



**RURAL
ELECTRIFICATION
AUTHORITY**



Final IVA Output Verification Report No. 8 For the Electricity Service Access Project

Submitted by



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ABBREVIATIONS AND ACRONYMS

ESAP	Electricity Service Access Project
GPS	Global Positioning System
GRZ	Government Republic of Zambia
PIU	Project Implementation Unit
IVA	Independent Verification Agent
SME	Small and Medium Enterprise
REA	Rural electrification Authority
ZMW	Zambian Kwacha

ACKNOWLEDGEMENTS

The Independent Verification Agent (IVA) Team would like to sincerely express its heart-felt appreciation to the Electricity Service Access Project (ESAP) Project Implementation Unit (PIU) for the support rendered to it in undertaking the Eighth verification exercise (which is the first visit under the third IVA contract signed in May 2023). The Project Engineer, Mr. Wazingwa Mugala was particularly helpful in coordinating the whole exercise. Special thanks also go to ZESCO Limited's Regional and Area Managers of all the ten (10) provinces of the country that were visited, namely: Eastern, Muchinga, Northern, Luapula, Western, Central, Copperbelt, Southern, Northwestern and Lusaka provinces. The support which the IVA team received from the Regional and Area Managers went a long way in facilitating the verification exercise. Last but not the least, the various respondents who were engaged in all the 10 provinces and 36 districts are appreciated for their valuable time and data which they provided. The data went a long way in contributing towards the finalization of this report.

RuralNet Associates Limited¹
Lusaka, Zambia

¹ The IVA Core Team Consisted of Mr. Jacob S. Chisha, Project Coordinator; Mr. Twaambo Munaumba (IT Specialist); Ms. Rhoda Chiwele (Data Analyst); Ms. Alice Simushi (Supervisor for Team 1); Mr. Dalitso Tembo (Supervisor Team 2); Ms. Elfrida Machele, Supervisor Team 3, and Mr. Stephen Tembo (Team Leader).

Executive Summary

Introduction

The Government of the Republic of Zambia (GRZ) is seeking to increase electricity access in targeted rural areas to help improve the enabling environment for accelerated national electricity access in Zambia through the Electricity Service Access Project (ESAP). The access project is supported by the World Bank Group and implemented by the Rural Electrification Authority (REA). ESAP was initially for a period of 5 years, from 2018 to 2022 but has since been extended up to 30th June 2024. RuralNet Associates Limited was contracted to verify connections under subcomponent A1 as an Independent Verification Agent (IVA) up to the end of the ESAP implementation period. This report summarizes findings of the Eighth Verification Visit.

The eighth verification visit was necessitated by a request to verify a total of 3,863 connections (3,230 Households and 633 Small and Medium Enterprises - SMEs) made between 9th July 2022 and 3rd February 2023. The Terms of Reference (ToRs) require that the IVA physically verify 10% (386) connections with the following breakdown, 323 households (HHs) and 63 SMEs. The verification exercise was conducted from Monday 17th April to Wednesday 26th April 2023. Thirty-six (36) districts across all the ten (10) provinces were visited.

The key highlights are as follows:

Verifications:

- A total of 386 beneficiaries (i.e., 323 households and 63 SMEs) were verified out of the 3,863 connections done (3,230 households and 633 SMEs) for the period between 9th July 2022 to 3rd February 2023.
- Out of the total connections, 386 were verified. Of the 386 verified, 96.4% received LED bulbs during installation. Out of the 323 households who were verified, 311 (i.e., 96.3%) received LED bulbs during installation. Similarly, out of 63 SMEs who were verified, 61 (96.8%) received LED bulbs during installation. ZESCO is making a claim for 3,230 households and 633 SMEs. The total extrapolated verified number of SMEs is 613 while that of households is 3,110.
- The recommended payment to ZESCO for verification is as follows: **US \$ 67,430.00** for SMEs and **US \$ 513,150.00** for households, giving a total of **US\$ 580,580.00**.

Key challenges

From the first IVA visit up to the 8th one, **inadequate transport** has been persistently noted (and most widely cited challenge). Almost all the districts visited have either one or two vehicles to carter for all the jobs undertaken by ZESCO at district level, including the ESAP project. **Poor**

wiring of the buildings of the applicants (resulting in failed inspections) delayed connections. This was noted in a number of districts during the 8th visit. The **Poor state of the roads** was another challenge noted in a number of districts visited. The state of the roads deteriorated during the rainy season resulting in some roads becoming impassible. The verification team also noted that **some potential customers were outside the recommended radius** of ZESCO's power lines hence they did not meet the criterion to benefit from the electricity subsidy. In Luapula province, bulbs with **wrong specifications** were delivered. For instance, some households were given screw bulbs instead of bulbs which had pins. **Demand for subsided connections** heightened following the approval of the revised connection fees by the Energy Regulation Board. The ZESCO team had **difficulties contacting the potential clients** as some of them would either have their mobile phones off, change the simcard or there would be poor network. This contributed to delayed connections.

Part I: Introductory

1. INTRODUCTION

1.1. Introduction

The Electricity Services Access Project (ESAP) is Government of the Republic of Zambia (GRZ) project supported by the World Bank Group and implemented by the Rural Electrification Authority (REA). ESAP's development objective is to increase electricity access in targeted rural areas and help improve the enabling environment for accelerated national electricity access in Zambia. The project was initially designed to be implemented over a 5-year period (2018-2022) but later extended to June 2024. RuralNet Associates Limited has had three (3) contracts to provide IVA services to the ESAP project. The eighth visit (undertaken in April from the 17th to the 26th, 2023 over a period of 10 days) was the first under the third contract. The Verification questionnaire was the main tool used to collect information and data for the verification (**Appendix 5**). The Verification Manual (**Appendix 8**) was used in the training of the field team. This verification round was triggered by a request to verify a total of 3,863 connections (3,230 HHs and 633 SMEs) done between 9th July 2022 and 3rd February 2023. The ToRs required that 10% of the connections (or 386) be verified (323 HHs and 63 SMEs).

The objective of the IVA is to verify and monitor the outputs of the project's Sub component A1 for the implementing agent - ZESCO - to expand new electricity connections through the "last mile" connections. According to REA, the project targets 38,296 total connections. However, the total number of connections was later revised to 55,000 at a cost of **US\$ 8,000,000.00** budget allocation for subcomponent A1. Out of the total connections, 10% were to be verified to provide output verification reports. The reports were to include detailed information on the number, type, and location of connections, number of LED bulbs distributed and other relevant information to REA with a recommendation to approve payment for work done by ZESCO.

1.2. Tasks

The specific tasks of the assignment as elaborated in the ToRs involved the following:

- i) Designing a verification questionnaire.
- ii) Developing a sampling methodology.
- iii) Developing a verification manual.
- iv) Developing and maintaining a database of all connections of beneficiaries.
- v) Capturing data on the impact of the project.
- vi) Developing a document management system.
- vii) Verifying and confirming new connections that qualify for disbursement of subsidy payment to ZESCO.

- viii) Reporting on a quarterly basis.

2. METHODOLOGY

2.1 Data Collection Teams and Training

Training of field teams preceded field work. Three teams consisting of 2 enumerators and 1 supervisor per team underwent a one-day refresher training using the Verification Training Manual.² Field work was conducted in 36 districts across all the 10 Provinces of Zambia.

The Eighth verification visit was necessitated by a request to verify a total of 3,863 connections (3,230 Households and 633 SMEs) made between 9th July 2022 and 3rd February 2023. The ToRs require that the IVA physically verify 10% (386) connections. The verification exercise was conducted from 17th to 26th April 2023.

2.2 Districts Visited and Sample Sizes

As already alluded to above, out of the 3,863 connections done by ZESCO between 9th July 2022 and 3rd February 2023, 386 beneficiaries (i.e., 10%) were sampled. Of these, 323 were households and 63 were SMEs (see **Table 1** which presents sampled HHs and SMEs by district). The detailed methodology and total verifications sampled by district are presented at **Appendix 7**.

Table 1: Verifications by Province

Province	Verifications				Total	
	Households		SMEs		HHs	SMEs
	#	%	#	%	#	%
Central	56	17.3	15	23.8	71	18.4
Copperbelt	4	1.2	1	1.6	5	1.3
Eastern	39	12.1	13	20.6	52	13.5
Luapula	61	18.9	7	11.1	68	17.6
Muchinga	35	10.8	6	9.5	41	10.6
Northern	22	6.8	10	15.9	32	8.3
North Western	9	2.8	0	0	9	2.3
Southern	47	14.6	6	9.5	53	13.7
Western	26	8.0	2	3.2	28	7.3
Lusaka	24	7.4	3	4.8	27	7.0
Total	323	100%	63	100%	386	100%

² Please note that the same team members who have been used for previous verification exercises were targeted hence they already had the institutional memory.

2.3 Provincial and District Entry

In each Province, the first call of entry was the ZESCO Regional Engineer and in the districts the teams went through the Area/Branch Managers. Guides from the Operations/service departments were provided to the three teams for purposes of locating the sampled beneficiaries. The beneficiaries whose connections were verified were randomly selected. Verifications were done in all the 10 provinces as noted in **Table 1** above. A total of 36 districts were visited as already noted above.

2.4 Verification and Data Collection

Physical inspection of sampled installations was done. Verification data of new connections were captured using a structured questionnaire (see **Appendix 5**). The questionnaire was uploaded on hand-held electronic gadgets (Samsung Galaxy tablets³ to collect beneficiary data, including capturing of the respondent's photo and taking of GPS coordinates) where connectivity allowed. Due to challenges with connectivity in some districts visited, Supervisors could not manage to upload all the filled in questionnaire forms on a daily basis. Some had to finalize data uploads upon arrival in Lusaka.

Specifically, the enumerators inspected and did the following:

- i) Verify that installed connections were consistent with either the standard or the enhanced connection;
- ii) Verify that installed customer connections were in eligible project target areas;
- iii) Verify and document that customers have been provided with basic training and user information;
- iv) Verify the number of standard, enhanced and SME connections including the number of bulbs distributed;
- v) Verify that information on each installed connection included the sex of the head of the household/enterprise, and;
- vi) Gather socio-economic data on the beneficiaries and benefits from project sensitization and training activities.

Enumerators submitted their work to their respective team supervisors at the end of each day. The supervisors thoroughly checked the quality of the work of each enumerator. On a daily basis, the Project Manager compiled a Progress report which was submitted to ESAP after review by the Team Leader (**Appendix 11**).

2.5 Data Analysis and Reporting

Data has been analyzed using the Statistical Package for Social Sciences (SPSS) and Microsoft Office Excel. The percentages are based on absolute figures under consideration e.g., province, district or entire population. The Eighth IVA Output Verification Report is in two parts: (i) this very

³ RuralNet Associates has used electronic data collection technology since 2007. The technology has many advantages over paper-based questionnaire in that it is faster and more efficient. Data entry is direct and a number of checks and skip logic can be programmed to enhance data quality.

Narrative Report, and; (ii) the Verification Spread Sheet (consisting of all the variables that were targeted for verification). The latter is an excel sheet submitted separately.

Part II: Key Findings

3. VERIFICATIONS FINDINGS

Verifications:

- A total of 386 beneficiaries (i.e., 323 households and 63 SMEs) were verified out of the 3,863 connections done (3,230 households and 633 SMEs) for the period between 9th July 2022 to 3rd February 2023.
- Out of the total connections, 386 were verified. Of the 386 verified, 96.4% received LED bulbs during installation. Out of the 323 households who were verified, 311 (i.e., 96.3%) received LED bulbs during installation. Similarly, out of 63 SMEs who were verified, 61 (96.8%) received LED bulbs during installation. ZESCO is making a claim for 3,230 households and 633 SMEs. The total extrapolated verified number of SMEs is 613 while that of households is 3,110.
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This chapter discusses a number of findings, the key ones being:

- (i) Beneficiaries visited by category
- (ii) Selected demographics of beneficiaries
- (iii) Beneficiary socio-economic characteristics
- (iv) Beneficiary subsidies
- (v) Payment of connection fees
- (vi) Meter installation
- (vii) Bulbs and lighting points
- (viii) Beneficiary affordability to pay for electricity

- (ix) Training in operating a pre-paid meter
- (x) Challenges faced by beneficiaries, and
- (xi) Beneficiary satisfaction

Each of these findings is discussed below in sequence.

3.1 Beneficiaries Visited

A total of 386 beneficiaries were visited in all the 10 provinces of Zambia. Of the beneficiaries visited, 323 were households and 63 were Small and Medium Enterprises (SMEs). Luapula province had the largest proportion of households visited (18.9%), followed by Central (17.3%). The least was Copperbelt at 1.2%. Central province had the largest proportion of SMEs visited at 23.8%, followed by Eastern at 20.6%. Northwestern province had no SMEs visited while Copperbelt had 1.6% (see **Figures 1 and 2** for the rest of the details).

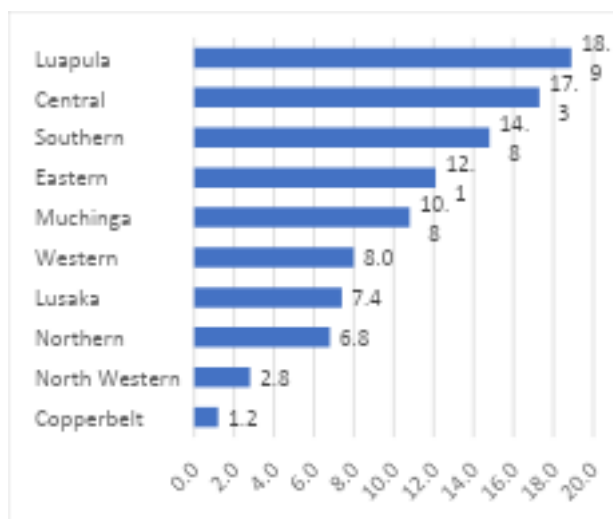


Figure 1: % distribution of sampled h/holds by Province

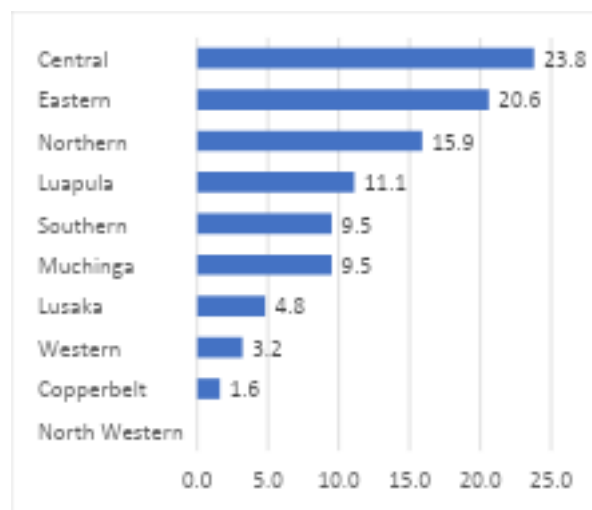


Figure 2: % distribution of samples SMEs by Province

3.2 Selected Demographics of Beneficiaries

Under this section, the sex of both households and SME beneficiaries is discussed.

3.2.1 Sex of Beneficiaries

Overall, out of the 386 household's sampled, under a third (108 or 28%) were female. In terms of proportion, there were more female household respondents in three of the provinces, namely; Central (55.5% versus 35.9%), Eastern (40.0% vs 29.9%) and Lusaka (27.2% against 6.5%) than their male counterparts (**Table 3** presents details). Clearly, out of the three provinces with a larger proportion of female headed households, Lusaka had the largest, as noted above. Out of the 323 HHs sampled, 28% were female. Similarly, out of the 63 SMEs sampled, 27% were female (**Table 3** has details by province).

Table 3: Respondents by Gender by Province

Province	Count	Beneficiary					
		Male		Female		Total	
		HHs	SMEs	HHs	SMEs	HHs	SMEs
Central	N	43	8	13	7	51	20
	%	18.5	17.4	14.3	41.2	18.3	18.5
Copperbelt	N	3	1	1	0	4	1
	%	1.3	2.2	1.1	0	1.4	0.9
Eastern	N	24	9	15	4	33	19
	%	10.3	19.6	16.5	23.5	11.9	13.5
Luapula	N	44	6	17	1	50	18
	%	19	13	18.7	5.9	18	17.6
Muchinga	N	31	6	4	0	37	4
	%	13.4	13	4.4	0	13.3	3.7
Northern	N	17	7	5	3	24	8
	%	7.3	15.2	5.5	17.6	8.6	8.3
North western	N	8	0	1	0	8	1
	%	3.4	0	1.1	0	2.9	0.9
Southern	N	35	6	12	0	41	12
	%	15.1	13	13.2	0	14.7	13.7
Western	N	17	2	9	0	19	9
	%	7.3	4.3	9.9	0	6.8	8.3
Lusaka	N	10	1	14	2	11	16
	%	4.3	2.2	15.4	11.8	4	14.8
Total	N	232	46	91	17	278	108
	%	100	100	100	100	100	100

3.3 Beneficiary socio-economic characteristics

Five major categories of beneficiary socio-economic characteristics are dealt with in this section, discussed in their respective order:

- (i) Income source
- (ii) Ownership of electric appliances
- (iii) Cooking sources
- (iv) Quality of houses
- (v) Other Assets ownership

3.3.1 Income Source

Overall, the majority of beneficiaries visited depended on informal employment (84.2%) compared to those who relied on formal employment (15.8%) as their main source of income, see **Table 4**.⁴ Analysis by beneficiary category shows that more SMEs in percentage terms depended on informal employment than their household counterparts (i.e., 92.1% for SMEs compared to 82.7% for households). This finding is consistent with findings from previous verification visits. One reason attributed to this may be that it is easier to mobilise resources for SMEs from the informal than the formal sector.

Table 4: Main Source of Income in 2022/2023 by Beneficiary Category

Employment Category	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Formal employment	56	17.3	5	7.9	61	15.8
Informal employment	267	82.7	58	92.1	325	84.2
Total	323	100%	63	100%	386	100%

3.3.2 Ownership of Electric Appliances

Ownership of electric appliances by beneficiary households and SMEs was analysed, ranging from radio to computer. The overall picture is that in terms of households, a mobile phone was by far the most commonly owned electric appliance at 98.1%, followed by television and radio at 60.7% and 54.8% respectively. These findings are consistent with those of the previous verification visits. This suggests a changing landscape of assets deemed a priority. All these top three appliances suggest the importance of communication and information receipt (see **Table 5** and **Figure 3** for details). However, the picture was somewhat different regarding SMEs where although mobile phone was the most commonly owned appliance (90.5%), the SMEs who owned a refrigerator had the second position (41.3%). This is not surprising given that this category of beneficiaries is engaged in business. They still need to communicate (hence mobile phone) as well as a refrigerator for water and drinks (see **Table 5** for details).

Table 5 Beneficiaries who owned Various Electrical Appliances

Electrical Appliance	Households		SMEs	
	Count	%	Count	%
Radio	177	54.8	19	30.2
Television	196	60.7	13	20.6
Mobile phone	317	98.1	57	90.5
Telephone (landline)	2	0.6	1	1.6
Refrigerator	101	31.3	26	41.3
Fan	44	13.6	4	6.3
Sewing machine	2	0.6	0	0.0

⁴ According to the Central Statistics Office and Ministry of Labour, **formal employment** is the type of employment in which employees are entitled to social security coverage and contract in addition to annual paid leave or any such entitlement and any legal registration for own account workers/employers. On the other hand, **informal employment** is the type of employment characterized by a lack of entitlement to annual paid leave and an absence of social security. This type of employment could be found in both the formal sector and informal sector production units. See **Central Statistics Office and Ministry of Labour and Social Security, Zambia 2018 Labour Force Survey Report, pp 9**. SMEs included running small grocery shops; barber shops; hardware shops, and restaurants.

Pressing iron	66	20.4	2	3.2
VCR/DVD	42	1.3	4	6.3
Computer	18	5.6	3	4.8
Satellite dish	81	25.1	5	7.9

A satellite dish was owned by nearly 40% of the households visited, which again is linked to largely entertainment.

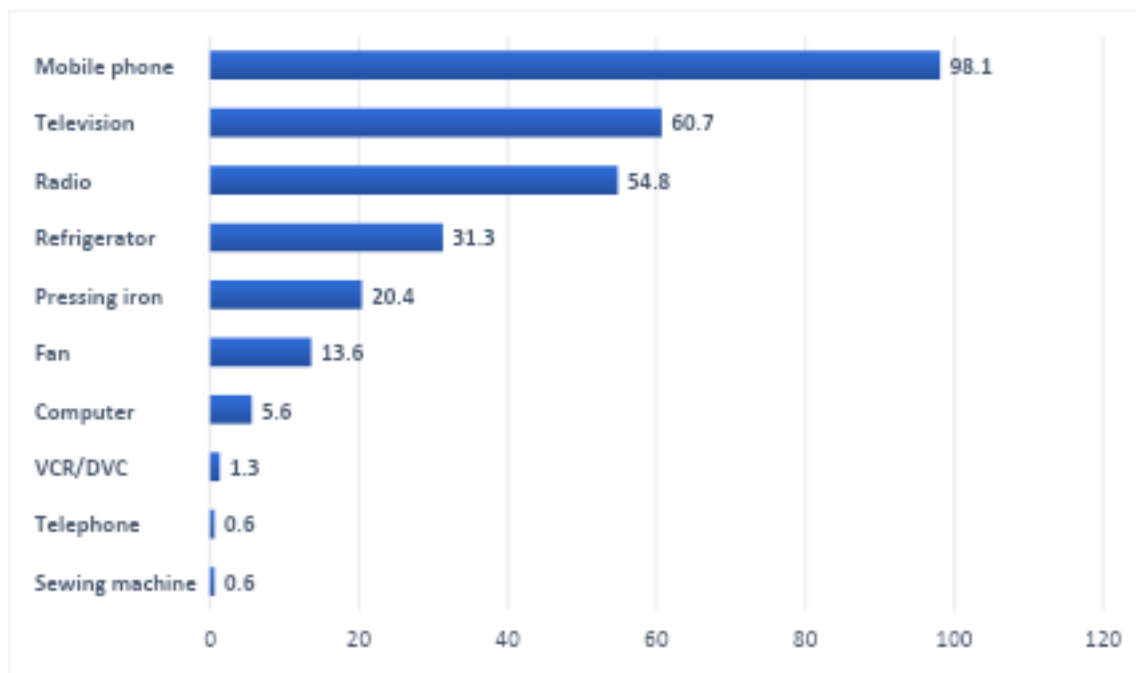


Figure 3: Percentage Households who owned Various Electrical Appliances

3.3.3 Cooking Sources

Charcoal was by far the most common cooking source cited by a total of 86% households, followed by electricity at 24%. A similar trend was observed regarding the use of various cooking sources by SMEs except that the proportion who did not prepare any food was far much higher (65.1% compared to 7.7% for HHs). This is expected given that there are not many SMEs who prepare food (except those who run eating places and similar entities). Charcoal was the most cited by both HHs and SMEs at 86% and 30% respectively while electricity was second in both cases at 24% and 7.9% for HHs and SMEs. For details, see **Table 6** as well as **Figure 4** – regarding households.

Table 6: Beneficiaries who cited Various Cooking Sources

Electrical Appliance	Households		SMEs	
	Count	%	Count	%
Electricity	77	23.8	5	7.9
Solar power	0	0.0	0	0.0
Liquid propane gas	0	0.0	0	0.0

Electrical Appliance	Households		SMEs	
	Count	%	Count	%
Bio gas	0	0.0	0	0.0
Kerosene	1	0.3	0	0.0
Charcoal	279	86.4	19	30.2
Firewood	38	11.8	1	1.6
Animal dung	0	0.0	0	0.0
Agricultural crop residue	0	0.0	0	0.0
Cooking fuel-no food cooked	25	7.7	41	65.1

No household cited using animal dung, kerosene, solar power nor agricultural crop residue as sources of cooking (see **Figure 4**).

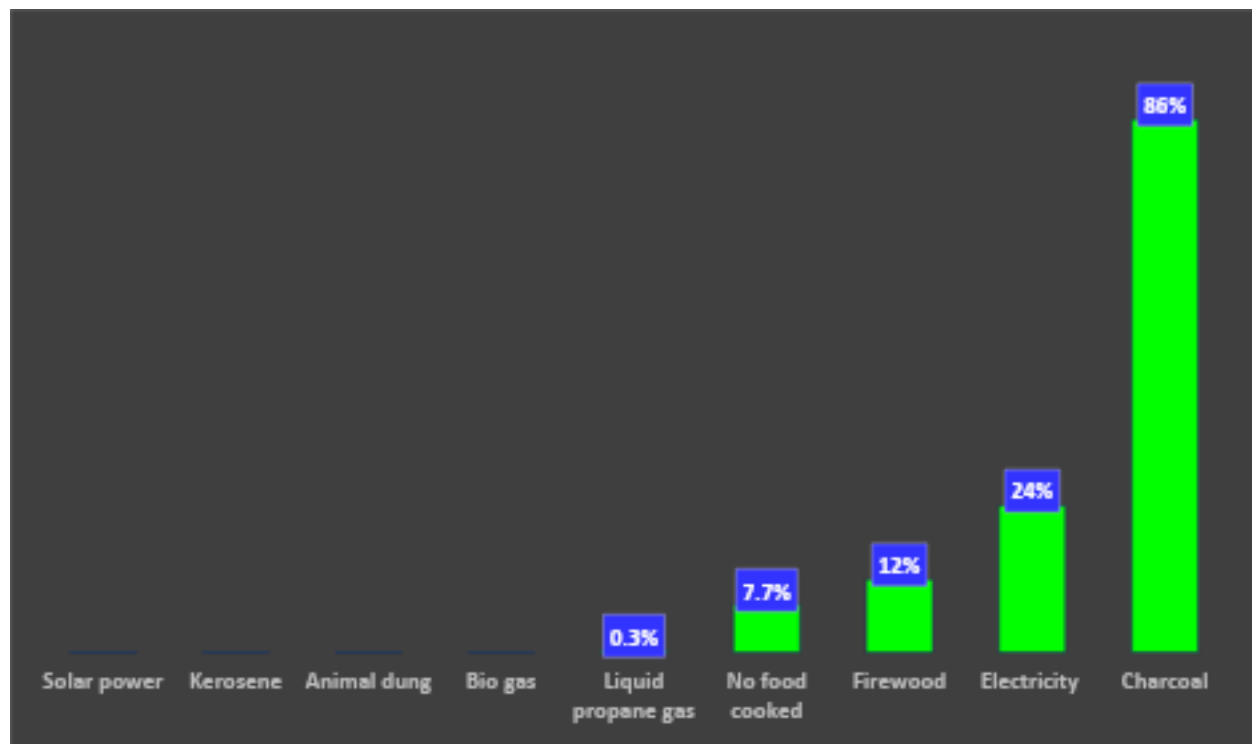


Figure 4: Beneficiary Households who used Various Cooking Sources (%)

3.3.4 Quality of Houses

Good houses are a proxy indicator for increase in household income, given that when households have disposable income, they tend to invest it in assets, including good housing. Based on the analysis in **Table 7**, the majority of the beneficiaries visited owned quality houses. For instance, an overwhelming majority of beneficiaries (99.5%) had an improved roofing, 92.5% had an improved floor and 90.9% had improved materials for the walls. The difference between the two stakeholder categories was not much. Nonetheless, there were slightly more SMEs (98%) whose houses had improved floor compared to their counterparts (households were at 91%).

Table 7: Main Building Materials Used for Residential House by Type and by Beneficiary Category

Building material type	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Improved floor (tiles, wood/planks and cement)	295	91	62	98	357	92.5
Improved roofing (metal/iron sheets/ceramic tiles)	322	99.7	62	98.4	384	99.5
Improved materials for walls (pan brick, burnt brick, cement blocks)	297	92.0	61	97	351	90.9

3.3.5 Other Assets Ownership

An analysis was undertaken regarding various assets owned by the beneficiaries visited. This ranged from owning a car to owning none of the assets cited in **Table 8**. The highest proportion of beneficiaries (both households and SMEs) owned a bicycle, at 31.6% followed by a car at 17.1% (see **Table 8** and **Figure 5**). On the other hand, those who owned none of the assets listed in Table 8 were the highest proportion at 53.4% which effectively was more than half.

Table 8: Other Assets Ownership by Type and by Beneficiary Category

Type of Asset	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Car	47	14.6	90	30.2	66	17.1
Tractor	2	0.6	2	3.2	4	1.0
Bicycle	100	31.0	22	34.9	122	31.6
Motor cycle	28	8.7	6	9.5	34	8.8
Animal drawn cart	2	0.6	1	1.6	3	0.8
Truck	2	0.6	3	4.8	5	1.3
Boat with a motor	0	0.0	0	0.0	0	0.0
Banana boat/hand dug canoe	0	0.0	0	0.0	0	0.0
Owned none of the above	182	56.3	24	38.1	206	53.4

As expected, the proportion of SMEs who owned various expensive assets was more than that of their counterparts and in some cases it was even double (e.g. 30.2% of the SMEs owned a car compared to their household counterparts at 14.6%), see **Table 8** for details. This suggests that SMEs have a better resource endowment than their counterparts. The proportion of those who did not own any of the assets cited in Table 10 was fairly high (53.4%). SMEs who owned nothing was far much less (38.1%) compared to their household counterparts (56.3%). This underlines the above point that the SMEs were generally better resourced.

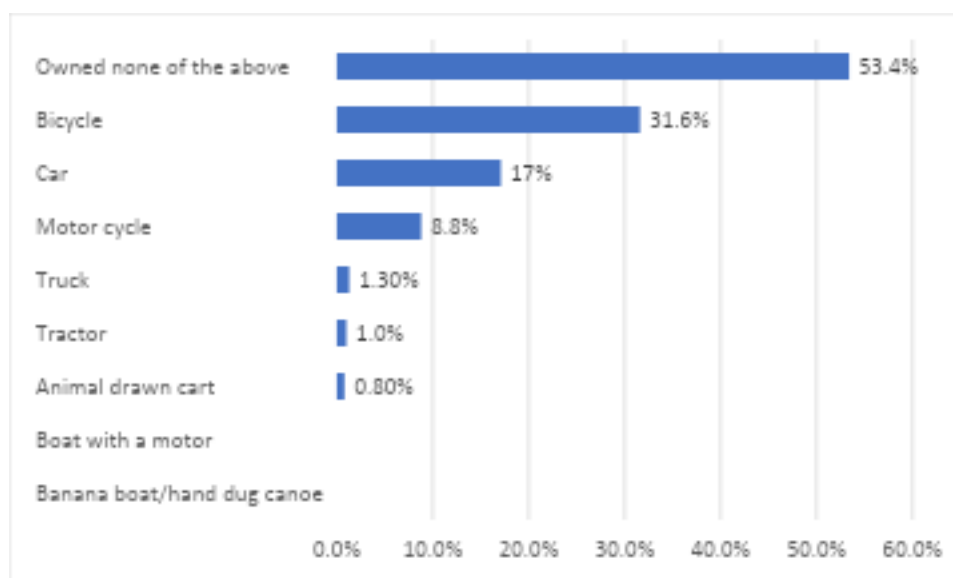


Figure 5: Asset Ownership by Both Categories of Beneficiaries

3.4 Beneficiary Subsidies

Overall, nearly 85% of both categories of beneficiaries knew about the subsidy offered by the project. The proportion by category of beneficiary was slightly higher in case of households (85.4% compared to 79.4% in case of SMEs) see **Table 9**.

Table 9: Proportion of Beneficiaries who knew about the Subsidy

Households		SMEs		Total	
Count	%	Count	%	Count	%
276	85.4	50	79.4	326	84.5

The most cited means by which beneficiaries learnt about the subsidy was friend/relative (at 79.8%), followed by door-to-door campaign (21.5%) while radio was third at 15.0%. Social media has gained popularity from being the least (during the last visit) to being the second last at 5.2% (it has more than doubled from 2.5%). On the other hand, television was at least at 4% (the lowest) despite it being cited as the second most owned asset by the beneficiaries at 60.7% (see **Figure 3**). This suggests that television was not widely used for disseminating information about the subsidy. If it was used, it could be a question of inappropriate timing of programming. Friend/relative has had a huge jump (by nearly 30 percentage points) from the previous visit. This suggests that increasing more beneficiaries are appreciating the subsidy as confirmed by the qualitative findings and hence they are talking about it more and more. For other details, see **Table 10** and **Figure 6**.

Table 10: The Means through which the Beneficiaries Learnt about the Subsidy

The Means	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Door to door campaign	41	14.9	9	18.0	50	15.3
Radio	42	15.2	7	14.0	49	15.0
Television	9	3.3	4	8.0	13	4.0
Social media	15	5.4	2	4.0	17	5.2
Friend/relative	223	80.8	37	74.0	260	79.8

A comparison of the two beneficiary categories shows that television was more cited (in terms of proportion) as a means through which information about subsidies was learnt among SMEs (8.0%) than households (3.3%), thus more than double. On the other hand, friend/relative was more useful among households than SMEs as a means of information dissemination about the subsidy (80.8% compared to 7.4%), see **Table 10** for details.

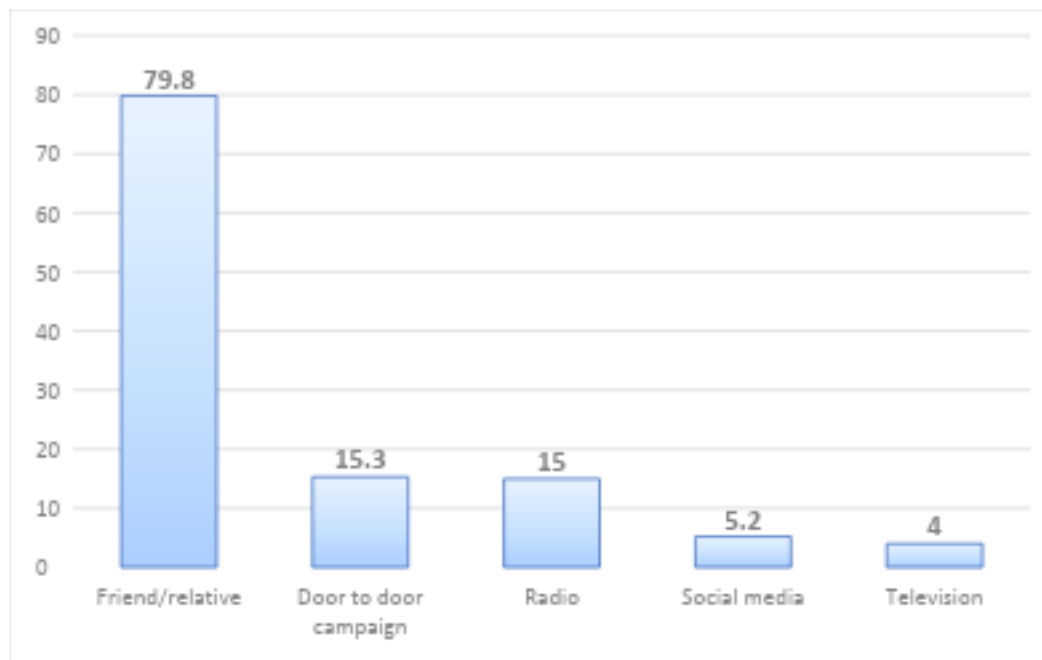


Figure 6: Means Beneficiaries Learnt about the Subsidy

3.5 Payment of Connection Fees

There were two main amounts of payment made for connections, ZMW 250 by households and ZMW 769 by SMEs. The analysis shows that 86.1% of the households paid the recommended connection fee while the corresponding percentage for SMEs was 72.3% (see **Table 11**). The difference (i.e., about 18.4% in case of households and 24.0% for SMEs) suggest that someone else rather than the respondent made the payment and hence the respondent did not know. The proportion of those who did not know was 13.7%.

Table 11: Beneficiaries Paying Various Amounts for the Connection of Electricity (ZMW)

Amount Paid (ZMW)	Households		SMEs		Total	
	Count	%	Count	%	Count	%
250	278	86.1	1	1.6	279	72.3
769	0	0.0	54	85.7	54	14.0
Did not know	45	13.9	8	12.7	53	13.7

3.6 Meter Installation

Four focus areas are dealt with in this Section:

- (i) Installation period
- (ii) Make of the meter
- (iii) Meter models, and
- (iv) Connection and meter ratings

Each of these is discussed below in sequence.

3.6.1 Installation Period

An analysis was undertaken to establish how much time is taken for meters to be installed from the point at which payment for connection fees is made. The period considered ranged from less than 1 month to more than 12 months. The highest proportion of the respondents (nearly three quarters, or 74.8%) had their meter installed between 1 and 3 months (down from more than 90% during the previous visit). Out of the above stated time categories, the one which had the highest proportion of respondents was between 1 and 3 months (44%), followed by those who had their meter installed in less than 1 month (30.8%, up from 18.5% during the previous visit). There was none who had their meter installed over 12 months (the reduction is from 3.9% from the previous visit to zero), see **Table 12** and **Figure 7**. These findings suggest that compared to the last visit, the efficiency levels by ZESCO is a mixture. In a number of areas (e.g., the period less than 1 month and between 1 and 3 months) the performance has declined. On the other hand, for the period over 12 months, the performance has improved. Among other reasons, this may be attributed to the worsening problems of transport (as attributed above under challenges). During one of the previous visits, it was observed that in some cases ZESCO staff had resorted to walking to the areas where they have to do the connections while carrying materials.

Table 12: Time Taken (months) for the Connection to be effected

Time taken (months)	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Less than 1 month	98	30.3	21	33.3	119	30.8
Between 1 and 3 months	143	44.3	27	42.9	170	44.0
Between 4 and 6 months	12	3.7	3	4.8	15	3.9
Between 7 and 12 months	14	4.3	3	4.8	17	4.4
Over 12 months	0	0.0	0	0.0	0	0.0
Did not know	56	17.3	9	14.3	65	16.8

A comparison between the two beneficiary categories shows a similar trend for the period less than 1 month (i.e. 30.3% for households and 33.3% for SMEs) as well as the period between 1 and 3 months (44.3% for households and 42.9% for SMEs) and the period between 7 and 12 months (4.3% and 4.8% respectively). Both households and SMEs had zero respondents for the period over 12 months, see **Table 12** for other details.

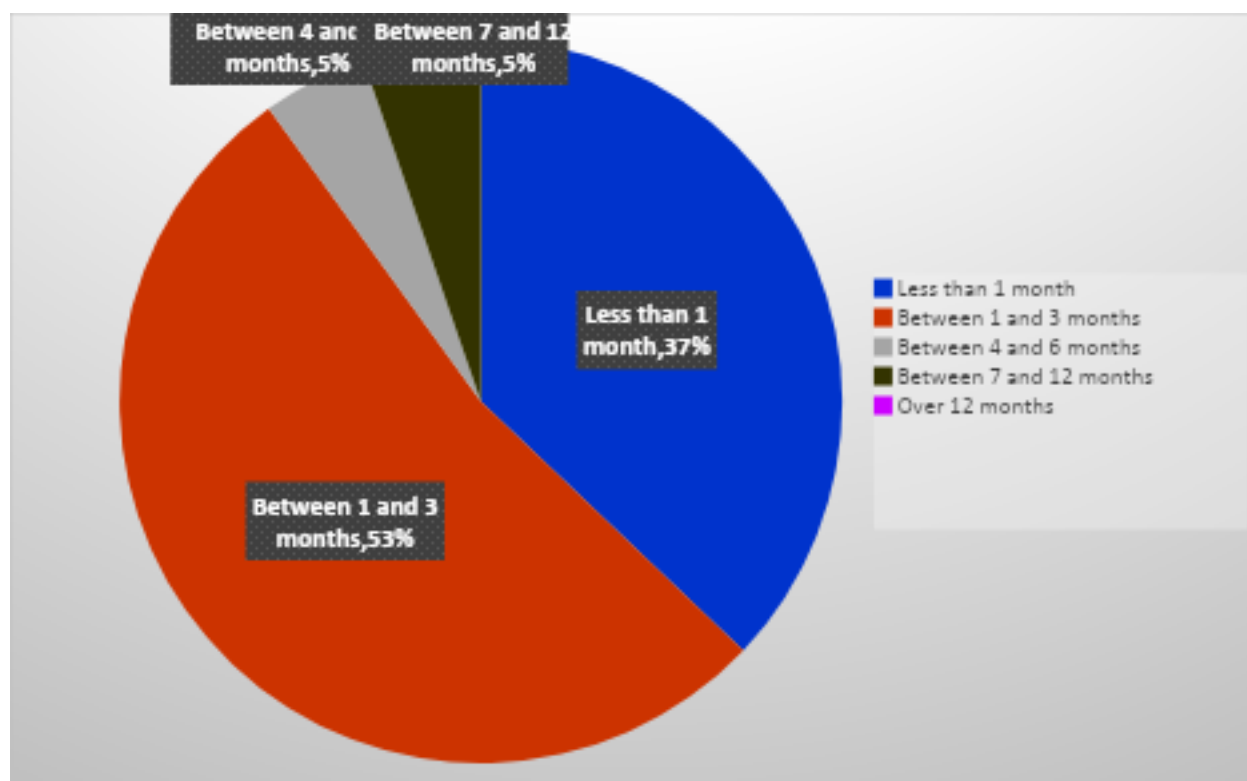


Figure 7: Time taken (months) for Connection to be Effected

3.6.2 Make of the Meter

A question was asked to the respondents regarding the most common make of meters installed by ZESCO. Only one make of meters was cited by all the respondents (both households and SMEs), i.e. CONLOG (see **Table 13**).

Table 13: Make of the Meter Installed

Make of the Meter	Households		SMEs		Total	
	Count	%	Count	%	Count	%
CONLOG	323	100.0	63	100.0	386	100.0

3.6.3 Meter Models Installed

A question was asked on the specifications of meter models installed. The specifications for the various meter models listed in **Table 14** are the same and none has advantages or disadvantages over the other. Consequently, the type of meter model installed depends on the type of meter model available at the time of connection. Of all the respondents interviewed, 93.3% installed BEC-44 (from 69.9%, an increase by nearly 24 percentage points from the previous visit) while those who installed IP54 were the second largest proportion at 3.6% (a drop from 21.0% during the previous visit), and CIUX smart was the least at 0.8%, see **Table 14** and **Figure 9** for details.

Table 14: Various Models of Meters Installed

Make of the Meter	Households		SMEs		Total	
	Count	%	Count	%	Count	%
BEC 23	6	1.9	3	4.8	9	2.3
BEC-44	302	93.5	58	92.1	360	93.3
IP54	12	3.7	2	3.2	14	3.6
CIUX smart	3	0.9	0	0.0	3	0.8

Across the two categories of beneficiaries, the proportions of various meters installed did not differ much except in case of BEC 23 where the difference was 2.5 times more in favour of SMEs (i.e. 1.9% for households, compared to 4.8% for SMEs). **Table 16** and **Figure 8** provide more details.

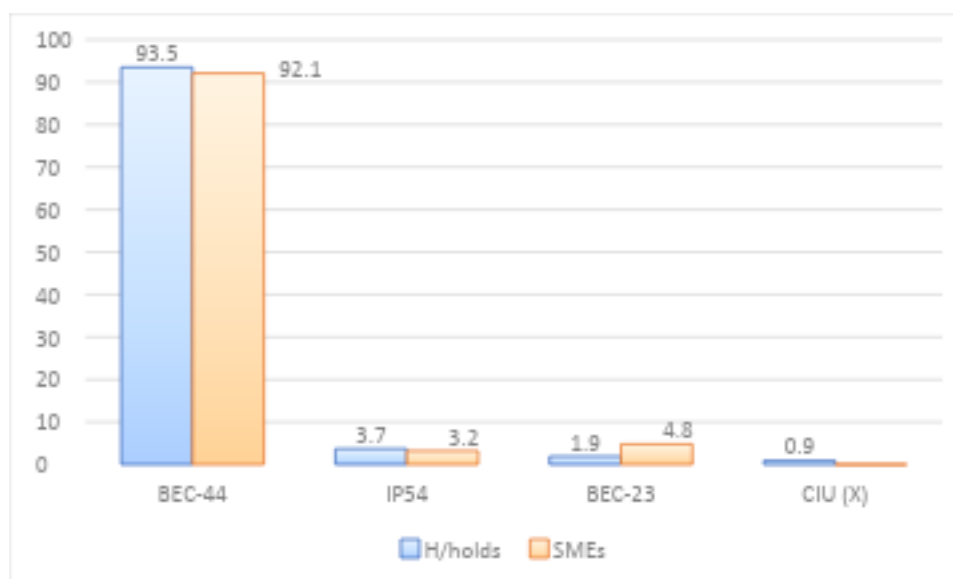


Figure 8: Percentage of Beneficiaries who had Various Makes of Meters

3.6.4 Connection and Meter Ratings

As high as 100.0% had pre-paid connection and 98.2% had 100 amps meters. Those with 80 amps were 1.8%. Regarding meter ratings in voltage, all households (100%) had 230 while the corresponding figure for SMEs was 96.8%. The variations between households and SMEs were not significant. **Table 15** has details.

Table 15: Type of Connection and Meter Ratings (amps and voltage)

Various Variables		Households		SMEs		Total	
		Count	%	Count	%	Count	%
Pre-paid connection		323	100.0	63	100.0	386	100.0
Meter ratings in Amps	100	317	98.1	62	98.4	379	98.2
	80	6	1.9	1	1.6	7	1.8
Post-paid connection		0	0.0	0	0.0	0	0.0
Meter ratings in Voltage	230	323	100.0	61	96.8	384	99.5
	400	0	0.0	2	3.2	2	0.5

3.7 Bulbs and Lighting Points

The following are the focus areas under this section, dealt with in sequence:

- (i) Bulbs in use
- (ii) Make of bulbs
- (iii) Beneficiaries who received bulbs
- (iv) Lighting points and sockets

3.7.1 Bulbs in Use

The most commonly used bulb was LED (by 92.0%), followed by Incandescent and Florescent tube both at 4.9% while the least used was CFL (4.4%), see **Table 16** and **Figure 9** for details. As has been noted in the previous visits, in peri-urban areas that were near district centres, florescent tubes were commonly used for security lighting while in typical rural areas they would use either Incandescent or CFL lights for both security as well as lighting inside houses.

Table 16: Household Bulbs in Use

Bulbs in use	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Incandescent	15	4.6	4	6.3	19	4.9
Florescent tube	17	5.3	2	3.2	19	4.9
CFL	14	4.3	3	4.8	17	4.4
LED	298	92.3	57	90.5	355	92.0

The proportion of households who used LED bulbs was slightly higher than that of their counterparts (92.3% compared to 90.5%). This similar trend obtained in case of florescent tubes, where a greater proportion of households (5.3%) used them than their SME counterparts (3.2%). On the other hand, slightly more SMEs (4.8%) used CFL bulbs compared to households (4.3%) see **Table 16**.

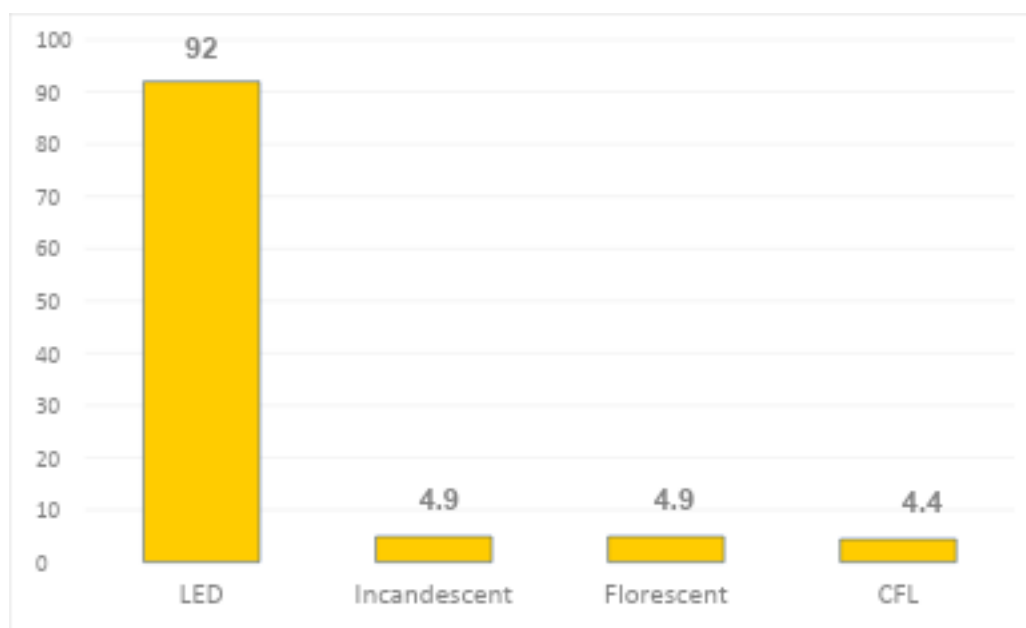


Figure 9: Household Bulb Type in Use

3.7.2 Make of Bulbs

The highest proportion of the make of LED bulb in use cited by the respondents was LED Philips/ZESCO (40.9%) followed by ZESCO A60 (35.5%). Philips was third at 13.5% while Galaxy was least at 0.0%. Woojong, Tiger head, Sunderbests and Hyper lux were at 1.0%, 2.1% 1.8% and 1.0% respectively. See **Table 17** for details by stakeholder category.

Table 17: Make of LED Bulb

LED bulb make	Households		SMEs		Total	
	Count	%	Count	%	Count	%
ZESCO A60	118	36.5	19	30.2	137	35.5
LED Philips/ZESCO	136	42.1	22	34.9	158	40.9
Philips	43	13.3	9	14.3	52	13.5
Woojong	3	0.9	1	1.6	4	1.0
Galaxy	0	0.0	0	0.0	0	0.0
Tiger head	5	1.5	3	4.8	8	2.1
Sunderbests	6	1.9	1	1.6	7	1.8
Hyper lux	4	1.2	0	0.0	4	1.0
Other	37	11.5	12	19.0	49	12.7

3.7.3 Beneficiaries who received Various Numbers of LED Bulbs

According to the beneficiary data collected and analysed, 96.4% of the total beneficiaries received LED bulbs. Both categories of recipients received a similar proportion of LED bulbs (for households it was 96.3% while SMEs it was 96.8%). The SMEs who received 3 LED bulbs were 98.4% while the households were 94.2% (see **Table 18** for the other details).

Table 18: Beneficiaries who received and Used LED Bulbs

Households		SMEs		Total	
Count	%	Count	%	Count	%
311	96.3	61	96.8	372	96.4
Those who receive 3 LED bulbs					
293	94.2	60	98.4	353	94.9

Table 19 presents the number and proportion of beneficiary households and SMEs who received and used various numbers of LED bulbs. The number of bulbs any beneficiary received increased from a maximum of 6 (during the previous visit) to 10 during the current visit (i.e. visit 8). As already noted above, the majority of beneficiaries received 3 bulbs (94.9%). The second highest proportion received 2 bulbs (1.6%) see **Table 19** for details. On average, households received 3.06 bulbs while their SME counterparts received 3.05.

Table 19: Beneficiaries who received and Used Various Number of LED Bulbs

Number of LED Bulbs	Household		SME		Total	
	Count	%	Count	%	Count	%
1	3	1.0	0	0.0	3	0.8
2	6	1.9	0	0.0	6	1.6
3	293	94.2	60	98.4	353	94.9
4	2	0.6	0	0.0	2	0.5
5	1	0.3	0	0.0	1	0.3
6	2	0.6	1	1.6	3	0.8
7	1	0.3	0	0.0	1	0.3
8	1	0.3	0	0.0	1	0.3
9	1	0.3	0	0.0	1	0.3
10	1	0.3	0	0.0	1	0.3
Total	311	100.0	61	100	372	99.9

3.7.4 Lighting Points and Sockets

On average, there were 6.42 lighting points and 4.46 sockets reported by beneficiaries. Households had a higher average of both than SMEs at 6.62 and 4.55 lighting points and sockets compared to 4.97 and 3.82 respectively for SMEs. **Table 20** has details.

Table 20: Average Number of Lighting Points and Sockets in the House/Building

Lighting points and sockets	Households		SMEs		Total	
	Count	Average	Count	Average	Count	Average
Lighting points	244	6.62	34	4.97	278	6.42
Sockets	244	4.55	34	3.82	278	4.46

3.8 Beneficiary affordability to pay for electricity

An assessment was undertaken aimed at establishing the extent to which beneficiaries were able to pay for electricity on a monthly basis. An overwhelming majority of respondents (both categories) were able to pay (nearly 100%, i.e. 99.5%), see Table 21.

Table 21: Beneficiaries able to pay for Electricity Every Month

Payment for electricity	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Beneficiaries who pay for electricity (%)	322	99.7	62	98.4	384	99.5

The average amount paid for electricity per month was ZMW 106.27. On average, SMEs paid ZMW 182.90 while households paid ZMW 91.51 (see Table 22).

Table 22: Average Amount Beneficiaries Pay for Electricity Every Month (ZMW)

Households		SMEs		Total (ZMW)	
Count	Amount (ZMW)	Count	Amount (ZMW)	Count	Amount
322	91.51	62	182.90	384	106.27

3.9 Training in Operating a Pre-paid Meter

Beneficiaries were asked whether they received training in how to operate the pre-paid meter during installation. A majority, 80%.8 indicated that they did (though it was a reduction from the previous visit where the figure was at 95.9%). See Table 23 for details. Discussions with ZESCO Field offices by the data collection team showed that ZESCO is still in a dilemma in terms of leaving the trainees with an operation user guide because of the fear of the beneficiaries tampering with the meter which could endanger human life. However, nearly one quarter (24.9%) of all beneficiaries had the user guide. This is a considerable improvement from the earlier visits where less than 7% of all beneficiaries had an operation user guide. In percentage terms, more SMEs (28.6%) had an operation user guide than their counterparts (24.1%), see Table 23.

Table 23: Training in Operation of Pre-paid Meter during Installation

Training details	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Beneficiary training	266	82.4	46	73.0	312	80.8

Training details	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Beneficiaries who cited that they had an operation user guide	78	24.1	18	28.6	96	24.9

3.10 Challenges Faced by Beneficiaries

Both households and SMEs who acknowledged facing challenges regarding electricity supply were 10.1% (or 39 of the total sample size of 386) which was a reduction by half from 2 visits back where they were 22%. Of the 10.1% who cited facing challenges, 11.5% were households while SMEs were only 3.2%, see **Table 24**. The reason for this huge gap was not clear.

Table 24: Beneficiaries who Cited Facing Various Challenges

Households		SMEs		Total	
Count	%	Count	%	Count	%
37	11.5	2	3.2	39	10.1

From the beneficiaries who reported facing challenges (i.e. 39 out of 366 respondents), five main challenges were cited by them (see **Table 25**), namely: load shedding; unexpected outages; frequent maintenance; low voltage, and other.⁵ These challenges are the same as those noted in the last visits. Of the five challenges that were cited, the most outstanding was unexpected outages (cited by 51.3%, an increase from 40.0% during the last visit), followed by low voltage (at 30.8%) and then load shedding at 17.9%. The least cited was frequent maintenance cited by 5.1% of the respondents.

Table 25: Reported Challenges Faced by Beneficiaries

Nature of Challenge	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Load shedding	7	18.1	0	0	7	17.9
Unexpected outages	18	46.6	2	100.0	20	51.3
Frequent maintenance	1	2.7	1	5.0	2	5.1
Low voltage	12	32.4	0	0.0	12	30.8
Other	5	13.5	0	0	5	12.8

Other main challenges from the qualitative research were as follows (see **Appendices 2 and 9** for details):

⁵ Three challenges were cited under the “other” and each of the three (3) had one (1) respondent or 0.2% in percentage terms: (a) Bulbs don’t last long; (b) “They give us less units”, and; (c) very poor wiring connection.

- **Inadequate transport** has been persistently noted (and most widely cited challenge). Almost all the districts visited have either one or two vehicles to carter for the all jobs undertaken by ZESCO at district level, including the ESAP project.
- **Poor wiring** of the buildings of the applicants (resulting in failed inspections) delayed connections. This was noted in a number of districts during the 8th visit.
- **The Poor state of the roads** was another challenge noted in a number of districts visited. The state of the roads deteriorated during the rainy season resulting in some roads becoming impassible.
- **Some potential customers were outside the recommended radius** of ZESCO's power lines hence they did not meet the criterion to benefit from the electricity subsidy.
- **Distribution of bulbs with wrong specifications** which was noted in Luapula province.
- **Demand for subsidised connections** heightened following the approval of the revised connection fees by the Energy Regulation Board.
- **Difficulties contacting the potential clients** by the ZESCO Team as some of them would either have their mobile phones off, change the simcard or there would be poor network. This contributed to delayed connections.

3.11 Beneficiary Satisfaction

Beneficiaries were asked whether they were satisfied with electricity service; securing of energy meter and transitioning of service cable. In all the three cases, those who were satisfied were an overwhelming majority accounting 96.1% (electricity service), 99.7% (proper securing o energy meter and 99.2% (proper transitioning of service cable). There was a small difference in the level of satisfaction between the two beneficiary categories (see **Table 26** for details).

Table 26: Beneficiary Satisfaction - Various

Various Services	Households		SMEs		Total	
	Count	%	Count	%	Count	%
Electricity service	310	96.0	61	96.8	371	96.1
Proper securing of energy meter	322	99.7	63	100.0	385	99.7
Proper transitioning of service cable	320	99.1	63	100.0	383	99.2

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

1. The IVA successfully carried out the verification exercise to establish the status of the connections made by ZESCO for the period 9th July 2022 to 3rd February 2023. The verification involved a total number of 386 beneficiaries representing 10% of the total beneficiaries connected during the period under review.
2. ZESCO has slightly slackened in its distribution of LED bulbs from 98.4 % (previous visit) to 96.4% (current visit) for both stakeholder categories. This is a reduction of 2 percentage points. This should not have been allowed given that during one of the previous visits, the distribution of LED bulbs was at 100%.
3. A number of challenges were noted which hindered the smooth implementation of the subsidy program. These included: inadequate transport (which has been ongoing since the IVA visits started); Poor wiring of the buildings of the applicants (resulting in failed inspections) delayed connections; Poor roads resulting in some roads becoming impassible; Some potential customers were outside the recommended radius of ZESCO's power lines hence they did not meet the criterion to benefit from the electricity subsidy; Wrong specifications of bulbs that were distributed in some parts of Luapula province; Heightening of demand for subsidised connections on account of a 183% increase in connection; The ZESCO team had difficulties contacting the potential clients due to connectivity and change of simcard issues (see Appendix 9 for details).

4.2 Recommendations

Based on the findings of the Eighth verification visit, the following are the recommendations (see **Table 27**)

Table 27: Recommendations

S/N	Recommendation	Action to be taken	Responsible	Status
1	As noted in the previous visits, ZESCO to maintain and improve its performance on the distribution of LED bulbs to customers. This is easier to do at the point when they make payment for connection. This enhances efficiency in LED bulb distribution	Further improve the distribution of LED bulbs. The target should be 100%. This to be done through the escalation of the practice of distributing LED bulbs at the point when customers pay their connection fees.	ZESCO/ REA	To be escalated

S/N	Recommendation	Action to be taken	Responsible	Status
2	ZESCO to consider further reducing incidences of power interruption through frequent maintenance	Replacement of old machinery with new machinery	ZESCO	On-going
3	ZESCO to consider further improving the system voltage levels in the affected areas to avoid power outages caused by voltage fluctuations	Re-enforcement of the system in affected areas	ZESCO	On-going
4	ZESCO to provide dedicated vehicles to undertake connections, a move which would significantly improve the implementation efficiency of the project.	Procure dedicated vehicles to undertake connections. In the short-term, a re-allocation of some vehicles for connections for some months would do while awaiting vehicle procurement.	ZESCO	On-going
5	REA should pay ZESCO the total amount of Five hundred eighty thousand and five hundred and eighty United States Dollars only (US\$ 580,580.00) for the connections made.	Interim Payment Certificates prepared following a no-objection from the World Bank.	REA-PIU	

4.3 Summary Key Tables

Table 28: Findings of the verifications

No of Connections	Eligibility of the Connections		Connection fee paid (ZMW)		Type of Connection		Type of Meter		LED Bulb Distribution	
	Project Area	Not in Project Area	HH 250	SME 769	SC	EC	Pre-paid	Post-paid	Received	Not Received

386	386	0	278	54	278	0	386	0	372	14
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Table 32: Comparison Analysis – Connections Completed (Claimed) and Suggested Sampling (Verifications/New connections)

	Total Number of SMEs verified	Total Number of SMEs verified with Bulbs		Total Number of Households verified	Total Number of Households with Bulbs		Total Surveyed
		Actual Number	Percentage		Actual Number	Percentage	
Actual No. Verified	63	61	96.8%	323	311	96.3%	386
Total Number Claimed	633			3,230			3,863
Verified Extrapolated Values (With Bulbs)		613			3110		3,723

Table 33: Summary of Process in Connection Verification (Verification/New connections)

Description	SMEs	Households	Total
Connections Claimed For	633	3,230	3,863
Verified Connections with Bulbs	61	311	372
Verified Extrapolated Connections with Bulbs	613	3,110	3,723
Connections Eligible for Re-imbursement	613	3,110	3,723
Rate Per Connection (US\$)	110	165	
Payment Claim from ZESCO Ltd (US\$)	69,630.00	532,950.00	602,580.00
Recommended Payment to ZESCO (US\$)	67,430.00	513,150.00	580,580.00

- Out of the total connections of 3,863, 386 were verified. Of the 386 verified, 96.4% received LED bulbs during installation. Out of the 323 households who were verified, 311 (i.e., 96.3%) received LED bulbs during installation. Similarly, out of 63 SMEs who were verified, 61 (96.8%) received LED bulbs during installation. ZESCO is making a claim for 3,230 households and 633 SMEs. The total extrapolated verified number of SMEs is 613 while that of households is 3,110.

Appendices

Appendix 1: Verification Schedule

VERIFICATION SCHEDULE: APRIL 2023			VERIFICATION SCHEDULE: APRIL 2023								
Team/Provinces	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11
Team 1	Rufunsa (1:0)	Nyimba (4:0)	Sinda (8:3)	Katete (7:2)	Chipata (9:2)	Travel Chibombo	Chibombo (12:2)	Kabwe (3:1)	Mkushi (24:5)	Serenje (4:2)	
Lusaka, Eastern & Central	Luangwa (2:0)	Petauke (12:6)	Travel Katete	Travel Chipata				Kapiri Mposhi (15:4)	Travel Serenje	Travel Lusaka	
Provinces	Travel Nyimba	Travel Sinda									
(12 Districts)											
Team 2											
Luapula, Northern & Muchinga Provinces	Travel Samfya	Samfya (25:3)	Mwense (12:1)	Nchelenge (22:3)	Luwingu (5:3)	Mungwi (6:5)	Cont. Mpulungu	Chinsali (4:0)	Mpika (20:3)	Travel Lusaka	
(11 Districts)		Travel Mwense	Mbereshi (3:0)	Travel Luwingu	Travel Mungwi	Travel Mpulungu	Travel Isoka	Siwangaandu (3:1)			
						Mpulungu (10:3)	Isoka (8:0)	Travel Mpika			
							Travel Chinsali				
Team 3	Siavonga (8:1)	Chirundu (22:3)	Monze (23:3)	Maamba (8:2)	Kalomo (2:0)						
Southern, Western, North Western & C/Belt		Travel Monze	Travel Maamba	Sinazongwe (4:2)	L/Stone (1:0)	Travel Sesheke	Sesheke (24:2)	Kaoma (2:0)	Kabompo (1:0)	Travel Solwezi	Luanshya (5:2)
(13 Districts)				Travel Kalomo			Travel Kaoma	Travel Kabompo	Mufumbwe (2:0)	Solwezi (4:0)	Travel Lusaka
										Travel Luanshya	
36 Districts in 10 Provinces											
Jacob Chisha (Coordinator)											
Team 1: Sample = 126	Team 2: Sample = 139		Team 3 Sample = Key: Chibombo (12:2) means verification of 12 Households and 2 SMEs								
1. Alice Simushi (Supervisor)	1. Daliso Tembo (Supervisor)		1. Elfrida Machele (Supervisor)								
2. Mary C. Chisupa	2. Quine Chiti		2. Hesron Chishimba								
3. Chola S. Chisha	3. Sekai Banda		3. Lucia Chibanda								

Appendix 2: Summary Qualitative Research Findings

ZESCO has continued with its distribution of LED bulbs as evidenced by its 96.4% outreach. In general, there were much less backlog during visit 8 compared to the other visits. It was also observed that the demand for the subsidy had generally increased to far much higher levels on account of the revision upwards of the connection fee from ZMW 1,709 to ZMW 4,846. This meant that a bigger proportion of ZESCO customers in the targeted areas could not afford. Consequently, they are looking to the subsidy programme for them to be able to access electricity. Other specific findings are as follows:

- Key Finding: After the closure of the ESAP connections on 16 June 2022 all pending applications were cancelled. However, an instruction was issued by ZESCO on 17th November 2022 to re activate and connect 2,262 customers whose applications were cancelled. Connections for ESAP were still on-going in some districts and there are a few customers who have been issued quotations and are yet to pay.
- Inadequate transport continues to be a major challenge
- Subsidy programme has increased customer base in all areas covered by the ESAP project
- ESAP connections were still being done at the time of the visit in some districts
- In Luapula some of the districts received screw bulbs which could not be given to customers who had the pin type of holders
- Backlog is very minimal and so are materials available. Generally materials are allocated according to pending jobs

Appendix 3: Training Time Table

RURALNET ASSOCIATES LIMITED
CONSULTING SERVICES FOR INDEPENDENT VERIFICATION AGENT (IVA)
FOR THE ELECTRICITY SERVICE ACCESS PROJECT SURVEY
TRAINING TIME TABLE FOR VISIT # 8

	09:00 To 1030	10:30-11:00	11:00-13:00	13:00-14:00	14:00- 16:00
Day1	Introductions Objective of the Training ESAP Brief (by ESAP officer) Objective of the Assignment	HEALTH BREAK	Verification Manual	LUNCH BREAK	Verification Manual (Continued)
Day 2	Recap of Day 1 Verification Questionnaire	HEALTH BREAK	Use of Tablets Role Play	LUNCH BREAK	Fieldwork Logistics

Appendix 5: Verification Questionnaire

VERIFICATION QUESTIONNAIRE

INTRODUCTION:

Good Morning/ Afternoon. My name is I am a researcher from RuralNet Associates Limited. Rural Electrification Authority (REA) based in Lusaka is working with RuralNet Associates Limited to conduct a verification survey in some of the Households that benefitted from the Electricity Service Access Project (ESAP) in all the Rural Districts of Zambia. The ESAP's development objective is to increase electricity access in targeted rural areas and help the enabling environment for accelerated national electricity access in Zambia.

You have been identified as one of the participants who can assist us with information on these important issues the survey is looking at. Participation in this survey is voluntary. You will not get any direct benefit for being part in this survey. However, we hope that this survey will help provide REA and other stakeholders whether the objectives of the project were achieved.

The information you are going to give us will be treated as confidential and will not be shared with anyone who has no role to play in this survey. The process will include asking you some questions and also taking of your photographs as proof of your participation. Please feel free not to answer any question you are not comfortable with and to stop and withdraw from the interview at any point if you feel like doing so.

Just in case you have any questions regarding this research, please do not hesitate to contact Mr. Stephen Tembo, the RuralNet's Chief Executive Office, at phone number 0966 743 100 or Mr. Nason Musonda, ESAP Manager on 0977 972 589

By saying "YES" you are showing your willingness to participate in this interview.

Should we proceed with the interview? YES-----

O: -----

001 Questionnaire ID -----

002 Province Name: 1=Central; 2= Copperbelt; 3=; Eastern; 4= Luapula; 5=Lusaka; 6=Muchinga; 7= Northern; 8= North Western; 9= Southern; 10= Western

003 District Name: _____

004 Physical Address-----

005 Is this address located in the project area? 1= Yes; No=2

006 Type of Beneficiary: 1= Household; 2=SME

007 Name of Beneficiary: _____

008 Contact Details (Beneficiary) Phone No. _____

009: Photo of Respondent (take Photo)

010 Beneficiary NRC # _____

011 Enumerator's Name-----

012 Supervisor's Name: 1= Elfrida Machele and Jacob Chisha; 2= 2021

013 Date of Interview: _____

A Demographic, Socio-economic				
No.	Questions and filters	Categories	Coding	Skip to
Q101	Are you the head of household/Beneficiary?	Yes	1	
		No	2	
Q102	What is your relationship with the head of household/Beneficiary?	Spouse	1	
		Child	2	
		Uncle	3	
		Aunt	4	
		Brother	5	
		Sister	6	
		Mother	7	
		Father	8	
		Nephew/niece	9	
		Tenant	10	
Q103	Record sex of the respondent	Male	1	
		Female	2	

Q104	Record sex of the household head/Beneficiary)	Male Female	1 2	
Q105	Number of people in the household			
Q106	What is the marital status of the household head/beneficiary?	Single Married Widowed Divorced Separated No response Not applicable	1 2 3 4 5 999 777	
Q107	How old are you? (Instruction to the enumerator: Probe when respondent was born then calculate age or ask for respondent's NRC)	Age in complete years Don't know No response	☐ 888 999	
Q109	What is your main source of income in 2022 (Instruction: only 1 answer)	Formal Employment Informal Employment	1 2	
Q110	Do you have adults (18 years) and above who live in this house?	Yes No	1 2	
Q111	If answer to Q?? is "Yes", how many contribute to the household income?	Number		
Q112	From the above, how many contribute to the household income?	Number		
B	Household Characteristics			

Q113	Does your household have the following electrical appliances?	Radio Television Mobile telephone Refrigerator Fan Sewing machine Pressing iron VCR/DVD Satellite dish Computer	1 2 3 4 5 6 7 8 9 10	
Q114	What type of fuel does your household mainly use for cooking? Multiple responses allowed)	Electricity Solar power Liquid propane gas (LPG) Biogas Kerosene Charcoal Wood Straw/Shrubs Agricultural crop residue Animal dung No food cooked in household	1 2 3 4 5 6 7 8 9 10 11	
Q115	What material is your dwelling house made of?	Panbrick Mud brick Burnt brick Cement blocks Pole and dagga	1 2 3 4 5	

		Mud	6	
		Grass straw	7	
		Hardboard	8	
		Iron sheets	9	
		Don't know	10	
		Other (Specify)		
Q116	Main material for the floor	Earth/sand	1	
		Wood/planks	2	
		Palm/bamboo	3	
		Ceramic/terrazzo tiles	4	
		Concrete cement	5	
		Carpet	6	
		Other	7	
Q117	Main material for the roof	No roof	1	
		Grass thatch	2	
		Rustic mat	3	
		Palm/bamboo	4	
		Wood planks	5	
		Metal/iron sheets	6	
		Cardboard	7	
		Cement fiber	8	
		Ceramic tiles	9	
		Mud tiles other	10	
Q118	Does any member of the household own the following? <i>If yes, indicate by circling</i>	Bicycle	1	
		Motor cycle	2	
		Animal drawn cart	3	
		Truck	4	
		Boat with a motor	5	

		Banana boat/hand dug canoe	6	
C	Eligibility for Subsidy			
Q119	Do you know about the subsidy programme for electricity access connection?	Yes No	1 2	
Q120	If “Yes” to Q 119, How did you know about the Electricity Subsidy?	Door to Door Campaign Radio Television Social Media Friend/Relative Other (Specify)	1 2 3 4 5 6	
Q120b	Are you a Tenant or Landlord	Tenant Landlord	1 2	
Q121	How much did you pay for the connection of electricity to your premises	K250 K769 Don’t know Other (Specify)	1 2 3	
Q122	When did you pay for the Connection?	Month and Year Don’t know		
Q123	How long did it take for the service to be connected?	Less than a month Between 1 and 3 months Between 3 months to 6 months Between 6 months and 12 Months Over 12 months Don’t know	1 2 3 4	

Q124	What type of connection is provided?	Standard(no ready board) Enhanced (with ready board)	1 2	
D	Electricity Supply Connections			
Q125	Is there an energy meter installed in this house?	Yes No	1 2	
Q126	If answer to Q 125 is "Yes" What is the make of the Meter?	Zambia Electrometer CONLOG Other (Specify)	1 2 3	
Q127	What is the Model of the Meter?	EM 101-6 BEC-44 Other (Specify)	1 2 3	
Q128	What is the Meter Number?			
Q129	What type of connection is in this house?	Pre-paid Post paid	1 2	
Q130	What are the ratings of the Meter in Watts	80 100	1 2	
Q131	What are the ratings of the Meter in Voltage	230	1	
Q132	What type of bulbs do you use in this house?(Tick all that apply)	Incandescent Florescent CFL LED	1 2 3 4	
Q133	What is the make of the bulbs you use in this house?	ZESCO A60 LED Phillips/ZESCO	1 2	

		Other (Specify)	3	
Q134	Did you/Landlord receive LED bulbs during the installation process?	Yes No	1 0	
Q135	If “Yes” to Q 134, how many did you/Landlord receive?	One Three Nil Don’t know Other (Specify)	1 2 3 4 5	
Q136	What is the Number of lighting points	Number		
Q137	How many sockets are in the house/building? Other (Specify?)	Number		
Q138	Did you undergo any training on how to operate a prepaid meter /ready board during the process of installation of power?	Yes No	1 2	
Q139	Do you have an operation user guide?	Yes No	1 2	
E	Affordability			
Q140	Are you able to pay for electricity every month	Yes No	1 2	
Q141	How much do you pay on average per month for electricity?	Amount		
Q142	Have you had challenges regarding power supply?	Yes No	1 2	
Q143	If yes, what are the challenges?	Load shedding	1	

		Frequent maintenance Unexplained outages Low voltage Other (Specify other)	0	
Q144	Are you satisfied with the electricity service?	Yes No	1 2	
F	Installation Inspection			
Q145	Is the Energy meter properly secured?	Yes No	1 2	
Q146	Is the service cable properly tensioned?	Yes No	1 0	
Q147	GPS Coordinates	Record using Android Device		

Appendix 6: Terms of Reference

Independent Verification Agent (IVA) for the Electricity Services Access Project Background

The Government of the Republic of Zambia (GRZ) has received financing from the World Bank support to support the implementation of its renewed effort in accelerating access to electricity services, particularly in rural areas. The World Bank Group has provided its support to the GRZ through the Rural Electrification Authority (REA) through financing under the Electricity Services Access Project (the Project). The Project's development objective is to increase electricity access in targeted rural areas and help improve the enabling environment for accelerated national electricity access in Zambia.

The Project comprises three components: (i) Component A will provide output based subsidies for consumer connections and finance network reinforcements and extensions for on-grid electrification; (ii) Component B will address existing regulatory impediments for private sector participation in off-grid electrification, build the needed capacity at key institutions, and design, and potentially pilot, financial mechanisms supporting private sector-led electrification through renewable energy mini-grids and stand-alone solar systems; and (iii) Component C will help fund the development of a comprehensive National Electrification Strategy as well as timely and efficient project implementation.

Under Subcomponent A1, ZESCO will expand new electricity connections through last mile connections to 22,000 low-income households and 1,000 SMESMEs in rural areas. Using an output-based approach, payments will be disbursed to ZESCO by REA upon verification of new, eligible connections. REA intends to contract the services of an independent verification agent (IVA) to verify and monitor the outputs of Subcomponent A1. The IVA will provide output verification reports with detailed information on the number, type, and location of connections, and other relevant information to REA together with a recommendation to approve payment. Based on this report, REA will disburse payment to ZESCO.

Technical Approach and Methodology Objectives

The objective of this assignment is to verify, on behalf of REA, that 40,000 grid connections have been installed by the service provider, ZESCO, in accordance with the Project objectives. In addition, field survey visits will gather socio-economic data on the beneficiaries, the extent to which the project has benefited women and vulnerable and disadvantaged groups, and the benefits from project sensitization and training activities. Specifically, the IVA will:

- i. Verify that installed connections are consistent with either the standard⁶ or the enhanced⁷ connection, and meet the quality standards required by the Energy Regulation Board;
- ii. Verify that installed customer connections are in eligible project target areas;
- iii. Verify that customers have been provided with basic training and user information;
- iv. Prepare Output Verification Reports (OVRs) that underpin the subsidy disbursement requests; and,
- v. Report on the key performance indicators for the project as laid out in the Project's Results Framework.

3.0 Scope of Work

The IVA firm will carry out a combined desk and physical verification of new, eligible connections made by ZESCO each time payment is requested. After receiving a list of connections made by ZESCO from REA, the IVA will travel to the specified areas to verify the connections and ensure their correct functioning based on agreed random sampling and technical evaluation criteria. The IVA will submit output verification reports to REA with the status of each verified connection, including detailed information on the number, type, and location of connections, and other relevant information. The reports need to confirm that eligible “Standard Connection” or “Enhanced Connection” modules were installed by cross-checking the connection data provided by ZESCO. Based on the IVA’s output verification reports, REA will make subsidy payments to ZESCO. Payments for eligible connections will be done on a quarterly basis.

The Consultant will be expected to carry out verification of 40,000 connections of all categories of subsidy program being implemented by ZESCO in targeted project areas.

3.1 Scope of Work Main Activities

This assignment will consist of a series of tasks focused on (1) structuring the verification process, (2) capturing data to monitor the impact of the project, (3) verification, and (4) reporting.

Task 1: Structure the verification process: Design a verification questionnaire, develop a sampling methodology, and develop a verification manual.

The IVA will prepare a verification questionnaire for approval by REA. The questionnaire will be used for a survey of a sample of household which are already connected to the grid under the project.

The questionnaire should at a minimum verify the following:

- i. Name, address, gender, contact information, and identification information of the customer including a photo of the person interviewed during verification and the photo of the house showing the service connection;

⁶ A “standard connection” is defined as installation of the following at eligible user-premises: Drop wire (about 30 meters of duplex); Single-phase pre-payment meter; Circuit breaker and lighting arrester; and at least three (3) CFLs.

⁷ An “enhanced connection” is defined as the standard connection package plus installation of user-premise wiring by using pre-fabricated systems such as a “ready board”.

- ii. Satisfaction of eligibility requirements under the Project;
- iii. Make, type (pre-paid / post-paid), power rating (Amps, Volts, Watts), model number and serial number of the installed meter;
- iv. Type of installation: Standard (no ready-board) / Enhanced (with ready-board);
- v. Make, model number, serial number and Watt rating of the Ready Board (if used);
- vi. Number and type of electric points in the connected households;
- vii. Number make and type of light bulbs (incandescent, fluorescent, CFL, etc.) used for lighting;
- viii. Availability of user's guide for Ready Board;
- ix. Confirmation that user was instructed in operating the pre-paid meter, ready board, etc. by the ZESCO appointed installation agent;
- x. Whether the customer was assisted in completing the connection application, and how the customer learned about the subsidy program.

The IVA will develop a sampling methodology to be used to select which new, eligible connections will be physically verified. The IVA will carry out random verification of at least 10% of household service connections (7% physical verifications and 3% by telephone) for which a payment is requested, depending on the mutually agreed methodology for carrying out the verification.

The IVA will develop a verification manual that includes adequate procedures to ensure that no outputs are subsidized that have been delivered prior to the project start date or that have been funded by other sources (e.g. other donors or customers paying unsubsidized fees) to determine whether service has been delivered as agreed.

Task 2: Capturing data: Develop and maintain a database of all connection beneficiaries, capture data on the impact of the project, and develop a document management system.

The IVA will develop and maintain (up-to-date) a database to capture beneficiary information collected through reporting from ZESCO and the verification questionnaire. The database should ensure REA has adequate and up-to-date information on the number of rural connections made and the connections that have been verified. The electronic database shall be in a format that may be easily incorporated in other database systems. The data collected, and the data structure should be compatible with existing databases at REA.

The IVA will also capture additional data to help monitor the impact of the project, including through the calling of focus groups. Such data includes but is not Limited to: i) annual volume of electricity sold to customers under the Project; ii) annual revenue generated from electricity sales to customers under the Project; iii) low income HHs connected under the Project; iv) service quality.

The IVA will develop a document management system to keep track of reports from the IVA, Customer Connection Information spreadsheets ZESCO provides to REA for review by the IVA, and other related documents.

Task 3: Verification: Verify new connections

In order to validate the subsidy claim submitted by ZESCO, the IVA shall verify installed connections by reviewing ZESCO's records on a monthly basis, conducting site visits, and completing a questionnaire for a sample of installation verified physically or by phone. For a sample of household physically verified, the IVA will certify that the connections have been

properly installed and are functioning according to the applicable regulation/required standards stated in the Operational Guidelines. The IVA will verify the consistency between data collected through verification and the associated records kept at the ZESCO office. Specifically, the review is intended to certify that:

- i. The results claimed by ZESCO (number and type of installation, location, etc.) are consistent with output definition: i.e. the new connection has been made and ZESCO has installed a pre-paid meter (and/or Ready Board) with all accessories on user-premises; and
- ii. The claimed output reimbursement is consistent with the agreed unit reimbursement.

Task 4: Reporting: Confirm to REA on a quarterly basis the number of acceptable connections that qualify for disbursement of subsidy payment to ZESCO

The IVA will document in a quarterly connection verification report, submitted to REA, the number and type (Standard/Enhanced) of connections which qualify for payment and the cumulative connections under the Project. All supporting documentation – including the questionnaires, digital photos, etc., must accompany this report.

In the quarterly connection verification report, the IVA will document all new connections and cumulative connections benefiting from the Project in the target areas. The indicators under the Project are:

- i. Number of households connected (by type of connection, location, etc. and disaggregated by gender);
- ii. Number of SMESMEs connected; and
- iii. Number of CFLs distributed among those customers.

4.2 Capacity Building and training

They will be no capacity building and transfer of knowledge under this assignment.

5.0 Required Reports and Schedule of Deliverables for this assignment

The consultant will submit the following documents to REA:

- i. Inception report detailing the Consultant's approach to executing the assignment
- ii. Verification questionnaire, sampling methodology, and verification manual.
- iii. List of data items for the beneficiary database, and a functional electronic database developed in standard software applications (compatible with Microsoft Word and/or Excel).
- iv. Regular updating/maintenance of the beneficiary database.
- v. Quarterly connection verification reports with corresponding payment estimates for ZESCO and updated Project indicators.
- vi. Final project completion report summarizing the activities carried out by ZESCO under the project, with an overall assessment of the project's impact on the project beneficiaries, as well as the project's contribution in supporting ZESCO's connection targets and the government's electricity access goals.

It is worth noting that all reports will be considered drafts until found acceptable by the World Bank.

5.1 Duration and phasing of the Assignment

The duration of this assignment is expected to be up to a maximum of 12 months during the life of the project. The consultant is expected to start the assignment by August 1st, 2019

6.0 Required Consultant Firms and Key staff Qualifications and Experience

6.1 Required Consultant Firms Qualifications and Experience

To carry out the IVA assignment, the Consultant shall propose a team of key staff with adequate qualifications and experience and number of key staff as provided below.

The team should demonstrate proven experience working in Zambia or a similar setting. It is preferable that the consultancy team be local or have local partnerships to ensure familiarity with local languages and customs while interacting with customers in the Project's target areas.

The team should demonstrate the following qualifications and experience:

- i. **Project Manager – Team leader**
Education / professional training: XXXX

Post qualification Experience: Minimum eight years' experience in project management and background in finance, accounting, business and/or project management or relevant discipline.
 - ii. **Project Engineer –**
Education / professional training: XXX
Post qualification Experience
Engineer with minimum five years' experience in electricity customer service provision.
 - iii. **Project Social Expert –**
Education / professional training: XXXX
Post qualification Experience
Sociologist, Economist or Social worker with minimum five years' experience in dealing with issues related to customer connections.
 - iv. **Survey support staff –**
Education / professional training:
 - v. **Post qualification Experience**
Technician with minimum five years' experience in customer electricity connections.
- Other requirements applicable to all staff**
- Must be fluent in the languages of the project's target population or have the capacity to obtain translation services.
 - Must be computer literate with profession skills in using MS Office application tools (e.g., MS Word, PowerPoint, Excel, etc.); and
 - Must have excellent report writing skills

7.0 Responsibilities of the IVA Consultancy Team

The IVA consultancy team shall be solely responsible for:

- i. Provision of required local transport for site inspections and connection verifications.
- ii. Securing any required visas, residency permits, work permits, personnel and property insurance, and any other legal permits and/or license requirements (as may be required by law) s.
- iii. Hiring of any local personnel familiar with the electricity sector and the local communities as a guide for the IVA to locate the selected sites or connections for inspection.
- iv. Any food, lodging or transportation costs incurred by the PIU, REA, or ZESCO staff accompanying the IVA should any personnel from the Project Implementing Unit, REA, or the ZESCO join the IVA during a site visit at IVA's request (and approval of the respective entity).

Data, Services, Personnel and facilities to be provided by the Client to the Consultant

- i. Financing agreement
- ii. Project Operational Manual
- iii. Standard conditions for Grants made by the World Bank
- iv. Disbursement guidelines for World Bank Loans/Grants
- v. Relevant project related studies

9.0 Institutional and organization Arrangements for the assignment

Reporting and Management of the Assignment

The selected consultant will work under the overall guidance and supervision of the REA Project Implementation Unit (PIU) for ESAP.

Attachments

Annex A – Guidelines on Financial Intermediary Financing – World Bank 2014

Appendix 7: Sampling Methodology

A two-staged sampling approach was used, namely; district and household/SME. Ten provinces where ZESCO had done connections were targeted. A total of 36 districts where ZESCO had done verifications were randomly selected, giving a total sample of 386 beneficiaries that were sampled.

Sampling Details by District

		Q002. Province Name										Total
		Central	Copperbelt	Eastern	Luapula	Muchinga	Northern	North Western	Southern	Western	Lusaka	
Q003. District name	Kazungula	0	0	0	0	0	0	0	1	0	0	1
	Kabwe	3	0	0	0	0	0	0	0	0	0	3
	Kapiri Mposhi	17	0	0	0	0	0	0	0	0	0	17
	Serenje	6	0	0	0	0	0	0	0	0	0	6
	Luanshya	0	5	0	0	0	0	0	0	0	0	5
	Chipata	0	0	11	0	0	0	0	0	0	0	11
	Katete	0	0	8	0	0	0	0	0	0	0	8
	Petauke	0	0	18	0	0	0	0	0	0	0	18
	Sinda	0	0	11	0	0	0	0	0	0	0	11
	Nchelenge	0	0	0	24	0	0	0	0	0	0	24
	Mbereshi	0	0	0	3	0	0	0	0	0	0	3
	Mwense	0	0	0	14	0	0	0	0	0	0	14
	Samfya	0	0	0	27	0	0	0	0	0	0	27
	Chirundu	0	0	0	0	0	0	0	0	0	24	24
	Luangwa	0	0	0	0	0	0	0	0	0	2	2
	Chinsali	0	0	0	0	6	0	0	0	0	0	6
	Isoka	0	0	0	0	9	0	0	0	0	0	9
	Mpika	0	0	0	0	22	0	0	0	0	0	22
	Shiwang'andu	0	0	0	0	4	0	0	0	0	0	4
	Luwingu	0	0	0	0	0	8	0	0	0	0	8
	Mpulungu	0	0	0	0	0	14	0	0	0	0	14
	Mungwi	0	0	0	0	0	10	0	0	0	0	10
	Solwezi	0	0	0	0	0	0	4	0	0	0	4
	Kabompo	0	0	0	0	0	0	3	0	0	0	3
	Mufumbwe	0	0	0	0	0	0	2	0	0	0	2
	Kalomo	0	0	0	0	0	0	0	2	0	0	2
	Maamba	0	0	0	0	0	0	0	12	0	0	12
	Monze	0	0	0	0	0	0	0	25	0	0	25
	Slavonga	0	0	0	0	0	0	0	9	0	0	9
	Sinazongwe	0	0	0	0	0	0	0	4	0	0	4
	Sesheke	0	0	0	0	0	0	0	0	26	0	26
	Kaoma	0	0	0	0	0	0	0	0	2	0	2
Total	Rufunsa	0	0	0	0	0	0	0	0	0	1	1
	Nyimba	0	0	4	0	0	0	0	0	0	0	4
	Chibombo	14	0	0	0	0	0	0	0	0	0	14
	Mkushi	31	0	0	0	0	0	0	0	0	0	31
Total		71	5	52	68	41	32	9	53	28	27	386

Appendix 8: Verification Manual

Preface

This manual is prepared for the Supervisors and Enumerators of the Independent Verification Agent (IVA) field team members. The manual will be used in the training of the field teams and may also be used by REA and ZESCO staff in supervising the IVA field work.

The guidelines contain basic principles and standard operating procedures for verification of connections made by ZESCO to ensure that no outputs are subsidized that have been delivered prior to the project start date or that have been funded by other sources (e.g. other donors or customers paying unsubsidized fees to determine whether service has been delivered as agreed).

Abbreviations

- o KWh Kilowatt Hour
- o MSE Micro and Small Commercial Enterprises
- o PV Photovoltaic
- o REA Rural Electrification Authority
- o ZESCO Zambia Electricity Supply Corporation Limited

1. Introduction

1.1. Background

The Electricity Services Access Project (ESAP) is Government of the Republic of Zambia (GRZ) project supported by the World Bank Group and implemented by Rural Electrification Authority (REA). The ESAP's development objective is to increase electricity access in targeted rural areas and help improve the enabling environment for accelerates national electricity access in Zambia. The project is to be implemented over a 5 year period (2019-2023). RuralNet Associates Limited will provide the services of an Independent Verification Agent (IVA) for a period of twelve months.

1.1 Objective

The objective of the IVA is to verify and monitor the outputs of the project's Subcomponent A1 for the implementing agent - Zambia Electricity Supply Corporation (ZESCO) to expand new electricity connections through the "last mile" connections to 40,000 low income households and Micro and Small Enterprises (MSEs). The IVA will provide output verification reports with detailed information on the number, type, and location of connections, and other relevant information to REA with a recommendation to approve payment for work done by ZESCO.

1.2 Project Area

ESAP is working toward scaling up the rural electrification programme in Northern, Luapula, Copperbelt, North-Western, Eastern, Southern, Muchinga, Central, and Western Provinces. A detailed schedule of the areas to be covered under the project is detailed at Annex 2.2.

1.3 Verification Visits

The project targets 40,000 connections by the end of the assignment. Verification visits will be done every month as long as ZESCO has made a minimum of 2,000 connections.

2. Sampling Methodology

As earlier alluded to, a minimum of 2000 connections will trigger a verification visit. This means that for the 2,000 connections, 200 or 10% will be verified. (7% will be physically verified and 3% by phone which will translate in 140 physical verifications and 60 by phone). The 200 connections for verifications will be systematically sampled. Firstly will calculate the sampling interval by dividing 200 into the total sampling frame (2000) which will give a sampling interval of 10. Secondly from the list starting from beneficiary number 1, every 10th person will be picked until the sample is achieved. This method of sampling will give an equal opportunity for every member of the population to be selected. Further, in deciding the sample we will bear in mind the regional distribution whereby, the districts/regions with more beneficiaries will have a proportionately higher number of verifications than the districts/regions with lower numbers. The final sample and the distribution per region will be agreed with the Client before each verification visit.

3. Verification Questionnaire

Data will be collected using a Verification Questionnaire (Annex 2). The questionnaire will be programmed on Samsung Galaxy Tablets. The VQ will capture all relevant information regarding eligibility, socio-economic data of beneficiary, installation type, connection type, subsidy paid by beneficiary etc.

4. Teams and Fieldwork model

Team(s) will be deployed to verify connections and collect data using a Verification Questionnaire.

4.1 Composition of Teams

Each field team will be composed of a Supervisor and Four Enumerators. Each Team will be allocated with a vehicle. Enumerators and Supervisors should have introductory letter each time they go in the field.

4.2 Fieldwork model

The fieldwork model for the verification visit is outlined below:

5 household per enumerator per day⁸.

⁸ The households will be randomly sampled

20 households per team (4 enumerators per day)
200 households by team in 10 days

5. Roles and Responsibilities

The primary responsibility of the field team(s) are to collect high quality data for the verification exercise. The general roles and responsibilities of the Supervisors and Enumerators are outlined below:

5.1 Roles and Responsibilities of the Supervisors

- ❖ Leading the field teams
- ❖ Maintaining continuous liaison with the Verification Management Team of RuralNet Associates Limited
- ❖ Quality control in the field including back-checks of completed interviews
- ❖ Charging the Tablets
- ❖ Carrying a spare tablet for backup
- ❖ Periodically uploading the data in the central server

5.2 Roles and responsibilities of the Enumerators

- ❖ Administrating the Verification Questionnaire
- ❖ Supporting the Supervisor implementing the fieldwork

Additional tasks may be assigned to the Supervisors and Enumerators in addition to the ones listed above. The field team members are expected to follow the instructions and guidance by the Verification Agent Management Team. To this effect each evening the Supervisor will provide a debrief to the Project Manager – Jacob Chisha – by telephone (WhatsApp) on total number of households interviewed, challenges if any, and an outline plan for the following day.

6. ID

This is the National Registration number of the Beneficiary

7. General Guidance

7.1 Before the Interview

- ❖ Please make yourself familiar with the themes and the questions
- ❖ Ensure you understand the exact purpose of each question. This will help you to know if the responses you are receiving are adequate.
- ❖ Please practice the questions.
- ❖ Always carry some hardcopy questionnaires with you so that if there are some problems in the tablet, you can still interview the households using paper-pen method.

7.2 At the Household

- ❖ Please show highest respect to the respondents
- ❖ It is extremely important that you make it clear to the respondents that their participation in the survey is voluntary, and that this survey respects their rights to privacy and confidentiality first and foremost
- ❖ Let the respondent know the time it will take for the survey to complete by saying. “The survey will be ----- long”
- ❖ Also let the respondent know and get permission to photograph him/her as proof that they were actually interviewed.
- ❖ You should prepare to interview the head of the household/beneficiary. If not available any other adult member of the household can be interviewed.
- ❖ Find a comfortable place to conduct the interview. This helps the questions to proceed at a reasonable pace. If you are standing, or otherwise uncomfortable, it will slow you down, which is an inconvenience to the respondent as well.
- ❖ Politely request for a comfortable seat to conduct the interview. This will allow you to conduct the interview efficiently and in less time
- ❖ Politely request access to the Meter so that you can take note of the Meter number, type, make, and model.

7.3 During the Interview

- ❖ All questions should have an answer, if not skipped.
- ❖ Try to ask questions exactly as they appear in the tablet as far as possible. Even small changes in wording can alter the meaning of the question.
- ❖ Ask the questions in the same order as they are given on the tablets.

- ❖ Even if the respondent answers two questions at once, ask each of them separately. You can explain that you must ask each question individually. Say “Just so that I am sure...” or “Just to refresh my memory...,” and then ask the question.
- ❖ Do not suggest answers to your questions. For example, do not “help” the respondent to answer.
- ❖ Ask the respondent to clarify her/his answer in case you think you may have misunderstood the response.
- ❖ Do not leave a question unanswered unless you have been instructed to skip the question.
- ❖ Please only use the response, ‘Don’t Know’ if you are sure that the respondent is unable to provide you with the answer.
- ❖ Check for consistency between the respondent’s answers.

7.4 After the Interview

- ❖ Thank the respondent and ask if s/he has any questions or comments.
- ❖ Check the whole questionnaire before you leave the household for completeness.
- ❖ Every evening the Supervisor(s) will have to check all the completed interviews.

Glossary of Terms

Beneficiary

Person whose name the service contract is made with ZESCO to connect and supply electricity.

Household

A household is “a group of people who live together, pool their money, and eat meal together each day in one kitchen. “One dwelling unit can have more than one household.

Household head

The head of the household is the household member who is the main decision-maker for the household. In this survey one person should be identified as the beneficiary or head of head of the household.

Respondent

The preferred respondent of the household survey is the most knowledgeable person of the household. In the absence of the most knowledgeable person in the household at the time of the interview, you may interview any adult 18 years and above with sufficient knowledge of the household including the composition of the household, income, and electricity service to the household.

In case of absence of any knowledgeable member in the household at the time of the survey, please consider replacing the household (i.e. interviewing an alternative household)

Type of Connection for payment

The method used to pay for electricity:

- Pre-paid: electricity units purchased before use
- Postpaid: electricity paid after

Types of Connections

There are two types of beneficiary connections you will come across in this survey

- o Household
 - Household connections with ready boards for houses with thatched roofs
 - Household connections for permanent structures
- o SME – Small and Micro Enterprises

Standard connection

For permanent structures, standard connections will include the drop wire from a supply line (up to 30m) to the meter box, a single-phase pre-payment meter, and three energy saving Light-Emitting Diode (LED) bulbs.

Enhanced connection

This connection is primarily for structures with thatched roofs that cannot be safely wired and will include the drop wire from a supply line (up to 30m) to the meter box, a single-phase pre-payment meter, a ready board, and one energy saving LED bulb.

Ready board⁹

Images of some types of Ready Boards are shown below:



Types of Bulbs¹⁰

⁹ Source:

<https://www.google.com/search?q=electricity+ready+board&tbm=isch&source=univ&sa=X&ved=2ahUKFwis6Lux6dLIAhXTTxUIHTUnC0oQ7Al6BAgJECQ&biw=1100&bih=625> accessed 5th November, 2019.

¹⁰ Source: <https://medium.com/@omegapacific/5-different-types-of-light-bulbs-32472c24bb70> accessed 5th November, 2019

Below is the list of five most common types of Light Bulbs along with their respective advantages.

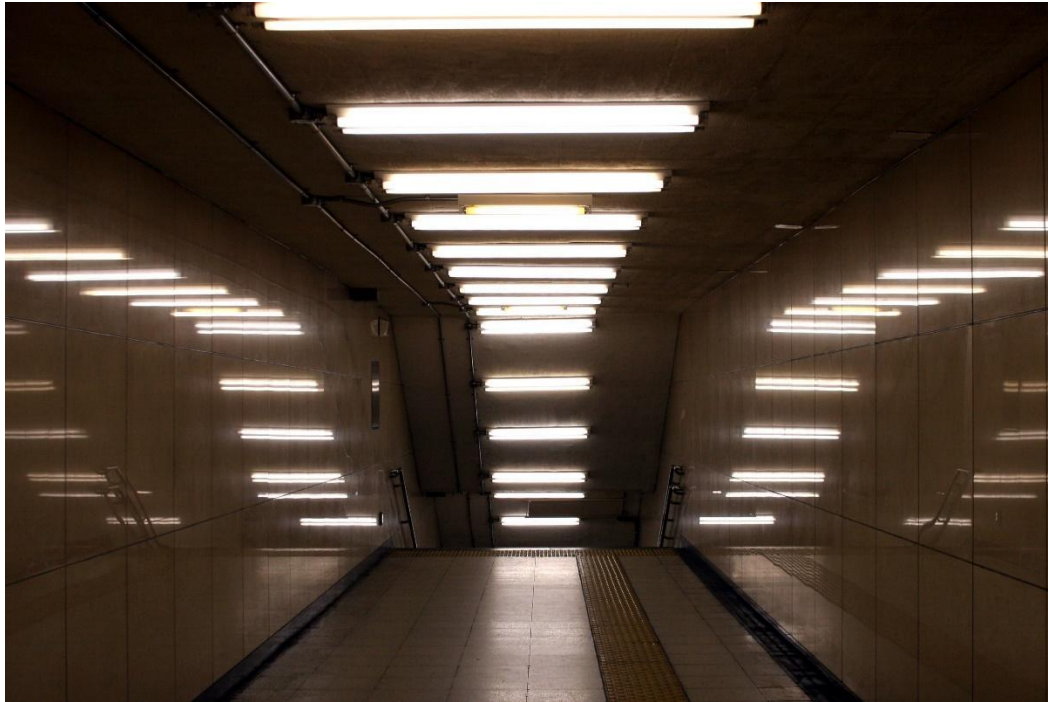
1- Incandescent Bulbs:



Incandescent bulbs are the typical bulbs. In an incandescent bulb, a tungsten filament glows when the current passes through it, illuminating the bulb. The tungsten filament is surrounded by a vacuum or nitrogen gas. The bulbs are available in different sizes including GLS, globe, candies, mushroom. However, the sudden flow of current causes the filament to heat and burn out. Incandescent bulbs only work for 700–1000 hours and are cause energy waste.

The incandescent bulbs have been the most common type of bulbs in the buildings since the invention of bulbs and are only recently replaced by the newer form of technology including LEDs, Fluorescent and HID bulbs.

2- Fluorescent Lamps:



The fluorescent bulbs are more complex than the incandescent bulbs. In a fluorescent tube, the electric current passes between the cathodes, exciting mercury and other gasses which are filled inside, radiating energy. The phosphorous coating at the outside converts radiant energy into visible light. The fluorescent lamps use less energy to produce the same amount of light and can last longer. But, these are difficult to dispose of due to mercury filling.

3- Compact Fluorescent Lamps (CFL):





The CFL are designed to replace incandescent bulbs in homes and commercial building. Working on the principle of fluorescent lamps, the CFL produces the same amount of light with less power. It consists of multiple tubular loops, filled with mercury and has a resemblance to the incandescent bulb.

As compared to incandescent bulbs, CFLs have a longer lifespan up to 10000 hours, are more energy efficient, and have higher luminous efficiency. But, the mercury in the loops makes them difficult to dispose of.

4- Halogen Lamps:





Halogen lamps are an improved version of incandescent bulbs in which tungsten filament is wrapped with a compact transparent envelope. The bulb takes its name from the filling of a small amount of Halogen with an inert gas. The inert gas increases the brightness and lifespan of the bulb resulting in higher luminous efficiency. These lamps are also smaller in size as compared to the incandescent bulbs.

5- Light Emitting Diode (LED):



LED bulbs are becoming increasingly common because of their energy efficiency and a variety of light colors. LED is a semiconductor device in which the electricity is applied to the negatively charged diode, resulting in the flow of electron and release of the photon. The photons combine to emit light from the diode.

A LED bulb consists of multiple diodes producing the required amount of light. As a semiconductor, the LEDs are high energy efficient and can produce brighter light with less energy.

Types of Meters¹¹

Images of some types of Meters are shown below:



¹¹ Source:

https://www.google.com/search?q=types+electricity+meters&tbm=isch&source=univ&sa=X&ved=2ahUKewjohJmG7tLIAhWVtXEKHRYhDW8Q7Al6BAgHECQ&biw=1100&bih=625#imgrc=_ accessed 5th November, 2019



Zambia Electrometer Prepaid meter



Conlog Prepaid meter interface

Electric points

- o Places or points where bulbs for Lighting are mounted
- o Sockets where power is tapped to a gadget or appliance

Installation Inspection

This will involve:

- Check whether the Energy Meter is properly secured i.e. fixed securely

Check whether the service cable is properly tensioned i.e. not loosely hanging but stretched out nicely.

Appendix 9: Summary of Materials at the Time of the Visit by Province

	Pre Paid Meters	Duplex Cables (meters)	LED Bulbs	Backlog
Central	78	1740	101	54
Luapula	56	1150	150	0
Muchinga	299	700	0	2
Eastern	89	450	100	18
Southern	237	3522	1633	127
Western	0	0	0	3
Northern	6	290	33	11
CB	0	0	0	0
Lusaka	415	5400	28	241
North Western	90	1850	379	72
TOTALS	1270	15102	2424	528

Summary of Materials at time of Visit

The response to the programme is very good. Backlog at the time of visit 17th to 25th April 2023 for the districts visited stood at 528 compared to 3428 during the last visit.

For Pre-paid meters there were a total of 1270 Pre-paid meters available. Lusaka Province had the highest number at 415 followed by Muchinga Province at 299. The only district visited on the Copperbelt Province – Luanshya did not have any materials in stock.

Appendix 10: Data Capture on the Impact of Project

The IVA has already stated capturing Key Performance Indicator (KPI) data related to project impact in its first verification visit such as income sources and cooking sources. These variables will be cross-tabulated with selected demographic data such as the age of beneficiaries; their marital status as well as their sex.¹² This will facilitate an assessment of the impact of such variables on different socio-groups including; the type of beneficiary (i.e. whether SME or household), age, marital status and sex/gender. Other variables which relate more directly to the project PDO will be used to measure impact. These will include educational outcomes resulting from children's access to lighting and Income Generating Activities (IGA) that use electricity, among others.

According to the best practice regarding assessment of impact of a project or any other intervention for that matter, adequate time frame needs to be allowed for change to happen. On average, the minimum period that is required for change to happen is one year or 12 months. Consequently, the IVA will undertake an impact assessment of the project during its last verification visit (i.e. after 12 month). In this regard, the KPI impact data that was collected during the first IVA verification visit will be used as baseline data to facilitate an assessment of project impact.¹³

During the last visit, the IVA will focus on two components:

- (i) The usual verification exercise on connections which ZESCO will have undertaken by then, and;
- (ii) Data collection to facilitate impact assessment. This will entail going back to the respondents (both households and SMEs) who were visited during the IVA first verification exercise to undertake data collection on impact related KPIs. This will be a longitudinal study – implying that the same households and SMEs visited during the first IVA verification exercise will be followed up during the last IVA's verification visit (i.e. after 12 months – the follow up will be easily done because the GPS coordinates for the respondents were captured during the first IVA verification visit).¹⁴

The project impact assessment will use mixed methods (i.e. quantitative and qualitative). Qualitative methods will include Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). In order to facilitate effective qualitative data collection, FGDs will be organized around

¹² Though certain demographic variables such as respondent's age and marital status have not been included in the Output IVA Report, data for these variables was collected and has already been inputted into SPSS.

¹³ It should be underscored here that even after 12 months, it will be difficult to measure the actual impact of the project because impact takes a longer time frame to show (usually not less than 5 years). In this regard, what will be captured are outcomes and emerging impacts.

¹⁴ This methodology for assessing project impact is explained in the IVA's technical proposal (bid document) - July 2019.

gender (hence in each district where FGDs will be undertaken, there will be one for men and the other for women). Consideration will also be given to organize youth FGDs in order to assess project impact on youth using qualitative methods. In-depth discussions will also be done targeted at selected individuals aimed at capturing success stories. This will help with addressing issues of attribution of success to the project.

Appendix 11: Detailed Qualitative Findings (Daily Field Reports)

Progress Report Day 1

IVA Visit # 8

Monday 17th April 2023

Introduction

This is the first visit of the Third IVA contract. However, it is the ninth visit undertaken by RuralNet Associates as an Independent Verification Agent (IVA). The task during this visit includes conducting 10% of the 3,863 (3230 Households and 633 SMEs) for the period 9th July 2022 to 3rd February 2023. The sample involves a total of 386 (323 HHs and 63 SMEs). The verifications are being conducted in all the 10 Provinces across 35 districts.

Three (3) teams have been constituted to carry out the verifications for this particular visit upon advice by the Client. On Monday 17th April, 2023 the teams travelled to their respective provinces to start the verification exercise as per schedule endorsed by ESAP. The following are the details of the work done by each team on day 1:

- Team 1 traveled to Lusaka Province. In Rufunsa, one (1) Household (HH) verification was done and in Luangwa, two (2) HHs were done. The team then proceeded to Nyimba where they spent a night.
- Team 2 used the whole day to travel to Samfya in Luapula Province.
- Team 3 travelled to Siavonga in Southern Province and did nine (9) verifications - 8 HHs and 1 SME.
- On the 2nd day Team 1 will be in Nyimba, Team 2 in Samfya and Team 3 in Chirundu district respectively.
- Many thanks to the ESAP and ZESCO Management who had earlier circulated information to all the regions regarding the visit.

Progress

A total of 12 verifications were done on day 1 out of the planned 386 verifications (3.1%). Of the 12 verifications, 11 were households and 1 for SME (see **Table 1**).

Table 1: Summary Progress Indicators

Description	Total
Estimated Total Verifications	386
Cumulative Actual Verified	12
Balance to be verified	374
Estimated Households	323
Total achieved – Households	11
Balance Households	312
Estimated SMEs	63
Total achieved – SMEs	1
Balance – SMEs	62
% Achieved of the total	3.1%

Progress by each Team is summarized in **Table 2**. A total of 3 districts were visited on day 1.

Table 2: Progress by Team

Team	Districts Visited	# of verifications done
Team 1	Rufunsa	1
	Luangwa	2
	Sub-total	3
Team 2	Siavonga	9
	Sub-total	9
Team 3	Travelling to Samfya	0
Total	3	12

Appendix: Qualitative Data

1. Rufunsa

- 1 verification done (1HH)
- Materials available – 28 LED Bulbs, 5 Pre-paid meters, 100m duplex cable.
- Backlog - 1 (St. Mary's High School)
- The last payment under ESAP was made on 27th February 2023.

Challenge

- The main challenge reported was that most of the potential customers are in areas that require erecting poles and extending the Medium Voltage line.

2. Luangwa

- 2 verifications done (2 HHs)
- Materials in stock: 10 Pre-paid meters, 400 m duplex cable
- No LED bulbs in stock.
- No Backlog
- Last connection under the subsidy programme was done on 17th February 2023.
- Main challenge reported was the poor flow of materials.

3. Siavonga

- 9 Verifications done (8 HHs and 1 SME)
- Materials available: 1203 LED bulbs, 217 Pre-paid meters, 2572 duplex cables
- 27 backlog of which 8 have paid and 19 are waiting to get quotations

Challenges:

- Failed inspection at connection

END OF REPORT

Progress Report Day 2

IVA Visit # 8

Tuesday 18th April 2023

Introduction

This is the first visit of the Third IVA contract. However, it is the ninth visit undertaken by RuralNet Associates as an Independent Verification Agent (IVA). The task during this visit includes conducting 10% of the 3,863 (3230 Households and 633 SMEs) for the period 9th July 2022 to 3rd February 2023. The sample involves a total of 386 (323 HHs and 63 SMEs). The verifications will be conducted in all the 10 Provinces across 35 districts.

Key Finding: After the closure of the ESAP connections on 16 June 2022 all pending applications were cancelled. However, an instruction was issued by ZESCO on 17th November 2022 to re activate and connect 2,262 customers whose applications were cancelled. Connections for ESAP were still on-going in some districts and there are a few customers who have been issued quotations and are yet to pay.

The following are the details of the work done by each team on day 2:

- Team 1: Nyimba – 4 verifications (4 HHs)
- Team 2: Samfya – 13 verifications (10 HHs, 3 SMEs)
- Team 3: Chirundu – 25 verifications (22 HHs, 3 SMEs)
- On the 3rd day Team 1 will be in Sinda, Team 2 in Samfya to finish off the verifications and Team 3 in Monze districts respectively.

Progress

A total of 60 verifications were done on day 2. Of the 60 verifications, 48 were households and 12 were SMEs (see **Table 1**). The cumulative number of verifications now stands at 72 (18.6%) out of the planned 386.

Table 1: Summary Progress Indicators

Description	Total
Estimated Total Verifications	386
Cumulative Actual Verified	72
Balance to be verified	314
Estimated Households	323
Total achieved - Households	59
Balance Households	264
Estimated SMEs	63
Total achieved - SMEs	13
Balance - SMEs	50
% Achieved of the total	18.6%

Progress by each Team is summarized in **Table 2**. A total of 4 districts were visited on day 2.

Table 2: Progress by Team

Team	Districts Visited	# of verifications done
Team 1	Nyimba	4
	Petauke	18
	Sub-total	22
Team 2	Samfya	13
	Sub total	13
Team 3	Chirundu	25
	Sub-total	25
Total	4	60

Appendix: Qualitative Data

4. Nyimba

- 4 verifications done (4HH)
- Materials available – No materials available for ESAP
- No Backlog except 3 which had queries.
- Last 4 connections under ESAP done 2nd week of April, 2023

Appeal

- General appeal from the public for an extension of the subsidy programme so that more people can benefit from cheap electricity connection.

5. Petauke

- 18 verifications done (12 HHs, 6 SMEs)
- Materials in stock: 83 Pre-paid meters, 300 m duplex cable and 100 LED Bulbs
- 9 Backlog: 4 quotations sent to customers and waiting for payment and 5 failed inspections.
- Connections still being done under the subsidy programme.

6. Chirundu

- 25 Verifications done (22 HHs and 3 SMEs)
- Materials available: 400 Pre-paid meters and 5,000m duplex cable
- 240 backlog of which 8 have paid and 19 are waiting to get quotation

Challenges:

- In Chirundu the whole town is eligible for subsidy connection. Over 2000 people had applied but their applications could not be processed further when the subsidy programme closed.

Samfya

- 13 verifications done (10 HHs, 3 SMEs)
- Verifications by the team only started in earnest after lunch as there was no one at the station to guide the team in the field.
- Remaining verifications for Samfya to be done on Day 3.
- Details regarding materials, backlog etc. To be provided in Day 3 Report.

END OF REPORT

Progress Report Day 3 IVA Visit # 8 Wednesday 19th April 2023

Introduction

This is the first visit of the Third IVA contract. However, it is the ninth visit undertaken by RuralNet Associates as an Independent Verification Agent (IVA). The task during this visit includes conducting 10% of the 3,863 (3230 Households and 633 SMEs) for the period 9th July 2022 to 3rd February 2023. The sample involves a total of 386 (323 HHs and 63 SMEs). The verifications will be conducted in all the 10 Provinces across 35 districts.

Key Finding: ESAP connections still being done in some districts as recent as 2nd week of April 2023

The following are the details of the work done by each team on day 3:

2. Team 1: Sinda - 11 Verifications (8HHs, 3 HHs)
3. Katete - 9 verifications (7 HHs, 2 SMEs)
4. Team 2: Samfya - 20 HHs
5. Team 3: Monze - 26 (23 HHs, 3 SMEs)
6. On the 4th day Team 1 will be in Chipata, Team 2 in Mwense and Team 3 in Maamba districts respectively.

Progress

A total of 66 verifications were done on day 3. Of the 66 verifications, 58 were households and 8 SMEs (see **Table 1**). The cumulative number of verifications done on this visit now stands at 138 out of the planned 386 (35.7%).

Table 1: Summary Progress Indicators

Description	Total
Estimated Total Verifications	386
Cumulative Actual Verified	138
Balance to be verified	248
Estimated Households	323
Total achieved - Households	117
Balance Households	206
Estimated SMEs	63
Total achieved – SMEs	21
Balance – SMEs	42
% Achieved of the total	35.7%

Progress by each Team is summarized in **Table 2**. A total of 4 districts were visited on day 3.

Table 2: Progress by Team

Team	Districts Visited	# of verifications done
Team 1	Sinda	11
	Katete	9
	Sub-total	20
Team 2	Samfya	20
	Sub-total	20
Team 3	Monze	26
	Sub total	26
Total	4	66

Appendix: Qualitative Data

v. Sinda

- 11 Verifications (8 HHs, 3 SMEs)
- Last ESAP connections were done on 7th and 8th April 2023
- No materials in store
- Demand for subsidy connections still high as evidenced by people inquiring for the service at the ZESCO office.

vi. Katete

- 9 verifications done (7 HHs, 2 SMEs)
- No backlog except for one (1) pending connection for a client who paid but was never at his premises each time the ZESCO team went for installation.
- ESAP connections last done in June 2022

vii. Monze

- 26 verifications done (23 HHs and 3 SMEs)
- Materials: Duplex cable 950m, LED bulbs - 430 and 20 Prepaid meters
- Backlog - 13 customers
- The last ESAP connection done 2nd week of April 2023

viii. Samfya

- 20 verifications done (20HHs)
- No backlog
- No materials in store. Usually get allocations according to number of pending jobs.
- Last ESAP connections done in February 2023

Challenges:

- Sharing resources like transport and labour for both ESAP and other operational jobs which impacts negatively on time and completion.
- Failed inspection by Clients which delays connection

Successes:

- Customer base has increased

END OF REPORT

Progress Report Day 4 IVA Visit # 8 Thursday 20th April 2023

Introduction

This is the first visit of the Third IVA contract. However, it is the ninth visit undertaken by RuralNet Associates as an Independent Verification Agent (IVA). The task during this visit includes conducting 10% of the 3,863 (3230 Households and 633 SMEs) for the period 9th July 2022 to 3rd February 2023. The sample involves a total of 386 (323 HHs and 63 SMEs). The verifications will be conducted in all the 10 Provinces across 35 districts.

Key Finding: None

The following are the details of the work done by each team on day 4:

7. Team 1: Chipata - 11 verifications (9HHs, 2 SMEs)
8. Team 2: Mwense – 13 verifications (12 HHs, 1 SME)
Mbereshi – 3 verifications (3 HHs)
9. Team 3: Maamba - 10 Verifications (8 HHs, 2SMEs)
Sinazongwe: 6 verifications (4 HHs, 2 SMEs)¹⁵

¹⁵ Sinazongwe added in order to make up for the numbers in Maamba which on the schedule had 22 (a typo) instead of 2 from total connections of 22.

Progress Report Day 5 IVA Visit # 8 Friday 21st April 2023

Introduction

This is the first visit of the Third IVA contract. However, it is the ninth visit undertaken by RuralNet Associates as an Independent Verification Agent (IVA). The task during this visit includes conducting 10% of the 3,863 (3230 Households and 633 SMEs) for the period 9th July 2022 to 3rd February 2023. The sample involves a total of 386 (323 HHs and 63 SMEs). The verifications will be conducted in all the 10 Provinces across 36 districts.

Key Findings:

- *In Luapula some of the districts received screw bulbs which could not be given to customers who had the pin type of holders*
- *Demand for subsidy connections is still high as most people cannot afford the revised connection fee of K4800*

The following are the details of the work done by each team on day 5: