6.13.1 Electricity Supply Challenges from the Local Mini-grid

Table 6.11 shows the percentage distribution of households that reported using the local mini-grid by type of challenge experienced, by rural/urban and province in 2023. Overall, an estimated 6,812 households were using a local mini-grid representing 0.2 percent of the total households countrywide. Of these households, 11.4 percent reported that they were getting inadequate hours of electricity supply from the local mini-grid, 5.9 percent high voltage, 0.9 percent unscheduled electricity supply interruptions but 81.8 percent did not have problems with electricity supply from the local mini-grid.

Analysed by rural/urban, results show that 17.5 percent of the households in rural areas complained of having inadequate hours of electricity supply from the local mini-grid with 1.4 percent complaining of unscheduled electricity supply interruptions. On the contrary, 81.1 percent of the households in rural areas did not report having experienced electricity challenges. In urban areas, high voltage was the only biggest challenge households reported having experienced from the local mini-grid at 16.9 percent.

Table 6.11: Percentage Distribution of Households by Type of Challenged Experienced from the Local Mini-grid and Rural/Urban, Zambia 2023.

	Households	Percent Share	Count	Inadequate hours of electricity	Low voltage	Highvoltage	Unscheduled outages	No problems	Percent Total
Total	4,119,848	0.2	6,812	11.4	0	5.9	0.9	81.8	100
Rural	2,375,655	0.2	4,441	17.5	0	0	1.4	81.1	100
Urban	1,744,193	0.1	2,371	0	0	16.9	0	83.1	100

6.14 Electricity Accidents Experienced from the Grid

During the Survey, households were asked if at all they had experienced any accidents using electricity from the National and Local mini-grids.

6.14.1 Electricity Accidents Experienced from the National Grid

Table 6.12 shows the percentage distribution of households who experienced accidents using electricity from the National grid by type disaggregated by rural/urban in 2023.

At national level, an estimated 5,996 households reported having experienced an accident using electricity supplied from the national grid reflecting 0.15 percent of the total households countrywide. Of these households, 82.3 percent reported having experienced a body injury to at least one of its household members representing the largest proportion, followed by 9.8 percent that had one of its household members suffer permanent limb damage while 7.9 percent of the households experienced death of one of its members from using electricity from the national grid.

In rural areas, 0.02 percent of the households encountered an accident with electricity from the National grid and none of these households had one of its members die or suffer permanent limb damage although all the 523 households had at least one member of its household suffer a body injury as a result of using electricity from the Grid.

In urban areas, 0.31 percent of the households encountered an accident with electricity from the National grid reflecting 5,473 households in absolute terms. Similarly, the largest proportion of households in urban areas had at least one member of its household suffer a body injury at 80.6 percent. Further, 10.8 and 8.6 percent of the households, respectively, lost at least one of its household members and experienced permanent limb damage.

Table 6.12: Percentage Distribution of Households by Type of Accident Encountered from using Electricity from the National Grid, Rural/Urban, Zambia 2023.

Residence	Total Household	Share Households who encountered a Problem	Number of Households that Encountered Problems when using National Grid Electricity	Death	Permanent limb damage	Body injury	Percent Total
Total	4,119,848	0.15	5,996	7.9	9.8	82.3	100
Rural	2,375,655	0.02	523	0.0	0.0	100.0	100
Urban	1,744,193	0.31	5,473	8.6	10.8	80.6	100

6.14.2 Accidents Experienced from Electricity from the Local Mini-grid

None of the sampled households reported having experienced an accident while using electricity from the Local mini-grid.

6.15 Perception of Quality of Electricity Supply

During the survey, households connected to the national grid and local mini-grid were asked to indicate their view of the quality power supply during the dry season.

6.15.1 Perception of Quality of Electricity Supply from the National Grid

Quality of Electricity supply during the Dry Season

Table 6.13 shows the percentage share of households connected to the national grid by perception of quality of power supply during the dry season by rural/urban and province in 2023. Of the 33.9 percent of the households connected to the national grid, 82.4 percent were of the view that quality of power supply during the dry season was regular compared to 17.6 percent who held the view that power was irregular over the same period.

Analysed by rural/urban, 83.7 percent of the households in rural areas were of the view that the quality of power supply from the national grid during the dry season was regular relative to 82.2 percent with a similar view in urban areas differing marginally by 1.5 percentage-points.

Analysed by province, results show that the largest proportion of households in each province in 2023 held the view that the quality of power supply from the national grid during the dry season was regular with North-western Province accounting for the largest share of households with such a view at 93.0 percent followed by households in Northern Province at 90.9 percent while Eastern Province accounted for the smallest percentage share of households who held the view that the quality of power supply from the national grid during the dry season was regular at 72.1 percent.

Table 6.13: Percentage Share of Households Connected to the National Grid by Perception of Quality of Power Supply during the Dry season by Rural/Urban and Province, Zambia 2023.

Residence	Perception of Quality of Power supply from the National Grid during the Dry season				
	Households	Proportion connected to National grid	Regular	Irregular	Percent Total
Total	**4,119,848**	**33.9**	**82.4**	**17.6**	**100**
Rural	2,375,655	7.4	83.7	16.3	100
Urban	1,744,193	69.8	82.2	17.8	100
Province					
Central	467,331	33.2	83.8	16.2	100
Copperbelt	536,681	63.9	83	17	100
Eastern	566,687	7.8	72.1	27.9	100
Luapula	300,198	20.4	87.5	12.5	100
Lusaka	629,890	78.7	78.8	21.2	100
Muchinga	212,415	20	86.1	13.9	100
Northern	348,518	10.2	90.9	9.1	100
North-western	256,981	23.9	93	7	100
Southern	484,680	24.1	83.5	16.5	100
Western	316,467	12.3	89.4	10.6	100

Quality of Electricity Supply duirng the Rain Season

Table 6.14 shows the percentage share of households connected to the national grid by perception of quality of power supply during the rainy season by rural/urban and province in 2023. Results show that 42.3 percent of the households connected to the national grid were of the view that the quality of power supply during the rainy season was regular while 57.7 percent held the view that power was irregular over the same period. This implies that the proportion of households who held the view that the quality of power supply from the national grid was regular during the dry season reduced to almost half during the rainy season (i.e. Dry season (Regular): 82.4% vs 42.3%: (Regular) Rainy season.

Analysed by rural/urban, the proportion of household in rural areas who held the view that the quality of power supply from the national grid was regular during the Rainy season was 11.2 percentage-points higher than that of their urban counterparts [i.e Rural (regular) 52.1% vs 40.9%(regual): Urban

Analysing by province, except for Central (53.2%), Eastern (60.5%), and Muchinga (58.8%) provinces, the proportion of the households who held the view that the quality of power supply from the national grid was irregular during the rainy season from each of the remaining provinces was higher with Copperbelt Province having the largest percentage share of households with such a view at 72.3 percent.

Table 6.14: Percentage Share of Households Connected to the National Grid by Perception of Quality of Power Supply during the Rain season by Rural/Urban and Province, Zambia 2023.

Residence	Perception of Quality of Power supply from the National Grid during the Rainy season				
	Households	Proportion connected to National grid	Regular	Irregular	Percent Total
Total	**4,119,848**	**33.9**	**42.3**	**57.7**	**100**
Rural	2,375,655	7.5	52.1	47.9	100
Urban	1,744,193	69.8	40.9	59.1	100
Province					
Central	467,331	33.2	53.2	46.8	100
Copperbelt	536,681	63.9	27.7	72.3	100
Eastern	566,687	7.8	60.5	39.5	100
Luapula	300,198	20.4	35.8	64.2	100
Lusaka	629,890	78.7	48.1	51.9	100
Muchinga	212,415	20.0	58.8	41.2	100
Northern	348,518	10.2	40.2	59.8	100
North-western	256,981	23.9	33.4	66.6	100
Southern	484,680	24.1	41.6	58.4	100
Western	316,467	12.3	44.1	55.9	100

6.16 Perception of Quality of Electricity Supply from the Local Mini-grid

Quality of Electricity Supply from Local Mini-grd

Table 6.15 shows the percentage distribution of households by perception of quality of power supply from the local mini-grid by rural/urban and province in 2023. Of an estimated 6,812 households using the local mini-grid representing 0.2 percent of the total households countyrwide, 36.4 percent were of the view that power from their local mini-grid supplier was irregular compared to 63.6 percent with a contrary view.

By rural/urban, slightly more than half the proportion of households using power from the local mini-grid held the view that power was irregular at 55.8 percent. However, the sampled households in urban areas were of the view that power from their local mini-grid was regular.

Table 6.15: Percentage Distribution of Households by Perception of Quality of Electricity supply from the Local Mini-grid by Rural/Urban, Zambia 2023.

Residence	Households	Percent Share	Count	Irregular	Regular	Percent Total
Total	4,119,848	0.2	6,812	36.4	63.6	100
Rural	2,375,655	0.2	4,441	55.8	44.2	100
Urban	1,744,193	0.1	2,371	0.0	100.0	100

Electricity Supply Challenges from Local Mini-grid

Table 6.16 shows the percentage distribution of households by type of challenge experienced from the Local Mini-grid by rural /urban in 2023.

Of the 6,812 households using the Local mini-grid representing 0.2 percent of the total households countrywide, overall results show that the majority of the households did not experience any problems with the local mini-grid service provider at 81.8 percent, 11.4 percent reported that electricity supply was only for a short time while 5.9 percent of the households experienced high voltage challenges with 0.9 percent citing unpredictable interruptions.

Regardless of residence, the majority of households both in rural and urban areas had no problems with the quality of electricity supply from the local mini-grid service provider reflecting a minimum of 81.1 percent. However, for the households in rural areas, the main challenge was short time of electricity supply at 17.5 percent while the main challenge faced by their counterparts in urban areas was was high voltage experienced by 16.9 percent of the households.

Table 6.16: Percentage Distribution of Households by Type of Challenge Experienced from using Electricity from the Local Mini-grid, Rural/Urban, Zambia 2023.

Residence	House-holds	Share of Households	Total	Short supply	High voltage	Unpredictable interruptions	No problems	Percent total
Total	4,119,848	0.2	6,812	11.4	5.9	0.9	81.8	100.0
Rural	2,375,655	0.2	4,441	17.5	0.0	1.4	81.1	100.0
Urban	1,744,193	0.1	2,371	0.0	16.9	0.0	83.1	100.0

6.17 Electricity Safety

6.17.1 Safety of Electricity from the National Grid

Figure 6.11 details the percentage share of households whose appliances got damaged due to voltage fluctuations from the national grid by rural/urban in 2023. Overall, results show that 13.3 percent of the households had their electrical appliances damaged due fluctuations in voltage from the National grid. Further, 15.6 percent of the households in rural areas relative to 13 percent in urban areas had their appliances damaged due to voltage fluctuations from the National grid.

Figure 6.11: Percentage Share of Households whose Appliance got Damaged due to Electricity Voltage Flactuations from the National Grid, Rural/Urban, Zambia 2023.

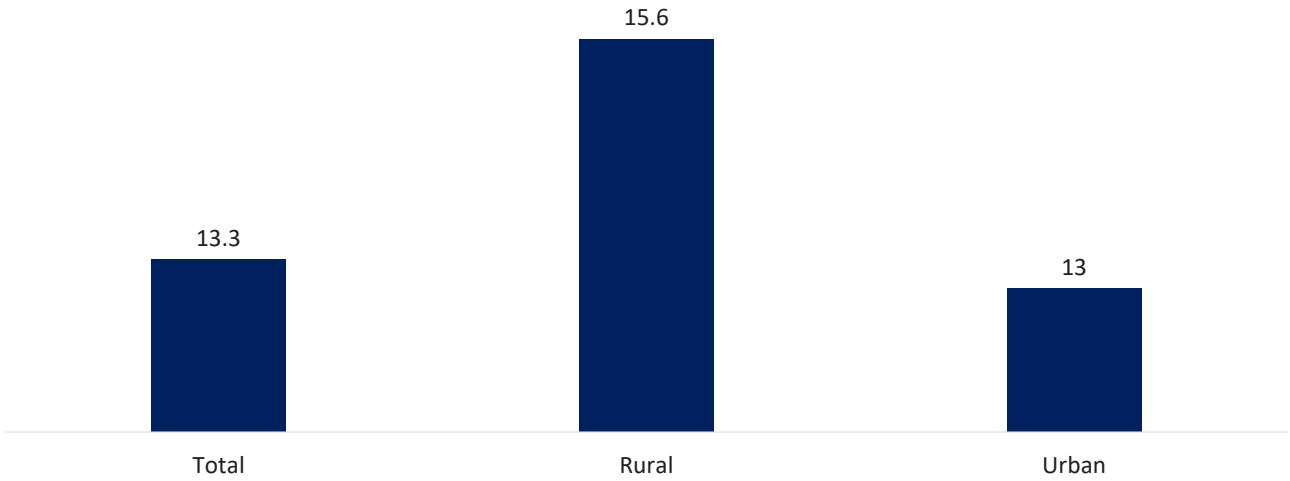
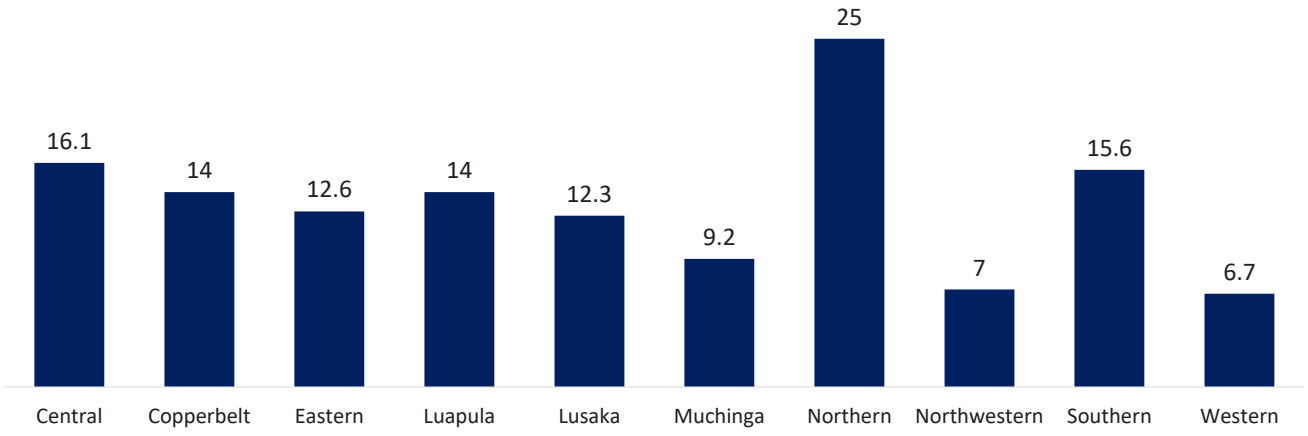


Figure 6.12 shows the percentage share of households whose appliances got damaged due to voltage flactuations from the national grid by province in 2023. Results show that the largest proportion of households with such reports were from Northern Province at 25 percent, followed by Central Province at 16.1 percent and Southern at 15.6 percent. Western Province had the smallest share of households with such reports at 6.7 percent.

Figure 6.12: Percentage Share of Households whose Appliances got Damaged due to voltage **Flactuations from the National Grid, by Province, Zambia 2023.**



6.17.2 Safety of Electricity from the Local Mini-grid

None of the sampled households reported having a damaged appliance due to voltage fluctuations from the local mini-grid.

6.18 Channels of Communication and Complaint Response

During 2023 NEAS, households were asked to state the main channel used to contact the grid (National/ Local mini-grid) electricity service provider in case of an electrical fault. Further, households were asked to indicate how long it took the grid service provider to resolve reported faults.

6.18.1 Reliability of Electricity from the National Grid

Table 6.17 shows the percentage distribution of households by main channel used to contact the national grid service provider in case of a fault by rural/urban in 2023. Results show that 71.7 percent either called or sent an SMS to the service provider, 7.7 percent visited the service provider to have the issue resolved while 4.4 percent requested a local technician to resolve the challenge. Further, 5.3 percent indicated that there was no system or channel that they could use to file a complaint while 1.5 percent indicated that they contacted the local community representative.

Regardless of residence, the largest proportion of households either called or sent an SMS to the service provider i.e. 53.3 percent in rural areas and 74.2 percent in urban areas.

Further analysed by province, results show that the largest proportion of households in each province either called the utility or sent an SMS to lodge the complaint with North-western Province recording a minimum of 51.5 percent.

Table 6.17: Percentage Distribution of Households by Main channel used to Contact the National Grid Service Provider in case of a Fault, Rural/Urban and Province, Zambia 2023.

Residence	Total Households	Share of national total	National	Call / SMS utility	Call a local technician	Send a letter/ email	Social media	Talk to community representative	Visit	No system to request a service/ file complaint	Other specify	Percent Total
Total	**4,119,848**	**33.9**	**1,396,628**	**71.7**	**4.4**	**0.3**	**1.2**	**1.5**	**7.7**	**5.3**	**8.3**	**100**
Rural	2,375,655	7.5	178,174	53.3	12.0	1.3	1.3	1.3	5.3	13.3	10.8	100
Urban	1,744,193	69.9	1,219,191	74.2	3.1	0.0	1.1	1.4	7.7	4.1	7.9	100
Province												
Central	467,331	33.2	155,154	54.5	7.2	0.0	0.9	0.9	7.8	14.5	14.2	100
Copperbelt	536,681	63.9	342,939	81.4	0.8	0.6	0.2	0.9	7.2	0.9	7.8	100
Eastern	566,687	7.8	44,202	59.0	7.7	0.0	1.3	1.3	12.8	10.3	7.7	100
Luapula	300,198	20.5	61,541	67.8	6.3	0.5	0.5	0.0	13.7	3.9	6.8	100
Lusaka	629,890	78.7	495,723	76.6	3.8	0.0	1.7	2.2	3.6	5.2	7.1	100
Muchinga	212,415	20.0	42,483	57.5	16.0	1.0	2.0	0.0	14.0	2.0	7.0	100
Northern	348,518	10.2	35,549	60.8	8.8	1.0	0.0	3.9	4.9	8.8	11.8	100
North-western	256,981	23.9	61,418	51.5	5.9	0.0	4.2	3.3	23.0	2.5	10.0	100
Southern	484,680	24.3	117,777	66.7	4.9	0.0	1.2	0.8	11.1	7.8	7.4	100
Western	316,467	12.3	38,925	89.6	2.4	0.0	0.0	0.0	4.1	1.6	2.4	100

Time Taken to Rectify an Electricity Faulty

Table 6.18 shows the percentage distribution of households by time taken by the national grid service provider to rectify a fault once reported, by rural/urban and province in 2023. Survey results show that 29.2 percent reported that the fault is rectified in less than a day representing the largest proportion followed by 24.8 percent who reported that it takes more than one day but less than 7 days to have the fault rectified while 17.7 percent of the households reported that it takes a day to have the fault sorted out.

Analysed by rural/urban, the largest proportion of households both in rural and urban areas reported that the fault is resolved in less than a day at 36.5 and 28.1 percent, respectively followed by those that reported that the fault is sorted out in more than one day but less than 7 days at 18.9 percent in rural areas and a corresponding 25.8 percent in urban areas. Thus, survey results imply that almost half the proportion of the respondent households had the fault rectified in a day or less (i.e. Rural: 52.% vs 46%: Urban).

Analysed by province, except for Lusaka Province where 30.4 percent of the households reported that the fault is rectified in more than one day but less than 7 days, the largest proportion of households in each of the remaining provinces reported that the fault is rectified in less than one day with Western Province accounting for the highest percentage at 45.5 percent.

Table 6.18: Percentage Distribution of Households by Time Taken to Rectify a Fault by the National Grid Service Provider, Rural/Urban and Province, Zambia 2023.

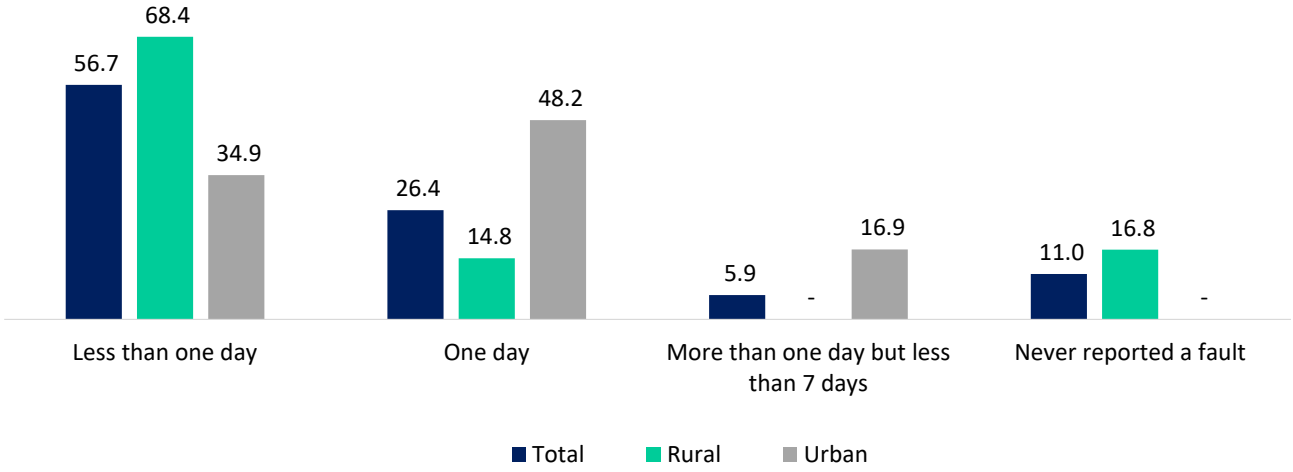
Residence	Total Households	Percentage of total households	National	Less than one day	One day	More than one day but less than 7 days	More than 7 days	other	Percent Total
Total	**4,119,848**	**33.9**	**1,396,628**	**29.2**	**17.7**	**24.8**	**10.9**	**17.4**	**100**
Rural	2,375,655	7.5	178,174	36.5	16.2	18.9	8.1	21.6	100
Urban	1,744,193	69.8	1,217,447	28.1	17.9	25.8	11.5	16.8	100
Province									
Central	467,331	33.2	155,154	28.9	17.2	16.9	9.9	27.1	100
Copperbelt	536,681	63.9	342,939	33.5	18.5	25.2	5.3	17.7	100
Eastern	566,687	7.8	44,202	32.1	23.1	16.7	10.3	16.7	100
Luapula	300,198	20.4	61,240	30.4	22.5	25.0	6.4	15.7	100
Lusaka	629,890	78.7	495,723	19.8	16.5	30.4	18.9	14.2	100
Muchinga	212,415	20.0	42,483	37.5	18.0	25.5	6.5	12.0	100
Northern	348,518	10.2	35,549	37.3	16.7	16.7	6.9	22.5	100
North-western	256,981	23.9	61,418	28.0	18.0	23.4	8.4	21.8	100
Southern	484,680	24.1	116,808	43.6	15.4	18.7	5.0	17.4	100
Western	316,467	12.3	38,925	45.5	20.3	17.9	2.4	13.8	100

6.18.2: Reliability of Electricity from the Local Mini-grid

Figure 6.13 shows the percentage distribution of households by time taken to rectify a fault by the local mini-grid service provider. Overall, 56.7 percent of the household at national level reported that the fault is rectified in less than a day, 26.4 percent in one day while 5.9 percent reported that it takes more than one day but less than 7 days to have the fault rectified by the local mini-grid service provider.

Analysis by rural/urban, 68.4 percent of the households in rural areas reported that the fault is rectified in less than a day, while 14.8 percent indicated that it took a day for the local mini-grid service provider to resolve the fault in rural areas. Further, 16.8 percent of the households in rural areas never even reported the fault. In urban areas, 34.9 percent of the households reported that the fault is rectified in less than a day while 48.2 percent said the service provider takes a day to resolve the fault with 16.9 percent of the households reporting that the service provider took more than one day but less than 7 days to have the fault rectified by the local mini-grid service provider.

Figure 6.13: Percentage Distribution of Households by Time Taken to Rectify a Fault by the Local Mini-grid Service Provider, Rural/Urban, Zambia 2023.



6.19 Generator Usage

A generator is one of the tools available that can be used by a household to provide access to electricity. The 2023 NEAS collected information from households on various uses of electricity supplied by the generator.

Figure 6.14 shows the proportion of households who used a generator as a source of electricity in rural and urban areas in 2023. Results show that 0.4 percent of the households in Zambia used a generator as a source of electricity. Further, 0.5 percent of the households in rural areas compared to 0.3 percent in urban used a generator as a source of electricity.

Figure 6.14: Proportion of Households who used a Generator as a Source of Electricity by Rural/Urban, Zambia 2023.

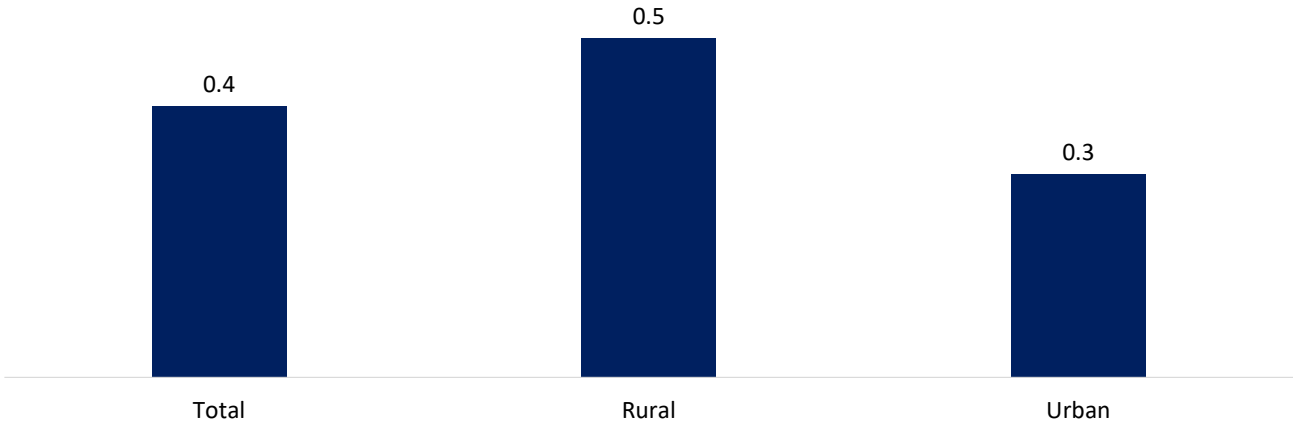


Figure 6.15 shows the proportion of households who used a generator as a source of electricity by province in 2023.

Results show that 0.8 percent of the households in Copperbelt Province used a generator as a source of electricity reflecting the largest proportion countrywide followed by Central and Lusaka provinces each at 0.7 percent. Eastern Province had the smallest proportion of household who used a generator as a source of electricity at 0.1 percent.

However, none of the sampled households in Luapula and North-western provinces reported using a generator as an alternative source of electricity.

Figure 6.15: Proportion of Households who use a Generator by Province, Zambia 2023.

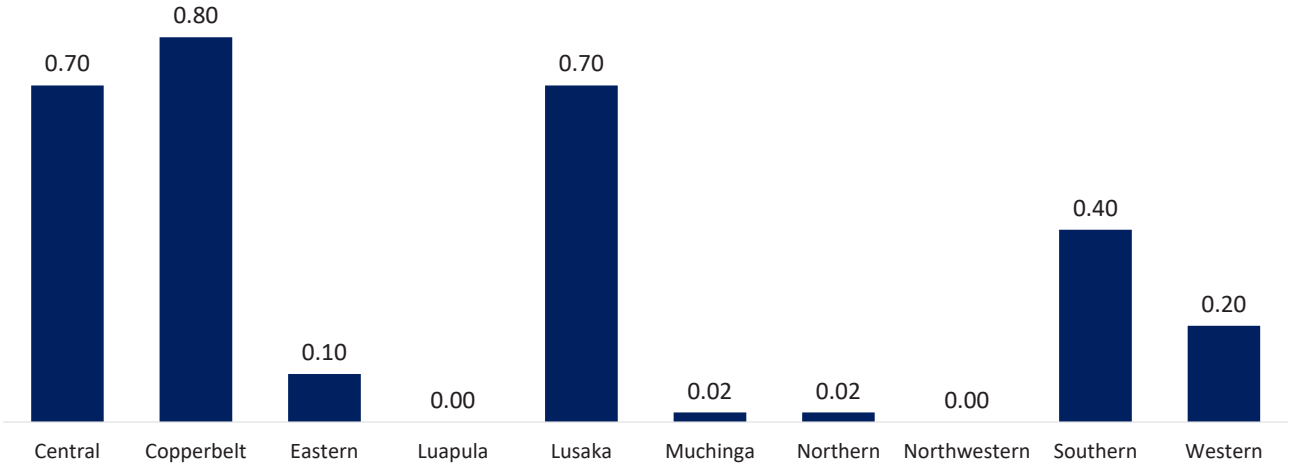


Table 6.19 shows the percentage distribution of households by maximum number of hours their generator could be used each day by rural/urban and province in 2023. At national level, 37.3 percent of the households indicated that their generator could continuously be used for 4 to 8 hours in a day representing the largest proportion followed by 31.5 percent of the households whose generator could continuously be used for 2 to 4 hours in a day while 17.6 percent of the households had a generator which could continuously operate for a maximum of 8 to 12 hours in a day.

Amongst rural households, the largest proportion of households had a generator that continuously work for 2 to 4 hours at 39 percent followed by those whose generators could continuously operate for more than 4 to 8 hours at 24.6 percent. It is also note worth that 9.8 percent of the households had a generator that could continuously work for more than 20 to 24 hours while none of the sampled households in rural areas had a generator that could continuously operate for more than 12 to16 hours .

In urban areas, the largest proportion of households had a generator that could continuously operate for more than 4 to 8 hours followed by those whose generators could continuously operate for more than 8 to 12 hours at 18.9 percent while the smallest proportion of households in urban areas had a generator which could continously operate for more than 2 to 4 hours at 13.7 percent. None of the sampled households had a generator that could operate for more than 12 hours.

Analysed by province, households in Central and Lusaka provinces had generators that could continuously operate for 2 to 4 hours at 55.8 and 57.9 percent, respectively, while Southern (52.3%), Copperbelt (67.3%), Eastern (100%) and Muchinga (100%) reported having a generator that could continuously operate for more than 4 to 8 hours. In addition, all the sampled households in Western and Northern provinces had a generator that could continuously operate for more than 8 to 12 and 20 to 24 hours, respectively. Incidentally, 18.3 percent of the households in Central Province could not state the capacity of their generator. Notably, none of the sampled households in Luapula and North-western provinces had a generator.

Table 6.19: Percentage Distribution of Households by Maximum Number of Hours their Generator could be used per Day by Capacity, Rural/Urban and Province, Zambia 2023.

Residence	Households	Percent Share	2-4 hours	More than 4 to 8 hours	More than 8 to 12 hours	More than 12 to 16 hours	More than 16 to 20 hours	More than 20 to 24 hours	Not Stated	Percent Total
National	**4,119,848**	**0.4**	**31.5**	**37.3**	**17.6**	**0**	**3**	**6.9**	**3.6**	**100**
Rural	2,375,655	0.5	39	24.6	17	0	4.3	9.8	5.2	100
Urban	1,744,193	0.3	13.7	67.3	18.9	0	0	0	0	100
Province										
Central	467,331	0.7	55.8	0	25.9	0	0	0	18.3	100
Copperbelt	536,681	0.8	18.8	67.3	13.8	0	0	0	0	100
Eastern	566,687	0.1	0	100	0	0	0	0	0	100
Luapula	300,198	0	0	0	0	0	0	0	0	0
Lusaka	629,890	0.7	57.9	19.4	21.1	0	0	1.6	0	100
Muchinga	212,415	0.02	0	100	0	0	0	0	0	100
Northern	348,518	0.02	0	0	0	0	0	100	0	100
Northwestern	256,981	0	0	0	0	0	0	0	0	0
Southern	484,680	0.4	0	52.3	0	0	23.1	24.6	0	100
Western	316,467	0.2	0	0	100	0	0	0	0	100

6.19.1 Backup Source for Lighting in case of Generator Failure

Table 6.20 shows the percentage distribution of households by backup source used for lighting in case of generator failure by rural/urban and province in 2023. Overall. Results show that the largest proportion of households used candles at 20 percent followed by those who used the solar home system at 17 percent while 6 percent used dry batteries. Further, 30 percent of the households did not have a backup source.

In rural areas, the main backup source used by households in case of generator failure was a home solar system at 24.2 percent followed by households who used candles at 16.4 percent while the main backup source used by households in urban areas were candles at 28.4 percent while 41.7 percent of the households used other alternatives. However, regardless of residence, about 30 percent of the households did not have a backup source.

Table 6.20: Percentage Distribution of Households by Backup Source used for Lighting in case of Generator Failure, Rural/Urban and Province, Zambia 2023.

Residence	Households	Percent share	Back up source used by households for lighting in case of Generator failure										
			Genset users	Dry cell batteries	Candles	Kerosene wick lamp	Gas lamp	Generator	Solar Home System	External Recharge-able Battery	Other Specify	No backup source	Percent Total
Total	**4,119,848**	**0.4**	**16,658**	**6**	**20**	**1.8**	**0**	**6.4**	**17**	**2.7**	**16.1**	**30**	**100**
Rural	2,375,655	0.5	11,708	8.5	16.4	2.5	0	9.2	24.2	3.9	5.3	30	100
Urban	1,744,193	0.3	4,950	0	28.4	0	0	0	0	0	41.7	29.9	100
Province													
Central	467,331	0.7	3,308	0	25.9	0	0	0	18.3	11.1	18.8	25.9	100
Copperbelt	536,681	0.8	4,449	0	22.7	6.7	0	6.6	13.3	0	32.2	18.6	100
Eastern	566,687	0.1	834	0	0	0	0	0	100	0	0	0	100
Luapula	300,198	0	0	0	0	0	0	0	0	0	0	0	0
Lusaka	629,890	0.7	4,437	1.5	32.8	0	0	17.5	5.5	2	14.3	26.3	100
Muchinga	212,415	0.2	389	100	0	0	0	0	0	0	0	0	100
Northern	348,518	0.2	544	100	0	0	0	0	0	0	0	0	100
North-western	256,981	0	0	0	0	0	0	0	0	0	0	0	0
Southern	484,680	0.4	2,176	0	0	0	0	0	25.5	0	0	74.5	100
Western	316,467	0.2	522	0	0	0	0	0	0	0	0	100	100
Note: None of the sampled households in Luapula and North-western provinces had a generator													

6.19.2 Backup source for Cooking and Heating in case of Generator Failure

Table 6.21 shows the percentage distribution of households by reported main backup source used for cooking and heating in case of generator failure by rural/urban and province in 2023. Results show that the largest proportion of households did not have a backup source at 44.4 percent while 17.7 percent used LPG and 37.9 percent used other alternatives such as firewood, charcoal, etc.

In rural areas, 55.2 percent of the households did not have a backup source representing the largest proportion, 15.1 percent cited using LPG while 29.7 percent used other alternatives. In urban areas, 23.7 percent used LPG as their main backup source while 57.3 percent used other alternatives with 18.9 percent of the households having no backup source.

Table 6.21: Percentage Distribution of Households by Backup Source used for Cooking & Heating in case of Generator Failure, Rural/Urban and Province, Zambia 2023.

Residence	Back up source used by households for cooking and heating in case of genset failure							
	Households	Genset users	Genset Users	Kerosene	Gas (LPG)	Other Specify	No backup source	Percent Total
Total	**4,119,848**	**0.4**	**16,658**	**0**	**17.7**	**37.9**	**44.4**	**100**
Rural	2,375,655	0.5	11,708	0	15.1	29.7	55.2	100
Urban	1,744,193	0.3	4,950	0	23.7	57.3	18.9	100
Province								
Central	467,331	0.7	3,308	0	18.3	18.8	62.9	100
Copperbelt	536,681	0.8	4,449	0	18.8	62.3	18.8	100
Eastern	566,687	0.1	834	0	0	100	0	100
Luapula	300,198	0	0	0	0	0	0	0
Lusaka	629,890	0.7	4,437	0	34	38.1	27.9	100
Muchinga	212,415	0.2	389	0	0	100	0	100
Northern	348,518	0.2	544	0	0	0	100	100
North-western	256,981	0	0	0	0	0	0	0
Southern	484,680	0.4	2,176	0	0	0	100	100
Western	316,467	0.2	522	0	0	0	100	100
Note: None of the sampled households in Luapula and North-western provinces had a generator								

6.19.3 Backup source for Electrical Gadgets in case of Generator Failure

Table 6.22 shows the percentage distribution of households by main backup source used to power electrical appliances in case of generator failure by rural/urban and province in 2023. Overall, results show that the largest proportion of households at national level did not have a backup source at 81 percent, 14.3 percent used LPG representing the largest proportion while 4.7 percent used other alternatives.

Analysed by rural/urban, the largest proportion of households both in rural and urban areas did not have a backup source at 73 and 100 percent, respectively. Further, 20.4 percent fo the households in rural areas used a solar home system as a backup source in case of generator failure while none of the sampled households in urban areas had a backup source.

Table 6.22: Percentage Distribution of Households by type of Backup Source used to Power Electrical Appliainces in case of Generator Failure, Rural/Urban and Province, Zambia 2023.

Residence	Households	Types of Backup Sources					
		Percent share	Genset Users	Solar Home System	Other Specify	No backup source	Percent Total
Total	**4,119,848**	**0.4**	**16,658**	**14.3**	**4.7**	**81**	**100**
Rural	2,375,655	0.5	11,708	20.4	6.6	73	100
Urban	1,744,193	0.3	4,950	0	0	100	100
Province							
Central	467,331	0.7	3,308	0	0	100	100
Copperbelt	536,681	0.8	4,449	6.1	0	93.9	100
Eastern	566,687	0.1	834	100	0	0	100
Luapula	300,198	0	0	0	0	0	100
Lusaka	629,890	0.7	4,437	7.6	17.5	74.9	100
Muchinga	212,415	0.2	389	100	0	0	100
Northern	348,518	0.2	544	0	0	100	100
Northwestern	256,981	0	0	0	0	0	100
Southern	484,680	0.4	2,176	25.5	0	74.5	100
Western	316,467	0.2	522	0	0	100	100

6.20 Solar Home Systems

A Solar Home System (SHS) refers to a system that generates electricity from sunlight. The SHS consists of components such as solar panel, charge controller, battery and inverter (in case of AC appliances). SHS can be used to power electrical appliances such as a lamp, radio, television, etc.

Figure 6.16 shows the percentage share of households who reported using a solar home system in rural and urban areas in 2023. Overall, 8.9 percent of the households countrywide reported using a solar home system. Further, 11.4 percent of the households in rural areas relative to 5.5 percent in urban areas reported using a solar home system. Thus, the proportion of households that reported using a solar home system in rural areas was double that of households in urban areas.

Figure 6.16: Percentage Share of Households using Solar Home Systems by Rural/Urban, Zambia 2023.

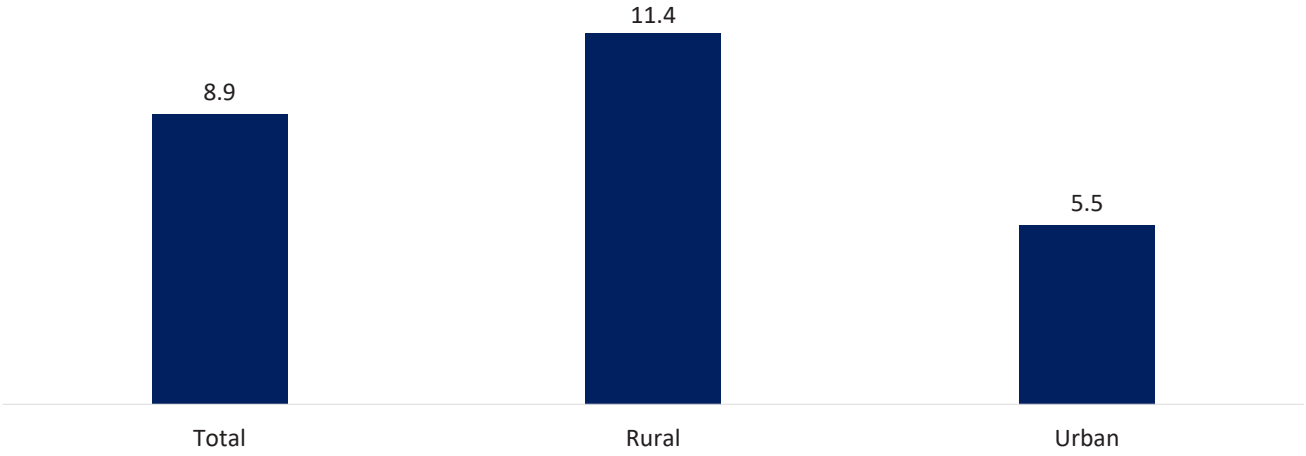
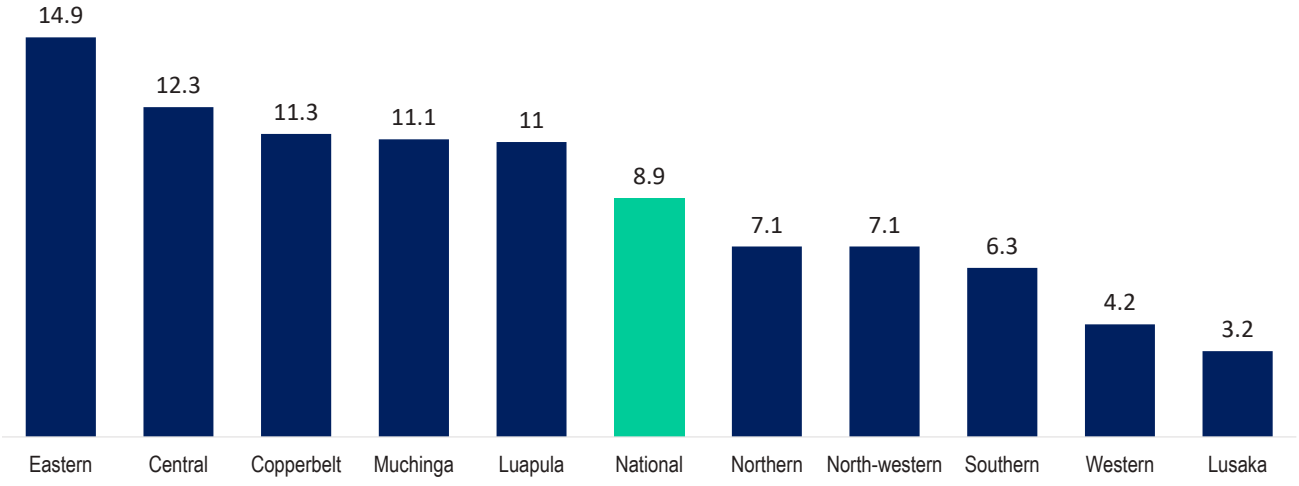


Figure 6.17 shows the percentage share of households who reported using a solar home system by province in 2023. Results show that the percentage shares of households who reported using a solar home system in Eastern, Copperbelt, Muchinga and Luapula provinces was higher than the national average of 8.9 percent with Eastern Province reflecting the largest proportion at 14.9 percent. The percenatge shares of households who reported using a solar home system in the reamining provinces were below the national average with Lusaka Province reflecting the smallest percent share of 3.2 percent.

Figure 6.17: Percentage Share of Households using Solar Home Systems by Province, Zambia 2023.



6.20.1 Number of Times Solar Home System broke down

Figure 6.18 shows the average number of times the solar home system broke down in the last 12-month period preceding the survey by rural/urban and province in 2023.

At national level, results show that the solar home system, on average, broke down 2.8 times in the last 12 months prior to the survey.

On average, the solar home system broke down 3.1 times in urban areas while the average in rural areas was 2.7 times over the same period under consideration.

Figure 6.18: Average Number of Times the Solar Home System Broke Down in the Last 12 Months Preceding the Survey, by Rural/Urban, Zambia 2023.

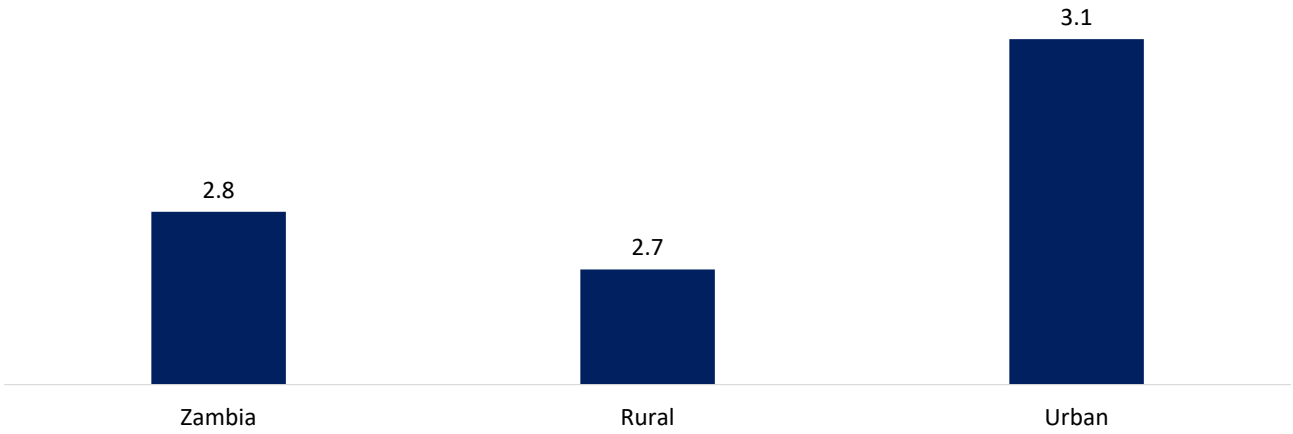


Figure 6.19 shows the average number of times the solar home system broke down in the last 12 months preceding the survey by province in 2023. Results show that solar home systems in Lusaka Province on average, broke down more times (3.5 times) than in any other province, followed by Western Province (3.3 times) and Copperbelt Province with an average of 3.1 times over the 12-month period. Luapula and Eastern provinces, on average, experienced the least number of breakdowns of their solar home system over the period under consideration both at 2.5 times.

Figure 6.19: Average Number of Times the Solar Home System Broke Down in the Last 12 Months, by Province, Zambia 2023.

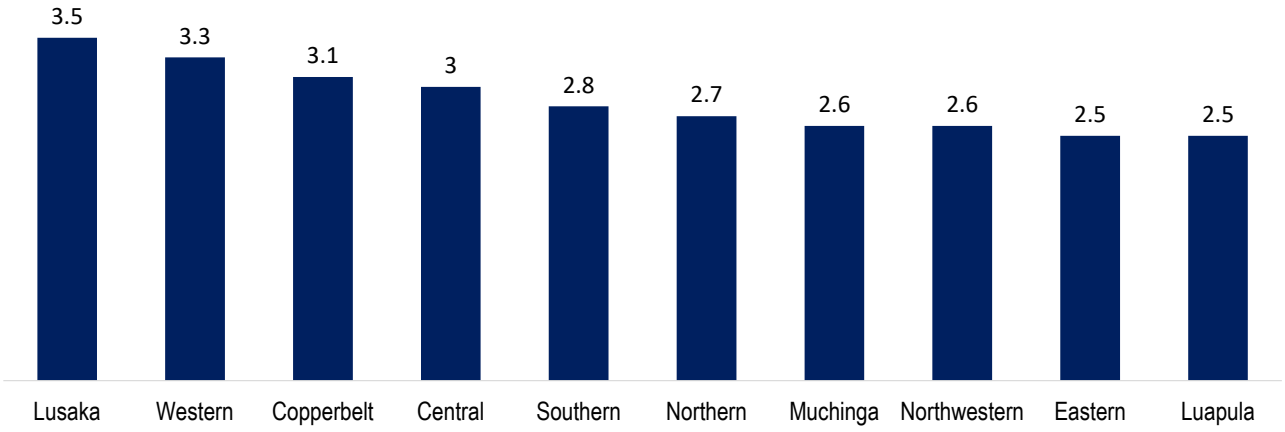
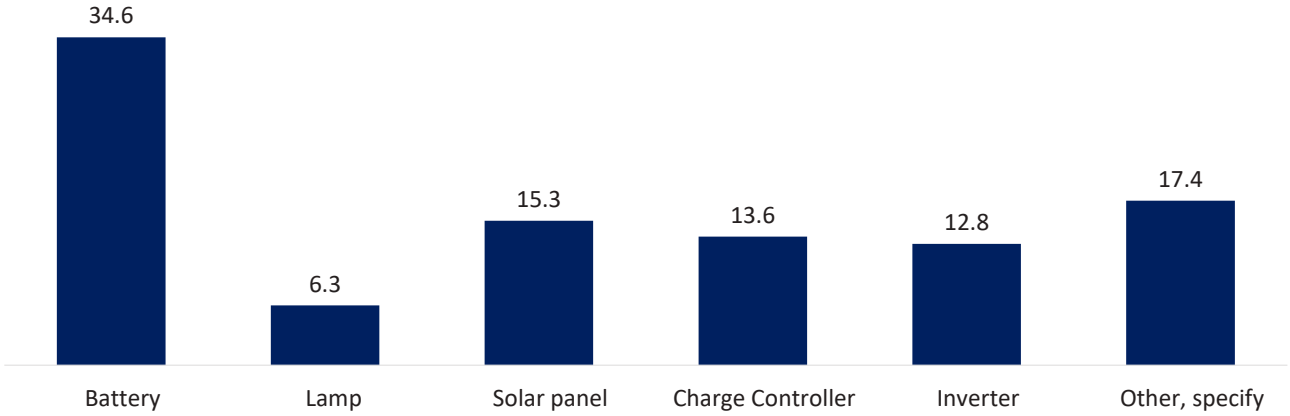


Figure 6.20 shows the percentage distribution of households by part of the solar home system that broke down the last time preceding the survey day in 2023. Results show that 34.6 percent of the households cited battery breakdown reflecting the largest proportion, 15.3 percent solar panel break down, 13.6 percent charge controller breakdown while 12.8 percent cited an inverter breakdown. Thus, solar lamp breakdown was the least cited at 6.3 percent.

Figure 6.20: Percentage Distribution of Households by Part of the Solar Home System that broke down the Last Time Preceding the Survey,Zambia 2023.



6.21 Solar Lanterns

Table 6.23 shows percentage share of households who used solar lanterns by rural/urban and province in 2023. Overall, 4.2 percent of the households used solar lanterns reflecting an estimated 172,334 households in absolute terms. In rural areas, 5.9 percent of the households used solar lanterns relative to 1.8 percent of the households in urban areas. Further, the majority of the houseolds using using solar lanterns were in rural areas at 81 percent.

Analysed by province, Eastern Province had the largest share of households using solar lanterns at 9.9 percent followed by Northern Province at 8.4 percent while Lusaka Province had smallest share of houseoulds using solar lanterns at 0.8 percent.

Table 6.23: Percentage Share of Households who used Solar Lanterns, Rural/Urban and Province, Zambia 2023.

Residence	Households	Percent Share	Solar Households	Percentage Distribution (Location)
Total	**4,119,848**	**4.2**	**172,334**	**100.0**
Rural	2,375,655	5.9	140,223	81
Urban	1,744,193	1.8	32,111	18.6
Province				
Central	467,331	4.7	22,063	12.8
Copperbelt	536,681	2.0	10,722	6.2
Eastern	566,687	9.9	56,087	32.5
Luapula	300,198	4.5	13,397	7.8
Lusaka	629,890	0.8	4,932	2.9
Muchinga	212,415	5.4	11,539	6.7
Northern	348,518	8.4	29,445	17.1
North-western	256,981	3.3	8,596	5.0
Southern	484,680	2.5	11,971	6.9
Western	316,467	1.1	3,583	2.1

6.22 Primary Battery Charging Sources

Rechargeable batteries, also known as Secondary cells, are batteries that can be reused multiple times by recharging them with electricity. They retain their capacity to hold a charge even after being drained, unlike disposable batteries (primary cells).

The most common types of rechargeable batteries include: Nickel-Cadmium (NiCd), Nickel-Metal Hydride (NiMH), Lithium-Ion (Li-ion) and Lead-Acid (used in cars and solar systems). Rechargeable batteries are used in devices such as flashlights, toys, remote controls, power tools and electric vehicles.

During the Survey, households were asked to state the main (primary) source of energy used to charge their rechargeable battery(ies).

Table 6.24 shows the percentage distribution of households by main source of energy used to charge their rechargeable battery by rural/urban and province in 2023. The most common source used was solar at 86.2 percent followed by grid electricity at 10.8 percent while 0.2 percent of the households cited a generator.

In rural areas, 74.5 percent of the households cited solar as their primary source reflecting the largest proportion followed by grid electricity at 4.3 percent with 18.6 percent of the households having no main source. In urban areas, 81.3 percent of the households indicated having no main source while 11.7 and 6.5 percent cited solar and grid electricity, respectively.

At Provincial level, results show that Eastern Province (30.9 %) had the largest percentage of households using solar to recharge the battery, followed by Northern Province with 15.6 percent with the least being Lusaka at 1.4 percent. Further, larger proportions of households in each province cited not having any main source.

Table 6.24: Percentage Distribution of Households by Main Source of Charging the Battery, Rural/Urban and Province, Zambia 2023.

Residence	Total HHs	Percent Share	Total HHs using battery	Grid	Solar	Diesel/ Petrol genset	No Main source	Other Specify	Percent Total
Total	**4,119,848**	**4.2**	**172,334**	**10.8**	**86.2**	**0.2**	**0**	**2.9**	**100**
Rural	2,375,655	5.9	140,223	4.3	74.5	0.2	18.6	2.4	100
Urban	1,744,193	1.8	32,111	6.5	11.7	0	81.3	0.5	100
Province									
Central	467,331	4.7	22,063	1.7	11.1	0	87.2	0	100
Copperbelt	536,681	2.0	10,722	2.5	3	0.2	93.8	0.5	100
Eastern	566,687	9.9	56,087	0.7	30.9	0	67.4	1	100
Luapula	300,198	4.5	13,397	0.4	7.4	0	92.2	0	100
Lusaka	629,890	0.8	4,932	1.4	1.4	0	97.2	0	100
Muchinga	212,415	5.4	11,539	1	5.6	0	93.2	0.2	100
Northern	348,518	8.4	29,445	0.9	15.6	0	82.9	0.6	100
North-western	256,981	3.3	8,596	0.7	4.1	0	95	0.2	100
Southern	484,680	2.5	11,971	1.2	5.3	0	93	0.5	100
Western	316,467	1.1	3,583	0.3	1.8	0	97.9	0	100

NATIONAL ENERGY ACCESS BASELINE SURVEY

CHAPTER SEVEN

ENERGY UTILIZATION

CHAPTER 7:

ENERGY UTILISATION

The NEAS collected data from households on various sources of energy and their uses.

7.1 Energy Sources used by Type

Table 7.1 shows the proportional distribution of households by type of energy source used in rural and urban areas in 2023. At national level, the most common source of energy used by households was from the national grid at 34.4 percent, followed by dry batteries at 24.3 percent while 18.6 percent of the households cited using a solar home system. Only 0.2 percent of the households cited using a local mini-grid as their source of energy.

Analysed by rural/urban, results show that the largest proportion of households in rural areas use dry batteries as their source of energy at 33.3 percent followed by those who used solar at 25.5 percent while 7.7 percent used electricity from the national grid. Further, the largest proportion of households in urban areas used electricity from the national grid at 70.8 percent followed by 12.0 percent who used dry batteries and 9.5 percent who cited using solar. The least common sources of energy used by households in urban areas were local mini-grid and a generator at 0.3 and 0.1 percent, respectively.

Analysed by province, results show that the most common source of energy used by households in Lusaka and Copperbelt provinces was electricity from the national grid at 79.2 and 64 percent, respectively, while the largest proportion of households in each of the following provinces cited dry batteries as their most common source of energy i.e. Luapula (45.8%), Western (32.1%), Northern (31.3%), North-western (29.2%) and Muchinga (23.4%).

Further, Eastern Province had the largest proportions of households who cited using solar and rechargeable batteries as their most common source of energy at 34.9 and 9.9 percent, respectively. Though differing marginally with Central and Lusaka provinces, Copperbelt had the largest proportion of households who cited using a generator at 0.8 percent.

Table 7.1: Proportional Distribution of Households by Type of Energy Source Used, Rural/Urban and Province, Zambia 2023.

Residence	Does your household use any of the following sources of energy?						
	Households	Solar	Dry battery (Torch)	Rechargeable battery	Generator	National grid	Local mini-grid
Total	**4,119,848**	**18.6**	**24.3**	**4.2**	**0.4**	**34.4**	**0.2**
Rural	2,375,655	25.2	33.3	5.9	0.5	7.7	0.2
Urban	1,744,193	9.5	12.0	1.8	0.3	70.8	0.1
Province							
Central	467,331	23.4	19.4	4.7	0.7	35.9	0.3
Copperbelt	536,681	15.9	17.7	2.0	0.8	64.0	0.3
Eastern	566,687	34.9	31.7	9.9	0.1	7.9	0.0
Luapula	300,198	12.8	45.8	4.5	0.0	20.5	0.0
Lusaka	629,890	5.0	8.1	0.8	0.7	79.2	0.1
Muchinga	212,415	17.9	23.4	5.4	0.2	20.8	0.0
Northern	348,518	17.9	31.3	8.4	0.2	10.2	0.3
North-western	256,981	23.3	29.2	3.3	0.0	24.3	0.4
Southern	484,680	18.6	22.7	2.5	0.4	24.5	0.2
Western	316,467	16.3	32.1	1.1	0.2	12.8	0.0

Table 7.2 presents the percentage share of households who used electricity for cooking by rural/urban and province in 2023. Overall, results show that 15.8 percent used electricity for cooking. In rural areas, 4.2 percent of the households used electricity for cooking compared to 31.6 percent of the households in urban areas.

Analysed by province, among the households that were using electricity from the national grid for cooking, Copperbelt and Lusaka provinces had the largest percentage shares at 31.5 and 31.3 percent, respectively. Further, Central Province had the third largest share of households that used electricity for cooking at 20.1 percent while Northern and Eastern provinces had the least shares at 4.0 and 2.9 percent, respectively.

Table 7.2: Percentage Share of Households Connected to the National Grid using Electricity for Cooking, Rural/ Urban and Province, Zambia 2023.

Residence	Total Households	Proportion connected to national grid	Household	Percent Share
Total	**4,119,848**	**33.9**	**652,280**	**15.8**
Rural	2,375,655	7.5	100,484	4.2
Urban	1,744,193	69.9	551,796	31.6
Province				
Central	467,331	33.2	93,915	20.1
Copperbelt	536,681	63.9	169,268	31.5
Eastern	566,687	7.8	16,664	2.9
Luapula	300,198	20.5	28,002	9.3
Lusaka	629,890	78.7	197,161	31.3
Muchinga	212,415	20.0	14,286	6.7
Northern	348,518	10.2	14,056	4.0
North-western	256,981	23.9	33,352	13.0
Southern	484,680	24.3	68,032	14.0
Western	316,467	12.3	17,544	5.5

7.2 Charcoal Use by Households

During the survey, households were asked to indicate whether they had used charcoal for the purpose of cooking, heating water, home business,e.t.c. in the last 30 days preceding th survey.

Table 7.3 shows the proportional distribution of households who used charcoal 30 days preceding the survey by purpose disaggregated by rural/urban and province in 2023. At national level, 57.6 percent of the households were using charcoal for various purposes translating into an estimated 2,374,118 households. Further, 98.8 percent of these households used charcoal for cooking, 75.8 percent used it for heating water and 5.8 percent used it to do their home business while 0.8 percent used it for other purposes.

Analysed by rural/urban, 33.6 percent of the households in rural areas relative to 65.2 percent of their urban counterparts used charcoal for cooking while 23.1 percent of the households in rural areas relative to 52.7 percent in urban areas used it to heat water.

Analysis of charcoal used by province, results show that larger proportions of households in Lusaka and Copperbelt provinces used charcoal for cooking and heating water [i.e. Cooking: Lusaka (23%) vs (19.5%): Copperbelt) and Heating water Lusaka: (18.6%) vs (15.6%): Copperbelt], respectively. Notably, across the 10 provinces in Zambia, Western Province had the least proportion of households who used charcoal regardless of purpose.

Table 7.3: Proportional Distribution of Households who used Charcoal in the Last 30 Days by Purpose, Rural/ Urban and Province, Zambia 2023.

Residence	Total Households	% Share using Charcoal	Total HH using Charcoal	Cooking	Heating water	Home business	Other
Total	**4,119,848**	**57.6**	**2,374,118**	**98.8**	**75.8**	**5.8**	**0.8**
Rural	2,375,655	19.9	818,062	33.6	23.1	1.9	0.6
Urban	1,744,193	37.8	1,556,056	65.2	52.7	3.8	0.1
Province							
Central	467,331	7	288,992	12	9.1	0.4	0.1
Copperbelt	536,681	11.3	467,182	19.5	15.6	1.6	0.2
Eastern	566,687	3.5	145,561	5.9	3.9	0.3	0.1
Luapula	300,198	5.6	231,030	9.7	7.4	0.5	0
Lusaka	629,890	13.3	546,798	23	18.6	0.9	0
Muchinga	212,415	2.9	120,325	5	3.3	0.4	0
Northern	348,518	3.8	155,621	6.5	4.3	0.3	0
North-western	256,981	3.7	150,945	6.3	4.9	0.4	0.1
Southern	484,680	4.8	197,775	8.1	6.5	0.7	0.2
Western	316,467	1.7	69,888	2.9	2.2	0.2	0

7.3 LPG use by Households

During the survey, households using Liquified Petroleum Gas (LPG) were further requested to indicate the purpose for which they used LPG. Table 7.4 shows the proportional distribution of households by purpose of using LPG in the last 30 days prior to the survey by rural/urban and province in 2023.

Overall, 1.0 percent of the households countrywide used LPG translating into an estimated 40,666 households. Further, of the households that were using LPG, 94.0 percent used it to cook while about half the proportion of households (46.1%) used it for heating while 7 and 2.8 percent, respectively, used it for refrigeration and to run their home businesses.

Analysing use of LPG by province, results show that Lusaka (3.2%) , Central (1.7%) and Copperbelt (1.4%) provinces, respectively, accounted for larger proportions of households who had used LPG 30 days prior to the survey. Further, except for Luapula and Muchinga provinces where none of the sampled households reported using LPG, the largest proportion of households in the remainder of the provinces mainly used LPG for cooking with Western accounting for the smallest proportion among them at 59.9 percent.

Table 7.4: Proportional Distribution of Households who used LPG in the Last 30 Days Prior to the Survey by Purpose, Rural/Urban, Zambia 2023.

Residence	Total Households	Percent Share	Households	Cooking	Heating	Home business	Refrigeration	Other
Total	**4,119,848**	**1.0**	**40,666**	**94.0**	**46.1**	**2.8**	**7.0**	**4.8**
Rural	2,375,655	0.4	10,386	76.6	30.8	0.9	4.5	18.9
Urban	1,744,193	1.7	30,280	100.0	51.4	3.4	7.8	0.0
Province								
Central	467,331	1.7	8,027	75.6	20.5	0.0	3.4	24.4
Copperbelt	536,681	1.4	7,628	100.0	28.8	0.0	0.0	0.0
Eastern	566,687	0.1	582	100.0	0.0	0.0	0.0	0.0
Luapula	300,198	0.0	0	0.0	0.0	0.0	0.0	0.0
Lusaka	629,890	3.2	20,336	100.0	65.7	0.5	4.9	0.0
Muchinga	212,415	0.0	0	0.0	0.0	0.0	0.0	0.0
Northern	348,518	0.1	367	100.0	0.0	0.0	0.0	0.0
North-western	256,981	0.8	1,934	100.0	80.6	43.1	43.1	0.0
Southern	484,680	0.1	625	100.0	0.0	0.0	0.0	0.0
Western	316,467	0.4	1,165	59.9	0.0	18.0	61.1	0.0

7.4 Biogas use by Households

Biogas is a renewable energy source that is produced by the breakdown of organic matter such as food scraps and animal waste. It is a type of fuel that is produced when organic matter, such as food or animal waste, is broken down by microorganisms in the absence of oxygen. (https://energy.ec.europa.eu/topics/energy-poverty_en). It is commonly used for cooking, heating, electricity generation and vehicle fuel.

Table 7.5 shows the percentage share of households who used biogas by purpose in the last 30 days preceding the the survey disaggregated by rural/urban in 2023. An estimated 2,160 households reported using biogas countrywide representing 0.05 percent of the households in Zambia. Generally, results show that all the sampled households primarily used it for cooking and boiling water.

In rural areas, 0.04 percent of the households reported using biogas of which all the sampled households were using it for cooking and boiling water for drinking. Further, 0.06 percent of the households in urban areas were using biogas for cooking and boiling water for drinking of which none of the sampled households used it for other purposes.

Table 7.5: Percentage Share of Households who used Biogas by Purpose in the Last 30 Days Prior to the Survey, Rural/Urban and Province, Zambia 2023.

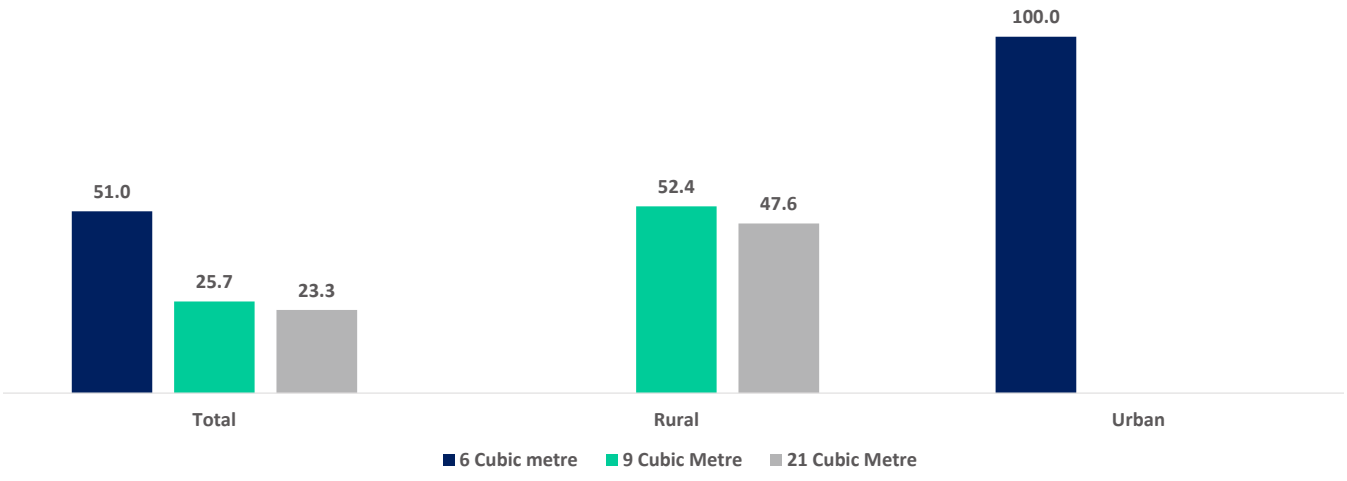
Residence	% share	Count	Yes	Cooking & Boiling Water
Total	4,119,848	0.05	2,160	100.0
Rural	2,375,655	0.04	1,058	100.0
Urban	1,744,193	0.06	1,101	100.0

A Biogas digester, also known as a biodigester, is a tank or system that is used to produce biogas (a mixture of methane and carbon dioxide) through the anaerobic digestion of organic matter. It is a sealed container that provides an ideal environment for micro organisms to break down the organic matter and produce biogas. Biogas digesters offer a sustainable way to manage organic waste, produce renewable energy, and reduce greenhouse gas emissions ***(https://www.nationalgrid.com/stories/energy-explained/what-is-biogas).***

The NEAS asked all those households that reported using biogas to indicate the size of the biodigester that they used. Figure 7.1 shows the percentage distribution of households by size of biodigester used disaggregated by rural/urban in 2023. Results show that the most commonly used size of biodigester countrywide is 6-cubic metre at 51.0 percent, followed by a 9.0-cubic metre biodigester at 25.7 percent while 23.3 percent of the households used a 21-cubic metre biodigester.

Analysed by rural/urban, the finding shows that none of the sampled households in rural areas used a 6-cubic metre biodigester. However, 52.4 percent of the households used a 9-cubic metre Biodigester while the remaining 47.6 percent of the households used a 21-cubic metre one of an estimated 1,058 households residing in rural areas. Notably, all the sampled households in urban areas used a 6-cubic metre biodigester.

Figure 7.1: Percentage Distribution of Households by Size of Biodigester Used, Rural/Urban , Zambia 2023.



7.5 Ethanol use by Households

The 2023 NEAS survey collected data from households using ethanol. Table 7.6 shows the percentage distribution of households who used ethanol by purpose in the last 30 days preceding the survey disaggregated by rural/urban in 2023. Results show that 0.04 percent of the households countrywide used ethanol. Further, 0.01 percent of the households in rural areas reported using ethanol relative to 0.07 percent in urban areas.

Table 7.6: Percentage Distribution of Household who used Ethanol in the Last 30 Days Prior to the Survey, Rural/Urban, Zambia 2023.

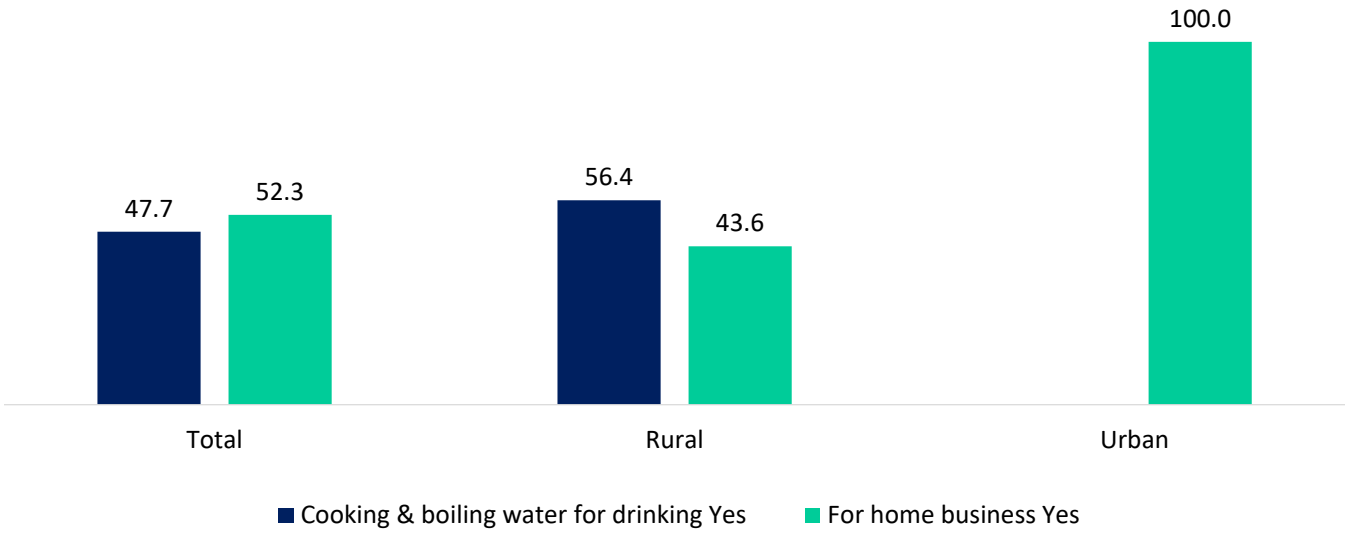
Residence	Does your household use any of the following sources of energy?: Ethanol					
	Total	% Share	Households	Yes	No	Percent Total
Total	4,119,848	0.04	1,544	0.04	99.96	100
Rural	2,375,655	0.01	292	0.01	99.99	100
Urban	1,744,193	0.07	1,252	0.07	99.93	100

7.6 Kerosene use by Households

Figure 7.2 presents the percentage share of households who reported using kerosene by rural/urban in 2023. Of an estimated 1,746 households who reported using kerosene representing 0.04 percent of the households countrywide, 47.7 percent used it for cooking and boiling water for drinking while 52.3 percent used it to do home business.

In rural areas, 56.4 percent of the households used kerosene for cooking and boiling water for drinking while 43.6 percent used it to do their home business. In urban areas, all the sampled households reported using kerosene in their home business.

Figure 7.2: Percentage Share of Households who used Kerosene by Purpose in the Last 30 Days Prior to the Survey, Rural/Urban, Zambia 2023.



7.7 Cooking and Heating Energy Sources

Households in Zambia use a variety of energy sources in their homes to undertake various household activities. Figure 7.3 reflects the percentage distribution of households by type of energy source used for cooking and heating in 2023. Overall, results show that slightly more than half the population of households countrywide used firewood to do their cooking and heating activities at 56.8 percent reflecting the largest proportion followed by those who used charcoal at 26.9 percent and electricity at 15.8 percent. On the other hand, less than 1.0 percent of the households countrywide used other sources of energy such as LPG, Biogas, Ethanol, etc.

Figure 7.3: Percentage Distribution of Households by Energy Source used for Cooking and Heating, Zambia 2023.

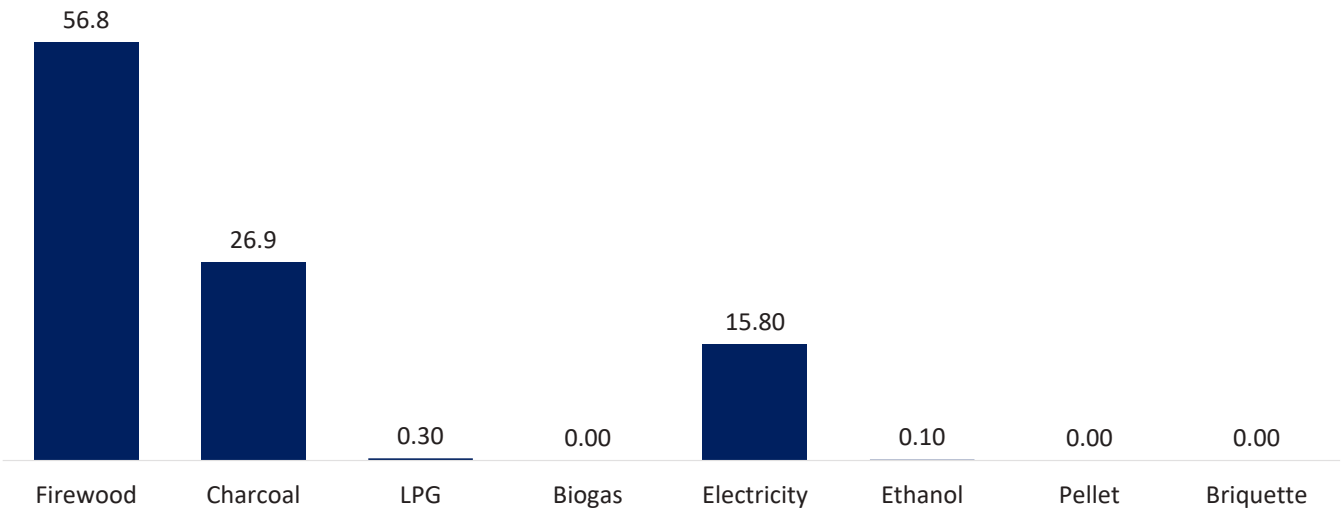


Table 7.7 shows the percentage distribution of households by type of energy source used for cooking and heating disaggregated by province in 2023. Except for Lusaka (15%) and Copperbelt (28.5%) provinces, in each of the remaining provinces, the largest proportion of households were using firewood for cooking and heating with a minimum of 56.5 percent in Central and Luapula provinces.

Further, charcoal was the second most widely used energy source for cooking and heating countrywide with Lusaka and Copperbelt provinces accounting for the largest proportions at 52.1 and 39.7 percent, respectively. Notably, although Luapula is predominantly rural, 34.2 percent of its households were using charcoal for cooking and heating differing by 5.5 percentage-points with Copperbelt Province which is highly urbanized.

Despite electricity being one of the cleaner sources of energy, it ranked as the third most commonly used energy source for cooking and heating countrywide at 15.8 percent. Among the 10 provinces, Copperbelt and Lusaka provinces accounted for the largest proportions of households who used electricity for cooking and heating at 31.5 and 31.3 percent, respectively. Northern and Eastern provinces had the smallest percentage shares of households who used electricity for cooking at 4.0 and 2.9 percent, respectively.

Table 7.7: Percentage Share of Households by Type of Energy Source used for Cooking by Rural/Urban, Zambia 2023.

Residence	Households	Firewood	Charcoal	LPG	Biogas	Electricity	Ethanol	Pellet	Briquette	Percent Total
Total	**4,119,848**	**56.8**	**26.9**	**0.3**	**0.04**	**15.8**	**0.1**	**0.03**	**0.03**	**100**
Central	467,331	56.6	22.5	0.3	0.0	20.1	0.3	0.08	0.2	100
Copperbelt	536,681	28.5	39.7	0.1	0.0	31.5	0.0	0.16	0.0	100
Eastern	566,687	84.4	12.6	0.0	0.0	2.9	0.0	0.00	0.0	100
Luapula	300,198	56.5	34.2	0.0	0.0	9.3	0.0	0.00	0.0	100
Lusaka	629,890	15.0	52.1	1.2	0.2	31.3	0.2	0.00	0.0	100
Muchinga	212,415	75.3	18.0	0.0	0.0	6.7	0.0	0.00	0.0	100
Northern	348,518	75.5	20.4	0.1	0.0	4.0	0.0	0.00	0.0	100
North-western	256,981	61.4	25.3	0.3	0.0	13.0	0.0	0.00	0.0	100
Southern	484,680	69.8	16.0	0.0	0.1	14.0	0.0	0.00	0.0	100
Western	316,467	82.9	11.4	0.1	0.0	5.5	0.0	0.00	0.0	100

7.8 Cooking and Heating Equipment

The type of cooking equipment (appliance) chosen by a households for daily preparation of food is very important as it plays a key role to its well-being. The type of appliance used has an influence on a household`s use of clean energy as well as having a knock-on effect on the environment.

For most of the households, the type of cooking equipment in mainly determined by economic considerations rather than household preference. Figure 7.4 shows the percentage distribution of households by type of equipment used for cooking in 2023. At national level, results show that the most commonly used type of cooking equipment was three stone open fire (48.0%) followed by a brazier with 38.2 percent of households using it. The least commonly used type of cooking equipment by households was an ethanol stove at reflecting 0.01 percent.

Figure 7.4: Percentage Distribution of Households by Type of Equipment used for Cooking and Heating, Zambia 2023.

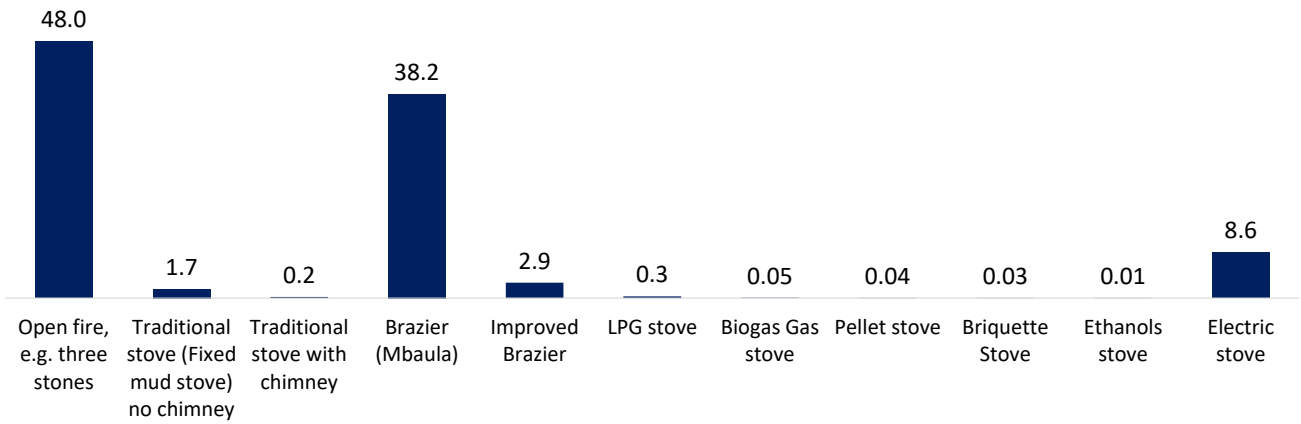


Table 7.8 shows the percentage share of households who used an electric stove for cooking by rural/urban and province in 2023. Generally, 14.7 percent of the households countrywide reported using an electric stove for cooking. Further, 12.5 percent of the households in urban areas relative to 2.2 percent of the households in rural areas reported using an electric stove for cooking.

Analysed by province, larger proportions of households in Lusaka and Copperbelt provinces used an electric stove for cooking at 4.6 and 3.9 percent, respectively. However, less than 1.0 percent of the households in North-western, Luapula, Eastern, Western, Muchinga and Northern provinces were using an electric stove for cooking.

Table 7.8: Percentage Share of Households who Used an Electric Stove for Cooking, by Rural/urban and Province, Zambia 2023.

Residence	Total Households	Share of Households using an Electric Stove
Total	**4,119,848**	**14.7**
Rural	2,375,655	2.2
Urban	1,744,193	12.5
Central	467,331	2.1
Copperbelt	536,681	3.9
Eastern	566,687	0.4
Luapula	300,198	0.6
Lusaka	629,890	4.6
Muchinga	212,415	0.3
Northern	348,518	0.3
North-western	256,981	0.7
Southern	484,680	1.5
Western	316,467	0.4

During the Survey, households not using an improved cookstove were asked to give a reason for not using it. Table 7.9 shows the percentage distribution of households who were not using an improved cookstove by reason for not using it in rural/urban and province in 2023. Out of 80.3 percent of the households who were not using an improved cookstove, 62.3 percent were of the view that it was "too expensive" representing the largest proportion, 18.8 percent reported that they "did not know it" while 10.0 percent reported that they "did not know where to buy it". Further, 0.7 percent of the households "did not just like it" while 0.2 percent indicated that "the taste of food prepared using this type of stove was not good". Furthermore, 0.5 percent cited cultural beliefs as a basis for not using an improved cookstove.

Analysed by province, except for North-western Province with the largest proportion of households who reported that they "did not know" an improved cookstove at 41.6 percent, the largest proportion of households in each of the remaining provinces were of the view that it was "too expensive" with households in Muchinga Province topping the list at 77.8 percent. Further, in 8 out of the 10 provinces, the second largest proportions of households "did not know what an improved cookstove was" i.e. (Southern - 25.6%), (Luapula - 21.1%), (Lusaka - 18.4%), (Western - 17.6%), (Central - 17.3%), (Northern - 15.4%), (Muchinga - 13.9%) and (Copperbelt - 9.7%). Notably, Lusaka, Copperbelt and Southern provinces had the largest proportions of households who chose the response "other reasons for not using it".

Table 7.9: Percentage Distribution of Households not using an Improved Cookedstove by Reason Cited, Rural/Urban and Province Zambia 2023.

Residence	Households	% Share not using Improved cookstove	Count	Too expensive	Do not know where to buy	Do not know it	Don't like it	Food doesn't taste good	Cultural beliefs	other specify	Percent Total
Total	**4,119,848**	**80.3**	**3,309,342**	**62.3**	**10.0**	**18.8**	**0.7**	**0.2**	**0.5**	**7.6**	**100**
Rural	2,375,655	91.6	2,175,862	60.1	10.9	21.5	0.5	0.2	0.5	6.5	100
Urban	1,744,193	65.0	1,133,480	66.6	8.3	13.7	1.1	0.1	0.5	9.7	100
Province											
Central	467,331	76.6	357,821	62.7	10.3	17.3	0.8	0.5	2.4	6.0	100
Copperbelt	536,681	68.6	367,950	74.0	5.7	9.7	0.1	0.1	0.3	10.2	100
Eastern	566,687	86.4	489,819	58.2	15.8	14.9	1.1	0.2	0.2	9.7	100
Luapula	300,198	90.8	272,631	59.1	15.0	21.1	0.4	0.3	0.0	4.1	100
Lusaka	629,890	58.2	366,896	60.9	7.3	18.4	1.9	0.0	0.5	11.0	100
Muchinga	212,415	92.7	196,900	77.8	4.9	13.9	0.2	0.5	0.1	2.6	100
Northern	348,518	92.7	323,032	66.5	13.0	15.4	0.4	0.0	0.3	4.4	100
North-western	256,981	84.7	217,777	33.1	19.7	41.6	1.0	0.0	0.2	4.5	100
Southern	484,680	86.4	418,737	60.3	2.9	25.6	0.4	0.1	0.6	10.2	100
Western	316,467	94.1	297,779	68.3	7.0	17.6	0.1	0.0	0.1	6.8	100

7.9 Household Energy Sources for Lighting

Lighting plays a crucial role in shaping the quality of human life, influencing various aspects from productivity, improvement of visibility, comfort to safety. The survey collected data on sources of energy used for lighting and types of lighting devices that households used. Additionally, households were asked to state the average number and types of light bulbs they used at their premises.

Table 7.10 shows the percentage distribution of households by type of energy sources used for lighting by rural/urban in 2023. Overall, results show that 36.5 percent of the households used solar as a source of energy for lighting reflecting the largest proportion followed by those who used dry batteries at 23.6 percent with 22.2 percent of the households using electricity while 3.6 percent of the households used rechargeable batteries as a source of energy for lighting.

In rural areas, slightly more than half the proportion of households (51.7%) used solar as a source of energy for lighting followed by 32.5 percent using dry batteries, 5.7 percent using electricity and 5.3 percent using rechargeable batteries. Further, 4.8 percent of the households used candles while none of the sampled households reported using kerosene for lighting. In urban areas, the largest proportion of households used electricity for lighting at 44.6 percent followed by those who used candles at 26.8 percent, 15.8 percent using solar with 11.4 percent using dry batteries. In addition, 1.4 percent of the households in urban areas used externally rechargeable batteries as a source of energy got lighting.

Table 7.10: Percentage Distribution of Households by Type of Energy Source used for Lighting by Rural/Urban, Zambia 2023.

Residence	Households	Electricity	Candle	Kerosene	Solar	Dry Bateries	Ext_Recharge Battery	Percent total
Total	**4,119,848**	**22.2**	**14.1**	**0**	**36.5**	**23.6**	**3.6**	**100**
Rural	2,375,655	5.7	4.8	0	51.7	32.5	5.3	100
Urban	1,744,193	44.6	26.8	0	15.8	11.4	1.4	100
Province								
Central	467,331	25.9	11.1	0	39.6	19.0	4.3	100
Copperbelt	536,681	32.8	28.2	0	21.4	16.2	1.3	100
Eastern	566,687	6.2	3.3	0	52.0	29.9	8.7	100
Luapula	300,198	12.2	10.7	0	27.6	45.2	4.2	100
Lusaka	629,890	51.6	30.4	0	9.4	8.1	0.5	100
Muchinga	212,415	13.9	13.4	0	45.6	22.7	4.3	100
Northern	348,518	8.1	5.1	0	47.6	31.2	8.0	100
North-western	256,981	16.8	15.4	0	37.1	28.4	2.3	100
Southern	484,680	18.2	7.2	0	50.3	22.1	2.2	100
Western	316,467	9.7	5.1	0	52.3	31.9	1.0	100

7.10 Electricity as Source of Energy for Lighting

The 2023 NEAS survey asked households to state their source of energy for lighting. For the households that reported using electricity from the Grid, their results are shown in Table 7.11 showing the percentage distribution of households who used electricity for lighting, rural/urban and province in 2023.

Results further show that of the total number of households who reported using electricity, 85 percent were in urban areas while 15 percent were in rural areas. Lusaka (35.6 percent) had the largest percentage share of households among the 10 provinces who reported using electricity for lighting followed by Copperbelt at 19 percent with Muchinga, Northern and Western provinces each having reported 3 percent.

Table 7.11: Percentage Share of Households who used Electricity for Lighting by Rural/Urban and Province, Zambia 2023.

Residence	Total HH	% sahre	Total HH using electricity for Lighting	% sahre
Total	**4,119,848**	**22.2**	**913,522**	**100.0**
Rural	2,375,655	5.7	136,310	14.9
Urban	1,744,193	44.6	777,213	85.1
Province				
Central	467,331	25.9	121,151	13.3
Copperbelt	536,681	32.8	176,192	19.3
Eastern	566,687	6.2	34,980	3.8
Luapula	300,198	12.2	36,740	4.0
Lusaka	629,890	51.6	324,849	35.6
Muchinga	212,415	13.9	29,575	3.2
Northern	348,518	8.1	28,111	3.1
North-western	256,981	16.8	43,079	4.7
Southern	484,680	18.2	88,185	9.7
Western	316,467	9.7	30,659	3.4

Table 7.12 shows the average number of candles used by a household per month by rural/urban and province in 2023. Results show that households, on average, used 10 candles per month countrywide. Further, households in rural areas, on average, used more candles than their urban counterparts (i.e. Rural: 14 candles vs 9 candles: Urban).

Analysed by province, results show that households in Northern Province, on average, used the highest number of candles per month at 29 followed by Central Province at 23 candles per month while households on the Copperbelt, on average, used the least number of candles per month at 6.

Table 7.12: Average Number of Candles used by Households per Month for Lighting by Rural/Urban and Province, Zambia 2023.

Residence	Average number of candles used
Total	**10**
Rural	14
Urban	9
Province	
Central	23
Copperbelt	6
Eastern	10
Luapula	9
Lusaka	7
Muchinga	15
Northern	29
North-western	10
Southern	9
Western	9

7.11 Use of Externally Rechargeable Batteries by Households

Externally rechargeable batteries for lighting are a great option for sustainable and efficient energy solutions.

During the survey, households who reported using an externally rechargeable battery as the primary source of energy for lighting were asked to state the number of light bulbs powered by this source. Table 7.13 shows average number of light bulbs powered by a rechargeable battery by type, rural/urban and province in 2023. At national level, results show that, an externally rechargeable battery, on average, powered at least 2 light emitting diode (LED) light bulbs while the same externally rechargeable battery powered at least 1 incandescent (ordinary) light bulb, a fluorescent light bulb and energy saving Compact Fluorescent Lamp (CFL).

In rural areas, the average number of light bulbs powered by an externally rechargeable battery was similar to the average at national level although none of the sampled households reported an ordinary light bulb being powered by an externally rechargeable in rural areas. In urban areas, the average number of light bulbs powered by an externally rechargeable battery was similar to the average at national level.

Table 7.13: Average Number of Light Bulbs Powered by an Externally Rechargeable Battery by Type, Rural/Urban and Province, Zambia 2023.

Residence	Incandescent light bulbs	Fluorescent tubes	compact fluorescent lamp (CFL)	LED
Total	**1**	**1**	**1**	**2**
Rural	0	1	1	2
Urban	1	1	2	2
Province				
Central	0	1	2	2
Copperbelt	1	1	1	1
Eastern	0	0	1	3
Luapula	1	1	1	2
Lusaka	1	1	2	3
Muchinga	1	1	2	2
Northern	1	1	1	2
North-western	1	1	3	3
Southern	0	0	2	2
Western	0	1	1	2

Table 7.14 shows the percentage distribution of households with rechargeable batteries by type, rural/urban and province in 2023. Results show that 3.7 percent of the households countrywide used rechargeable batteries representing an estimated 154,234 households. Of these households, 89.6 percent used Lithium ion batteries while 10.4 percent used Lead acid batteries.

Analysed by rural/urban, 5.4 percent of the households in rural areas used rechargeable batteries of which 90.2 percent were Lithium ion batteries while 9.8 percent were Lead acid batteries. In urban areas, 1.5 percent of the households used a rechargeable battery of which the majority used Lithium ion batteries at 86.6 percent relative to 13.4 percent who used Lead acid battery.

Table 7.14: Percentage Distribution of Households with Rechargeable Batteries by Type, Rural/Urban and Province, Zambia 2023.

Residence	Households	% Share	Total	Lithium	Lead Acid	Percent Total
Total	**4,119,848**	**3.7**	**154,234**	**89.6**	**10.4**	**100.0**
Rural	2,375,655	5.4	127,906	90.2	9.8	100.0
Urban	1,744,193	1.5	26,327	86.6	13.4	100.0
Province						
Central	467,331	4.2	19,635	97.3	2.7	100.0
Copperbelt	536,681	1.7	9,217	84.7	15.3	100.0
Eastern	566,687	9.5	54,083	90.2	9.8	100.0
Luapula	300,198	4.1	12,237	83.3	16.7	100.0
Lusaka	629,890	0.7	4,429	65.8	34.2	100.0
Muchinga	212,415	4.5	9,632	86.5	13.5	100.0
Northern	348,518	7.6	26,393	94.4	5.6	100.0
North-western	256,981	2.2	5,567	71.7	28.3	100.0
Southern	484,680	2.0	9,897	94.9	5.1	100.0
Western	316,467	1.0	3,143	87.8	12.2	100.0

Table 7.15 shows the proportional distribution of households with rechargeable batteries by type of light bulb used in rural/urban and province in 2023. Proportionally, results show that 53.8 percent of the households used CFLs reflecting the largest proportion followed by 26.5 percent using LED light bulbs, 22.2 percent using fluorescent bulbs with 20.1 percent using ordinary light bulbs.

Regardless of residence, results show that more than half the proportion of households were using energy saving light bulbs CFLs (i.e Rural: 52.5% vs 59.2%: Urban). Although use of ordinary bulbs by households both in rural (20%) and urban (20.5%) areas was almost the same, the proportion of households using LED light bulbs in rural areas was more than double that of households in urban areas (i.e. Rural: 29.4% vs 13.9%: urban).

Table 7.15: Proportional Distribution of Households with Rechargeable Batteries by Type of Light Bulb Used, Rural/ Urban and Province, Zambia 2023.

Residence	Total	Percent	Count.	Incandescent light bulbs	Fluorescent tubes	Energy saving light bulbs (CFL)	LED bulbs/Tubes
Total	**4,119,848**	**4.2**	**172,334**	**20.1**	**22.2**	**53.8**	**26.5**
Rural	2,375,655	5.9	140,223	20.0	20.8	52.5	29.4
Urban	1,744,193	1.8	32,111	20.5	28.1	59.2	13.9
Province							
Central	467,331	4.7	22,063	23.6	31.3	69.6	12.9
Copperbelt	536,681	2.0	10,722	17.6	29.6	37.0	41.0
Eastern	566,687	9.9	56,087	3.9	13.6	46.7	42.1
Luapula	300,198	4.5	13,397	39.6	24.2	55.3	5.6
Lusaka	629,890	0.8	4,932	47.5	19.6	62.9	5.1
Muchinga	212,415	5.4	11,539	40.9	35.0	53.0	17.1
Northern	348,518	8.4	29,445	31.9	32.1	59.5	31.0
North-western	256,981	3.3	8,596	28.0	17.3	42.2	9.9
Southern	484,680	2.5	11,971	8.1	2.6	58.0	12.2
Western	316,467	1.1	3,583	8.2	27.6	68.8	12.3

CHAPTER EIGHT

HOUSEHOLD EXPENDITURE ON ENERGY

CHAPTER 8:

HOUSEHOLD EXPENDITURE ON ENERGY

Household expenditure plays a crucial role in the economy for several reasons. It is closely linked to household poverty, well-being, and living standards. Typically, households spend different amounts based on the type of source for their energy needs. There are several sources of energy that households in Zambia are able to use for their everyday needs. The installed generation capacity in Zambia is **3,811.3 MW** and this capacity comprises of 83 percent of hydro, 8.7 percent of coal, 2.9 percent of heavy fuel oil, 2.2 percent of diesel and 3.2 percent solar PV (**ESR, 2023**).

Household consumption expenditure has a significant impact on aggregate demand, income, and employment within an economy. The NEAS collected data from the households on amounts spent on mini-grid, dry batteries, solar home system, solar lantern, kerosene, repair of generator and many other types of energy related expenditures.

8.1 Expenditure on Repair of Solar Home System

Households that used solar energy were asked how much they spent on repairs of their solar home system. Figure 8.1 depicts average household expenditure on repairing the solar home system in the last 12 months prior to the survey by rural/urban in 2023. At national level, average household expenditure on repairing the solar home system was K471.49. Further, households in rural areas, on average, spent K506.89 in the last 12 months preceding the survey. This implies that households in rural areas, on average, spent 191.20 more on repairing their solar home system than their urban counterparts whose average expenditure was K315.69.

Figure 8.1: Average Household Expenditure (in Kwacha) on Repairing the Solar Home System in the Last 12 months Prior to the Survey by Rural/Urban, Zambia 2023.

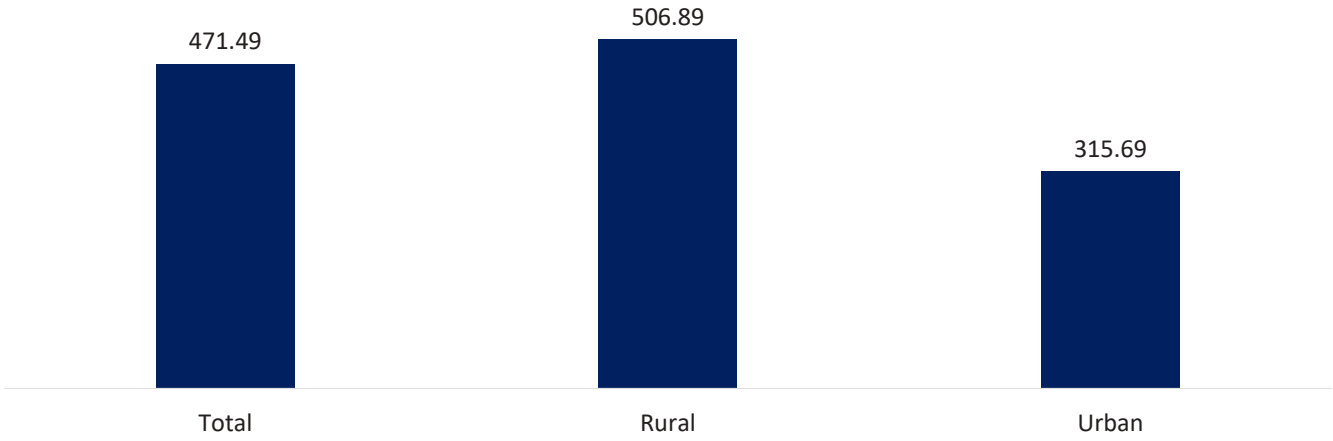
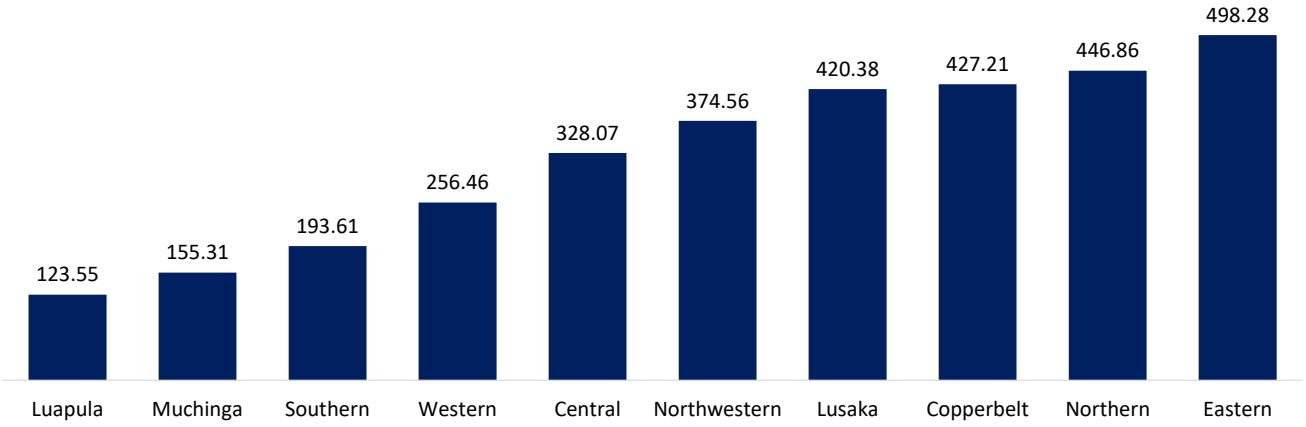


Figure 8.2 shows average household expenditure on repairs of the solar home system in the last 12 months prior to the survey by province in 2023. Results show that households in Eastern Province, on average, incurred the highest expenditure on repairs of the solar home system at K498.28 followed by Northern Province at K446.86. Muchinga and Luapula provinces, on average, incurred the least expenditures on repairs of their solar home systems at K155.31 and K123.55, respectively.

Figure 8.2: Average Household Expenditure (in Kwacha) on Repairing the Solar Home System in the Last 12 months Prior to the Survey by Province, Zambia 2023.



8.2 Household Expenditure on Firewood

During the survey, households using firewood were asked to indicate how much money, on average, they spent on firewood per month. Table 8.1 shows average monthly household expenditure on firewood by sex of head, rural/urban and province in 2023. At national level, results show that households spent K108.47 on firewood per month. Further, male headed households on average spent K2 more on firewood than female headed households i.e [Male-headed: K109.09 vs K106.79: Female-headed].

By rural/urban, households in rural areas, on average, spent K115.24 on firewood compared to K98.46 spent by urban households. Further, male-headed households in rural areas, on average, spent K117.75 compared to K95.61 by their urban counterparts while female-headed households in rural areas, on average, spent K107.89 on firewood compared to K105.37 by their counterparts in urban areas.

At provincial level, results show that households in Lusaka Province on average spent the highest amount on firewood at K133.54, followed by households in Southern Province at K127.67 while households in Muchinga Province on average spent the least amount at K72.07.

Table 8.1: Average Monthly Household Expenditure (in Kwacha) on Firewood by Sex of Household Head by Rural/ Urban and Province, Zambia 2023.

Residence	National Average	Male Heads	Female Heads
Total	108.47	109.09	106.79
Rural	115.24	117.75	107.89
Urban	98.46	95.61	105.37
Province			
Central	118.76	123.96	107.23
Copperbelt	107.27	95.91	129.50
Eastern	85.16	83.77	89.75
Luapula	105.46	106.08	104.23
Lusaka	133.54	136.57	124.52
Muchinga	72.07	75.72	10.00
Northern	87.98	88.41	86.15
North-western	101.68	101.23	103.11
Southern	127.67	133.30	112.55
Western	123.72	128.34	116.24

8.3 Household Expenditure on Externally Rechargeable Batteries

Households who reported using externally rechargeable batteries as an energy source were asked how much they spent to acquire them. Table 8.2 shows the average price paid by households to acquire an externally rechargeable battery by capacity, rural/urban and province in 2023. Results show that at national level, households, on average, paid K1,157.94 for a battery of capacity (0 to 50)Ah. For a (50 to 100)Ah capacity battery, households, on an average, paid K3,228.67 while for a (100 to 200)Ah capacity battery, households, on average, paid K6,784.36.

In rural areas, a battery whose capacity ranged between (0 to 50)Ah, on average, cost K1,221.21 while the same type of battery with similar capacity cost K803.66 in urban areas. Further, a battery with capacity of more than 50Ah to 100Ah, on average, cost K419.34 more in rural areas than in urban areas at K3,362.17 relative to K2,942.83. Further, for a (100 to 200)Ah capacity battery, on average, cost more in rural areas than in urban areas at K6,874.41 relative to K6,229.30.

At provincial level, results show that households in Northern Province, on average, paid the highest price for a battery with capacity (0 to 50)Ah at K1,415.56 while households in Eastern Province, on average, paid the highest price for a (50 to 100)Ah capacity battery at K 3,787.42. Further, households on the Copperbelt, on average, paid the highest price for a (100 to 200)Ah capacity abttery than any other province at K8,000.00.

Table 8.2: Average Price Paid by the Household for the Externally Rechargeable Battery by Capacity, Rural/Urban and Province, Zambia 2023.

Residence	0 to 50Ah	More than 50 to 100Ah	More than 100 to 200Ah
Total	1,157.94	3,228.67	6,784.36
Rural	1,221.21	3,362.17	6,874.41
Urban	803.66	2,942.83	6,229.30
Province			
Central	1,171.56	2,719.66	8,000.00
Copperbelt	641.64	3,006.85	8,100.00
Eastern	1,199.81	3,787.42	6,947.97
Luapula	923.4	3,492.10	-
Lusaka	1,355.53	3,200.00	-
Muchinga	1,290.19	2,798.29	6,900.00
Northern	1,415.56	2,500.00	7,000.00
North-western	966.53	2,960.78	5,580.24
Southern	1,191.90	3,000.00	-
Western	-	3,664.32	-

8.4 Household Expenditure on Generator Repairs

Households that reported using a generator as a source of energy were further asked to indicate how much each household spent on repairs, maintenance or generator spare parts. Table 8.3 shows the average amount incurred by household repairing, maintaining or buying generator spare parts by capacity. At national level, results show that (0 to 5)kw and a more than (10-20)kw capacity generator, on average, cost K1,118.43 and K9,063,16, respectively, while a generator whoe capacity was more than (20 to 30)kw, on average, cost K1,000. Disaggregated by rural/urban, results show that rural households, on average, spent K541.65 on repairs of a (0 to 2)kw capacity generator and K9,063.16 on repairs of a more than (10 to 20)kw capacity generator while households in urban areas, on average, spent K1,112.92 on repairs of a (0 to 2)kw capacity generator. Notably, none of the sampled households reported having incurred any cost on repairs on a more than (10 to 20)kw capacity generator and a more than (20 to 30)kw capacity generator, respectiely.

Table 8.3: Average Cost (in Kwacha) of Repairing/Maintenance /Part(s) of the Generator by Capacity, Rural/Urban, Zambia 2023.

Residence	Total	0 to 5kW	More than 10kW to 20kW	More than 20kW to 30kW
Total	1,118.43	811.47	9,063.16	1,000.00
Rural	1,122.66	541.65	9,063.16	1,000.00
Urban	1,112.92	1,112.92	-	-

8.5 Household Expenditure on Fuel for the Generator

Households that use generators will usually have generators that run on either petrol or diesel, During the survey, households that used a generator were further asked to indicator, on average, hos much each household spent on fuel by type to run their generator. Table 8.4 shows average household expenditure on fuel for the for the generator by fuel type, rural/urban and province in 2023. At national level,, regardless of fuel type, results show that a households, on avergae, spent K828.70. Further analysed by fuel type, results show that a household, on average, spent K856.14 and K806.60 on diesel and petrol, respectively.

By rural/urban, results show that households in rural areas, on average, spent more on fuel for the generator than their urban counterparts [i.e Rural: K857.33 vs K756.16: Urban]. Further, household in rural areas, on average, spent more on diesel and petrol than their urban counterparts at K890.70 and K831.63, respectively, relative to K775 and K738.51 on diesel and petrol by their urban counterparts.

Table 8.4: Average Household Expenditure on Fuel for the Generator by Fuel Type, Rural/Urban and Province, Zambia 2023.

Residence	Total	Diesel	Petrol
Total	**828.70**	**856.14**	**806.60**
Rural	857.33	890.70	831.63
Urban	756.16	775.76	738.51
Province			
Central	535.40	761.55	150.00
Copperbelt	671.35	713.98	648.24
Eastern	500.00	500.00	-
Luapula	-	-	-
Lusaka	1,009.12	1,706.48	753.22
Muchinga	-	-	-
Northern	300.00	300.00	-
Northwestern	-	-	-
Southern	1,379.75	1,000.00	1,494.10
Western	1,100.00	1,100.00	-

8.6: Household Expenditure on LPG

During the survey, households using Liquified Petroleum Gas (LPG) were asked how much each household spent on LPG per month. Table 8.5 shows the average monthly household expenditure on LPG by rural/urban in 2023. At national level, results shw that a household, on average, spent K481.14 on LPG per month.

Analysed by rural/urban, results show that households in urban areas, on average, spent an extral K72.91 on LPG than their rural counterparts whose average monthly expenditure on LPG was K426.20.

Table 8.5: The Average Monthly Household Expenditure on LPG, Rural/Urban, Zambia 2023.

National Average	481.14
Rural	426.20
Urban	499.11

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11	George Mubanga	38	Michelo Choongo
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