

PRES
(Peri-urban and Rural Energy Services)
in Ethiopia, Kenya and Uganda

Uganda Country Report

The Shell Foundation
Sustainable Energy Programme (SEP)

An “Increasing Access” Project

Uganda surveys report

G.1 Objective of the study/Project

G.1.1 Aims of the study/fieldwork

- The study is aimed at providing an analysis of how people make informed decisions on the use, source, preferences and the investment patterns to meet their energy needs.
- Provide better access to energy services to periurban and rural communities
- Provide a wider range of energy services and products

This study forms the basis of determining the socio-economic viability, sustainability and appropriateness of the proposed energy product and service business. The study was designed to:

- To capture the present use of and possible future needs of energy among the local households, businesses, institutions and industry
- To document the present use of and identify possible future needs of energy/electricity among local households, business- and industry enterprises, institutes and authorities in the project areas.
- To estimate present cost of energy consumption among the above mentioned categories of energy consumers.
- To identify the priorities among the above mentioned energy consumers and their purchasing power and priorities when it comes to consumption of electricity

Additionally the study was designed to provide information on how to make high value energy products and services accessible and affordable to various segments of the population. The segments of interest include the households, businesses/local industries, institutions and local authorities.

G.1.2 The Study Methodology

G.1.2.1 Fieldwork planning: Pre-study information gathering and Preliminary visit or introduction

Between, the 9th April – 20th June 2001 the consultants sought to have discussions with officials at companies that have existing "rural" distribution networks, in Uganda, this means predominantly oil companies, and other organisations that might have an interest in an energy products and services business (financiers and equipment suppliers).

It proved very difficult to secure interviews - lack of interest in developing business in rural areas and suspicion about the motives of the study. Only two oil companies got involved initially, although a third did get back to the project team at a later date.

Although only a limited number of interviews were conducted, the project team supplemented the information gained by:

1. Obtaining lists of all the major fuel retail depots around the country
2. Collecting and studying information on the channel distribution systems for:
 - Agro companies
 - Beverage companies
3. Undertaking a review of:
 - Literature on Energy studies - Dfid- KaR, SIDA studies
 - Kikuubo, Kiyembe and Mbarara study
 - Electrical products distributors

On the strength of the interviews, other information and the project teams understanding, fieldwork was sited in Mpigi, Luwero and Kayunga and later Kamapala and Mbarara.

Mpigi	Luwero	Kayunga	Kampala	Mbarara
Catchment study	Catchment study	Catchment study	Oil Co.	Oil Co.
Tally	Tally	Tally	Distributors	Distributors
			Tally	Tally

In each case, the study team met the sub-county chief who assisted with organising the study. The selected areas were visited over a 3 weeks period by a team of 7 experienced researchers and two research supervisors;

G.1.2.2 Sampling frame

A complete list of all the households, business establishments and intuitions was obtained for the area. Discussions with the sub-county chiefs of the various areas provided basic socio-economic information on the area. .

G.1.2.3 Sample selection

A cluster sampling method was used for the sample selection. The main clusters formed were the trading centres, areas around trading centres and areas along the routes leading in and out of the trading centres. while a randomised sampling of households was applied.

The general shops were visited based on a simple random sampling selection.

G.1.2.4 Data Collection

A team of well-qualified (University graduates) and experienced researchers was used in the data collection exercise. These were trained for one day in Kampala. The training was conducted in two phases. The first phase comprised an introduction to the objectives of the study and a review of the survey instruments. The second phase consisted the field-testing of the enumerators and correction of mistakes. The training was conducted by the consultant (Statistician) from Kampala. The actual fieldwork commenced the following day in the first study area. REDC staff handled field supervision.

C1.2.5 Data Entry and Cleaning

Qualitative Data coding was done by a team of 3 persons each trained on how to fill the questionnaires. The activity took about 7 days. Data was captured into the computer using an EPINFO package (So far it is the best package for data entry) by a team of four experienced data entrants (all graduates). Each data entrant was required to do data cleaning of all the records he/she entered before his/her data could be accepted. The consultant then did the final data cleaning before commencing data analysis.

G.1.2.6 Data analysis

Quantitative Data analysis was done in SPSS/PC+ package by REDC staff. This took about 10 days. Further data manipulation was done in MS-EXCEL and this is where the charts were plotted. Occasionally other packages like Stats Direct were applied.

Documents and relevant literature on similar studies carried out in other areas were studied to give a background perspective to the final findings. The consultants compiled a summary of the findings in a preliminary report. The main results are documented in this report and presented in different sections below.

G.1.2.7 Survey Findings - Catchment survey

The following section summarises the findings of the catchment surveys.

The population of the three rural areas included in the studies are:

- Luwero district: 443,500 persons (male: female ratio of 92:100).
- Mpigi district: 913,867 (455,703 male: 458,164 female)
- Kayunga: 14,169 (6,538 males: 7,631 females)

Sex distribution of the head of household

Sex of Household head	District							
	MPIGI	%	LUWERO	%	KAYUNGA	%	Total	%
MALE	93	76.9	129	73.3	135	73.0	357	74.1
FEMALE	28	23.1	47	26.7	50	27.0	125	25.9
Total	121	100.0	176	100.0	185	100.0	482	100.0

75% of the households are male headed. The average ages of the household heads is 38.6 years with a range of 18 to 90 years.

Typical Education Levels of the household Heads

EDUCATION LEVEL	MPIGI	%	LUWERO	%	KAYUNGA	%	Overall Average	%
NONE	15	12.5	16	9.1	21	11.4	52	10.8
PRIMARY	50	41.7	73	41.5	80	43.2	203	42.2
SEC	40	33.3	72	40.9	70	37.8	182	37.8
TERTIARY	15	12.5	15	8.5	14	7.6	44	9.1
	120	100.0	176	100.0	185	100.0	481	100.0

The greater part of the households heads sampled is made up of primary (42%) and secondary (37.8%) school leavers.

Occupation of the head of household

Household Head Occupation	MPIGI	%	LUWERO	%	KAYUNGA	%	Overall Average	%
Civil servant	13	10.7	15	8.5	17	9.2	45	9.3
Wage earner	2	1.7	3	1.7	9	4.9	14	2.9
Self employed	33	27.3	35	19.9	49	26.5	117	24.3
Businessman	27	22.3	43	24.4	36	19.5	106	22.0
Farmer	34	28.1	75	42.6	68	36.8	177	36.7
Pension earner		0.0		0.0	1	0.5	1	0.2
Unemployed	4	3.3	4	2.3	3	1.6	11	2.3
OTHERS	8	6.6	1	0.6	2	1.1	11	2.3
	121	100.0	176	100.0	185	100.0	482	100.0

Most of the household heads are farmers. The rest are businesspersons and or self-employed.

Household size

The average household size is found to be about 5.5 people.

Cooking energy

Energy Type	MPIGI	%	LUWERO	%	KAYUNGA	%	Overall Average	%
ELECT	0	0.0	3	1.7	4	2.2	7	1.5
PARAFFIN	32	26.4	57	32.4	51	27.6	140	29.0
CHARCOAL	56	46.3	94	53.4	130	70.3	280	58.1
FIREWOOD	109	90.1	126	71.6	142	76.8	377	78.2
OTHER	0	0.0	0	0.0	4	2.2	4	0.8
	121	100.0	176	100.0	185	100.0	482	100.0

Only 1.5% of the visited households use electricity to cook. Most use firewood and charcoal to cook. While 30 % of the households use paraffin on an occasional basis.

Cooking appliances and equipment

APPLIANCE	Mpigi	%	Luwero	%	Kayunga	%
3-stone fire	105	86.8	117	66.5	140	75.7
Improved Wood Stove	7	5.8	9	5.1	7	3.8
Trad. Metal Stove	59	48.8	97	55.1	132	71.4
Improved Charcoal Stove	7	5.8	5	2.8	9	4.9
Kerosene Wick Stove	52	43.0	60	34.1	53	28.6
Pressure Paraffin Stove	7	5.8	16	9.1	13	7.0
Electric Hot Plate	1	0.8	2	1.1	2	1.1
Electric Kettle	0	0.0	0	0.0	2	1.1
Electric immersion heater	0	0.0	0	0.0	2	1.1
Electric Cooker/Oven	1	0.8	0	0.0	2	1.1
Solar Water Heater	0	0.0	0	0.0	0	0.0
LPG Stoves	0	0.0	0	0.0	0	0.0
Refrigerators	1	0.8	10	5.7	3	1.6
Other	0	0.0	2	1.1	3	1.6
Total	121	100.0	176	100.0	185	100.0

Numbers of appliances owned overall

APPLIANCE	Mean	Std Dev	Minimum	Maximum	N	%
3-stone fire	1.42	0.6	1	3	362	75.1
Improved Wood Stove	1.43	0.66	1	3	23	4.8
Trad. Metal Stove	1.34	0.63	1	5	288	59.8
Improved Charcoal Stove	1.19	0.4	1	2	21	4.4
Kerosene Wick Stove	1.08	0.3	1	3	165	34.2
Pressure Paraffin Stove	1.08	0.28	1	2	36	7.5
Electric Hot Plate	1.2	0.45	1	2	5	1.0
Electric Kettle	1	0	1	1	2	0.4
Electric immersion heater	1	0	1	1	2	0.4
Electric Cooker/Oven	1	0	1	1	3	0.6
Solar Water Heater	0	0	0	0	0	0.0
LPG Stoves	0	0	0	0	0	0.0
Refrigerators	1.07	0.27	1	2	14	2.9

Other	1.2	0.45	1	2	5	1.0
Total						

There are no households that rely on LPG stoves and solar heaters. 75.1% of the households depend on the three-stone fire for cooking. The improved wood stove is still rare. As expected the traditional metal sigiri (**TMS**) features prominently with 60% owning and using them. On average, households own 1 to 5 charcoal stoves. Only 4.4% of households visited use improved charcoal stoves. About 34% of the households use of paraffin wick stove.

Lighting energy

Energy Source	MPIGI	%	LUWERO	%	KAYUNGA	%	Overall Average	%
ELECT	27	22.3	40	22.7	33	17.8	100	20.7
PARAFFIN	117	96.7	167	94.9	172	93.0	456	94.6
CAR-BAT	4	3.3	5	2.8	3	1.6	12	2.5
FIREWOOD	3	2.5	0	0.0	0	0.0	3	0.6
DRY CELLS	32	26.4	68	38.6	59	31.9	159	33.0
OTHER	8	6.6	20	11.4	5	2.7	33	6.8
	121	100.0	176	100.0	185	100.0	482	100.0

The bulk of electricity consumed is used on lighting rather than for any other purpose. This accounts for the proportionate rise in the dependence on electricity for cooking compared to electricity for lighting among the connected household's from 1.5% to 20.7%. Paraffin is the major source of lighting energy among the households. Dry cells are used in hand torches to give light, and about 33% use them. Interestingly, some 3 households in Mpigi reportedly use firewood to light. The dependence on lead-acid batteries to supply lighting in the households, features only among 2.5% of the population.

Lighting equipment

	Mpigi	%	Luwero	%	Kayunga	%
Kerosene Wick Lamp	97	80.2	126	71.6	150	81.1
Hurricane Lamp	75	62.0	127	72.2	111	60.0
Kerosene Pressure Lamp	14	11.6	20	11.4	17	9.2
Dry Cell Torch	47	38.8	86	48.9	72	38.9
NI-Cad Battery	2	1.7	0	0.0	2	1.1
Automotive Lead Acid battery	8	6.6	10	5.7	10	5.4
Deep Cycle battery	1	0.8	0	0.0	0	0.0
Solar PV SHS	0	0.0	0	0.0	0	0.0
Generators	0	0.0	0	0.0	0	0.0
Incandescent Bulbs	26	21.5	40	22.7	35	18.9
Fluorescent Lamps	8	6.6	9	5.1	4	2.2
Solar lights (CFLs)	0	0.0	0	0.0	1	0.5
Halogen Lamps	0	0.0	0	0.0	0	0.0
Solar Lanterns	0	0.0	0	0.0	0	0.0
LPG lanterns	0	0.0	0	0.0	0	0.0
Total	121	100.0	176	100.0	185	100.0

Average Numbers owned

	Mean	Std Dev	Minimum	Maximum	N	%
Kerosene Wick Lamp	1.82	0.98	1	8	373	77.4

Hurricane Lamp	1.37	0.69	1	6	313	64.9
Kerosene Pressure Lamp	1.16	0.37	1	2	51	10.6
Dry Cell Torch	1.16	0.46	1	4	205	42.5
NI-Cad Battery	1	0	1	1	4	0.8
Automotive Lead Acid battery	1.04	0.19	1	2	28	5.8
Deep Cycle battery	2	.	2	2	1	0.2
Solar PV SHS	0	0	0	0	0	0.0
Generators	0	0	0	0	0	0.0
Incandescent Bulbs	3.73	3.07	1	15	101	21.0
Fluorescent Lamps	1.62	0.97	1	4	21	4.4
Solar lights (CFLs)	1	.	1	1	1	0.2
Halogen Lamps	0	0	0	0	0	0.0
Solar Lanterns	0	0	0	0	0	0.0
LPG lanterns	0	0	0	0	0	0.0
Other(s)	1	.	1	1	1	0.2

The kerosene wick lamps are the most common lighting appliance and these are distributed among 77.4% of the households visited. A household could have one or as many as 8 lamps. Next to the former are the hurricane lamps. The brighter and more light-intensive, Kerosene pressure lamp does not feature much among the households. Handheld torches are common devices and these are used by about 43% of households. Electric bulbs feature more commonly than the fluorescent tubes/lights. The former are used in 21% of the households. The number of these ranges from 1 to 15 bulbs per house. By comparison, only 4.4% of households visited possess fluorescent lights. No household either possessed or used halogen, Solar or and gas lanterns.

Entertainment energy

ENERGY SOURCE	MPIGI	%	LUWERO	%	KAYUNGA	%	Overall Average	%
Electricity	20	22.0	36	22.8	30	20.0	86	21.6
Car-Battery	15	16.5	33	20.9	17	11.3	65	16.3
Dry Cells	74	81.3	126	79.7	117	78.0	317	79.4
	91	100.0	158	100.0	150	100.0	399	100.0

The most common energy source for household entertainment is the dry cells. Much of this energy is used to power radios. Lead-acid batteries are used in one out of every ten households.

Luxury and Entertainment Items

Appliance/Device	Mpigi	%	Luwero	%	Kayunga	%
Transistor Radio	46	38.0	68	38.6	80	43.2
Radio Cassette	70	57.9	135	76.7	105	56.8
Television sets	22	18.2	39	22.2	26	14.1
Video Decks	1	0.8	2	1.1	3	1.6
Mobile Phones	6	5.0	2	1.1	4	2.2
Computers	121	100.0	0	0.0	0	0.0
Photocopiers	121	100.0	0	0.0	0	0.0

Air-conditioners/Fans	2	1.7	5	2.8	2	1.1
Others	1	0.8	2	1.1	0	0.0
Total	121	100.0	176	100.0	185	100.0

The most common type entertainment found in the households are radio cassette recorders which are found in 64.3% of the households, transistor radios found in 40.2% of the households and TV sets found in 18% of the households. None of the households possessed computers and photocopiers.

Numbers owned

Appliance/Device	Mean	Std Dev	Minimum	Maximum	N	%
Transistor Radio	1.16	0.71	1	9	194	40.2
Radio Cassette	1.08	0.34	1	5	310	64.3
Television sets	1.05	0.21	1	2	87	18.0
Video Decks	1	0	1	1	6	1.2
Mobile Phones	1.08	0.29	1	2	12	2.5
Computers	0	0	0	0	0	0.0
Photocopiers	0	0	0	0	0	0.0
Air-conditioners/Fans	1	0	1	1	9	1.9
Others	1	0	1	1	3	0.6
Total						

Household Energy Utilisation

Energy Source	MPIGI	%	SEMUTO	%	KAYUNGA	%	Overall	%
Fire Wood	106	22.0	121	25.1	139	28.8	366	75.9
Charcoal	56	11.6	94	19.5	130	27.0	280	58.1
Agricultural residues	13	2.7	5	1.0	4	0.8	22	4.6
Paraffin	110	22.8	163	33.8	173	35.9	446	92.5
Electricity	26	5.4	38	7.9	32	6.6	96	19.9
LPG	0	0.0	0	0.0	0	0.0	0	0.0
Candle	7	1.5	24	5.0	8	1.7	39	8.1
Diesel	0	0.0	0	0.0	0	0.0	0	0.0
Solar	0	0.0	0	0.0	0	0.0	0	0.0
Car Battery	14	2.9	32	6.6	15	3.1	61	12.7
NICAD Cells	0	0.0		0.0	1	0.2	1	0.2
Dry cells	85	17.6	148	30.7	132	27.4	365	75.7
Generator	0	0.0	0	0.0	0	0.0	0	0.0
Others	0	0.0	0	0.0	0	0.0	0	0.0

As expected the most common sources of energy are the biomass products. The dependence on charcoal is highest in Kayunga (Mukono). However the dependence on dry cells is most common in Semuto.

Energy expenditures

	Average monthly expenditures on the different energy types								
DISTRICT	Firewood	Charcoal	Kerosene	Candles	Dry cells	Electricity	Nicad cells	Wet battery	Overall Av.

MPIGI	7117	6063	3869	543	2475	6310	0	3615	12370
LUWERO	6571	5647	5442	1423	3187	8168	0	4184	13955
KAYUNGA	7299	5645	4108	744	3347	10808	1500	2720	14978
Grand mean	7163	5729	4538	1126	3080	8520	1500	3695	13953

As shown in the table above the overall average monthly household expenditure on energy in the rural areas is extremely modest.

Average Quantities of Energy Consumed per month

DISTRICT	Firewood (head loads)	Charcoal (sacs)	Kerosene (litres)	Candles (packets)	Car battery (number)	Nicad cells (Pairs)	Dry cells (Pairs)
MPIGI	9.5	1.23	2.83	0.43	1	0	2.3
LUWERO	9.14	1.64	4.28	1.12	1.03	0	2.58
KAYUNGA	13.83	1.31	3.18	0.48	1	1	2.57
Grand Average	11.86	1.41	3.5	0.86	1.02	1	2.51

Households use about 12 head loads of per month, with the highest level of firewood use in Kayunga. For those that use charcoal, about 1.5 sacs of charcoal are used per month. The quantity of paraffin used is about 3.5 litres, and they use about 9 sticks of candles per month. Households that own car batteries have on average one while those that use dry cells buy and use about 2.5 pairs per month.

Hours (time) of lighting per night

	MPIGI	%	LUWERO	%	KAYUNGA	%	Overall	%
1-3 HRS	34	28.1	54	30.7	66	35.7	154	32.0
4-5 HRS	58	47.9	90	51.1	88	47.6	236	49.0
6 HRS	29	24.0	32	18.2	31	16.8	92	19.1
Total	121	100.0	176	100.0	185	100.0	482	100.0

Most households need light for 4 hours to 5 hours each night then few (19%) go beyond 6 hours a night.

Purpose for lighting

	1-3 HRS	%	4-5 HRS	%	6 HRS	%	Overall	%
SECURITY	11	25.6	30	28.6	28	41.2	69	31.9
READING	24	55.8	59	56.2	26	38.2	109	50.5
BUSINESS	7	16.3	24	22.9	20	29.4	51	23.6
MEDICAL ATTENTION	2	4.7	1	1.0	5	7.4	8	3.7
INFANTS CARE	4	9.3	4	3.8	5	7.4	13	6.0
SPACE HEATING	1	2.3	0	0.0	0	0.0	1	0.5
Total	43	100.0	105	100.0	68	100.0	216	100.0

Most households require lighting for reading and homework for students and pupils. Then there are some persons that have night time occupations. Other than that, much of the light is for security and late businesses.

Level of awareness, ability and willingness to pay

	MPIGI		LUWERO		KAYUNGA		Overall	
	Aware	Available	Aware	Available	Aware	Available	Aware	Available

Incandescent Bulb	113	106	173	113	184	173	470	392
Fluorescent Tube	106	42	167	58	157	99	430	199
CFL	59	6	75	3	54	16	188	25
Halogen lamp	46	4	63	3	59	9	168	16
Wick lamp	121	118	176	170	184	183	481	471
Hurricane lamp	118	113	176	141	185	185	479	439
Pressure lamp	118	53	173	75	183	144	474	272
Solar lamp	46	2	66	3	56	7	168	12
Gas lamp	50	5	64	1	51	2	165	8
Car battery	119	40	171	25	177	96	467	161
Solar battery	33	1	31	2	24	4	88	7
Nicad battery	22	3	44	3	36	8	102	14
Dry cells	120	111	175	168	176	176	471	455
Radio	121	101	174	105	184	175	479	381
Television Sets	121	33	174	19	183	121	478	173
Mobile Phone	121	21	174	3	184	81	479	105
Paraffin refrigerator	98	5	146	1	104	6	348	12
Gas refrigerator	46	1	56	0	48	2	150	3
Vaccine refrigerator	36	0	49	0	15	1	100	1
Solar refrigerator	19	0	31	0	15	0	65	0
Conventional refrigerator	114	30	172	6	174	17	460	53
Evaporative refrigerator	12	1	18	1	10	1	40	3
Fan	115	32	173	32	181	128	469	192
Gas cooker	65	4	89	4	71	8	225	16
Electric iron	116	41	174	57	180	139	470	237
Charcoal iron	121	115	175	147	185	181	481	443
Paraffin stove	121	110	175	122	184	181	480	413
Charcoal stove	113	39	145	38	162	74	420	151
Gas cylinder	50	3	81	2	59	4	190	9
Electric cooker	106	2	153	3	149	30	408	35
Electric Kettle	105	11	161	14	167	63	433	88
Immersion heater	92	6	113	13	122	47	327	66
Solar heater	38	0	72	1	45	2	155	3
PV modules	25	0	53	1	28	0	106	1
Charge regulator	9	0	22	2	12	0	43	2
Inverter	7	0	17	1	8	0	32	1
Diesel generator	102	1	144	0	138	4	384	5
Petrol generator	116	1	161	0	140	5	417	6
Paraffin generator	41	0	53	0	36	2	130	2

The least known appliances include; Charge regulators, Inverters, PV modules, solar heaters gas cylinders, Paraffin, gas and solar refrigerators. Most of the items are not readily available in and around the study areas.

Services available

Available services	Number affirmative responses	%
Installation	29	9.1
Repair	279	87.2
Maintenance	12	3.8

Total	320	100
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Repair services rather than installation and maintenance are the most available.

Energy Sources and household appliances desired

ENERGY SOURCES AND APPLIANCES	Freq	%
Incandescent Bulb	92	5.1
Fluorescent Tube	29	1.6
CFL	23	1.3
Halogen lamp	6	0.3
Wick lamp	1	0.1
Hurricane lamp	68	3.8
Pressure lamp	97	5.4
Solar lamp	38	2.1
Gas lamp	10	0.6
Car battery	70	3.9
Solar battery	1	0.1
Nicad battery	9	0.5
Dry cells	1	0.1
Radio	119	6.6
Television Sets	211	11.8
Mobile Phone	52	2.9
Paraffin refrigerator	19	1.1
Gas refrigerator	1	0.1
Vaccine refrigerator	6	0.3
Solar refrigerator	5	0.3
Conventional refrigerator	171	9.5
Evaporative refrigerator	1	0.1
Fan	106	5.9
Gas cooker	17	0.9
Electric iron	106	5.9
Charcoal iron	4	0.2
Paraffin stove	64	3.6
Charcoal stove	46	2.6
Gas cylinder	1	0.1
Electric cooker	128	7.1
Electric Kettle	95	5.3
Immersion heater	16	0.9
Solar heater	44	2.5
PV modules	8	0.4
Charge regulator	2	0.1
Inverter	1	0.1
Diesel generator	5	0.3
Petrol generator	36	2
Paraffin generator	7	0.4
Solar Water Heater	7	0.4
Grid Electricity	60	3.3
Torch	9	0.5

Video Cassette Recorder	2	0.1
Total	1794	100

A significant number of the households wanted to own TVs, Radios, Electric cookers, Electric irons and electric fans.

Housing conditions and infrastructure design

	Housing unit	Mean Area	Std Dev	Min Area	Max Area	Number of households
Total area of a housing unit	Main House	25.12	17.74	3	120	475
	Kitchen	7.46	6.53	1	31.25	178
	Shop	6.56	9.6	1	50	64
	Servants Quarters	2.25	.	2.25	2.25	1
Average area per room	Main House	9.05	4.14	2.25	32	475
	Kitchen	5.11	3.54	0.75	30	178
	Shop	3.18	3.67	0.5	18	64
	Servants Quarters	2.25	.	2.25	2.25	1
Average number of rooms per unit	Main House	2.99	1.9	1	11	482
	Kitchen	1.45	0.86	1	6	181
	Shop	1.85	0.93	1	6	67
	Servants Quarters	1	.	1	1	1

Most households comprise at least one housing unit with an average floor area of 25.12m²; the smallest house visited is 3m² while the largest is 120m². 25% of the respondents have a second housing unit, which is smaller than the main housing unit.

The average area per room is 9.05m²; while the largest room is 32m² and the smallest is 2.25m².

In general, the main house has an average of 3 rooms. Also common are the single room tenements (7.2%). The largest house visited has 11 rooms. The second and third housing units comprise 2 rooms on average; these are of a relatively smaller size than those in the main housing unit one.

Functions of rooms	Freq	%
Living/sitting room	342	19
Cooking/Kitchen	177	9.8
Dinning room	90	5
One room house	130	7.2
Bedroom	744	41.4
Store	117	6.5
Others	175	9.7
Bathroom	22	1.2
Total responses	1797	100

G.1.2.8 Survey Findings - Tally survey

In the initial stage of the surveys a rural and peri-urban fuel stations tally was conducted. The findings justified that a purely urban equivalent of the tally be done. The findings of the second tally are summarised under the Kampala tally at the end of this report.

Characteristics of the visitors to the fuel stations

Means of Transport to the Station

Means of transport	Location				Overall	%
	Urban	%	Rural	%		
Foot/Walking	43	20.77	14	8.434	57	15.28
Car	89	43	50	30.12	139	37.27
Motorcycle	62	29.95	83	50	145	38.87
Bicycle	13	6.28	19	11.45	32	8.579
Total	207	100	166	100	373	100

Means of transport	No	%
Foot	57	15.3
Car	139	37.3
Motorcycle	145	38.9
Bicycle	32	8.6
Total	373	100

Most of the visitors to the stations get to the stations by motorcycles (38.9%) and vehicles (37.3%). Pedestrians constitute 15% of the stations visitors. Cyclists comprise only (8.6%).

Distance moved to the Station

Distance travelled	Urban	%	Rural	%	Overall	%
Less than 5 km	133	64.25	89	53.61	222	59.52
5-10 km	31	14.98	33	19.88	64	17.16
10-15 km	6	2.899	11	6.627	17	4.558
15-20 km	10	4.831	7	4.217	17	4.558
More than 20 km	27	13.04	26	15.66	53	14.21
Total	207	100	166	100	373	100

Overall distances

Distance	No	%
Less than 5 km	222	59.5
5-10 km	64	17.2
10-15 km	17	4.6
15-20 km	17	4.6
More than 20 km	53	14.2
Total	373	100

Most of the customers travel less than 5Km to the station. While the station customers travelling 20 Km and more constitute 14.2%.

Distance moved after the Station

An attempt was made to establish the destination of the customers after they left the stations, as represented in the table below.

Destination	Urban	%	Rural	%	Overall	%
Less than 5 km	115	55.56	68	40.96	183	49.06
5-10 km	26	12.56	37	22.29	63	16.89
10-15 km	15	7.246	14	8.434	29	7.775
15-20 km	13	6.28	14	8.434	27	7.239
More than 20 km	38	18.36	33	19.88	71	19.03
Total	207	100	166	100	373	100

Distance	Frequency	Percent
Less than 5 km	183	49.1
5-10 km	63	16.9
10-15 km	29	7.8
15-20 km	27	7.2
More than 20 km	71	19
Total	373	100

After leaving the petrol station, most of the station most of the customers either move less than 5kms or more than 20kms. Which implies that the fuel stations catchments are nearby or long distance travellers. 67% of the customers come from a radius of 10kms to the station.

A cross tabulation was done to establish the relationship between the origin and the destination of the customers to the station.

Relationship between the distance moved to the station and after the station

	Distance travelled after the station											
	< 5 km		5-10 km		10-15 km		5-20 km		>=20 km		Total	
Dist to the station	No	%	No	%	No	%	No	%	No	%	No	%
< 5 km	162	88.5	13	20.6	14	48.3	9	33.3	24	33.8	222	59.5
5-10 km	10	5.5	42	66.7	6	20.7	1	3.7	5	7.0	64	17.2
10-15 km	1	0.5	5	7.9	8	27.6	2	7.4	1	1.4	17	4.6
15-20 km	0	0.0	1	1.6	0	0.0	12	44.4	4	5.6	17	4.6
>=20 km	10	5.5	2	3.2	1	3.4	3	11.1	37	52.1	53	14.2
Total	183	100.0	63	100.0	29	100.0	27	100.0	71	100.0	373	100.0

There is a strong relationship exhibited between the distances moved by the customers to and from the station. Most of the customers that come from nearby places return to these after visiting the station, while those that travel far to reach the station have far destinations to travel to after the station. This further illustrates the fact that the stations mainly serve the populations around it.

Frequency of Visiting the Petrol Station

VISITS	Urban stations	%	Rural stations	%	Overall	%
First time	15	7.246	8	4.819	23	6.166

1-2 times/month	4	1.932	4	2.41	8	2.145
Once a week	25	12.08	17	10.24	42	11.26
Twice a week or	163	78.74	137	82.53	300	80.43
Total	207	100	166	100	373	100

Overall frequency

Frequency	No	%
First time to station	23	6.2
1-2 times/month	8	2.1
Once a week	42	11.3
Twice a week or more	300	80.4
Total	373	100

Most of the customers visit the stations two or more times a week (80%), while 11.3% come once a week. The first time visitors constitute only 6%. This implies that the various stations customers are dedicated.

Frequency of Visits By Means Of Transport To the Station

	First time		1-2times/month		Once week		>=2 a week		Total
	No	%	No	%	No	%	No	%	
Mean	No	%	No	%	No	%	No	%	No
Foot	3	5.3	0	0.0	16	28.1	38	66.7	57
Car	13	9.4	5	3.6	10	7.2	111	79.9	139
Motorcycle	4	2.8	0	0.0	5	3.4	136	93.8	145
Bicycle	3	9.4	3	9.4	11	34.4	15	46.9	32

An analysis was done to establish a relationship between the means of transport used to get to the station and the frequency of visits to the station. The findings show that 93.8% of customers that visit on a motorcycle, come to the station two or more times a week, whereas 46.9% of cyclist customers visit the station 2 or more times a week.

Frequency of Visits By Distance To the Station

	First time		1-2times/month		Once week		>=2 a week	
	No	%	No	%	No	%	No	%
Distance	No	%	No	%	No	%	No	%
<5 km	8	34.8	1	12.5	25	59.5	188	62.7
5-10 km	3	13.0	4	50.0	10	23.8	47	15.7
10-15 km	1	4.3		0.0		0.0	16	5.3
15-20 km	2	8.7		0.0	1	2.4	14	4.7
>=20 km	9	39.1	3	37.5	6	14.3	35	11.7
Total	23	100.0	8	100.0	42	100.0	300	100.0

The greater the distance to the station the less visits makes.

Common Goods/Services Sought from the Station

GOODS	Urban	%	Rural	%	Overall	%
Petrol	117	56.52	112	67.47	229	61.39
Diesel	35	16.91	15	9.036	50	13.4
Kerosene	50	24.15	34	20.48	84	22.52
Tyre repair	2	0.966	3	1.807	5	1.34
Oil filter	1	0.483	0	0	1	0.268

Lubricants	5	2.415	2	1.205	7	1.877
Airtime	2	0.966	4	2.41	6	1.609
Gas	1	0.483	0	0	1	0.268
Total	207	100	166	100	373	100

Overall averages

Goods/services	No	%
Petrol	229	59.8
Diesel	50	13.1
Kerosene	84	21.9
Tyre repair	5	1.3
Oil filter	1	0.3
Lubricants	7	1.8
Airtime	6	1.6
Gas	1	0.3
Total	383	100

The most common goods/services that people sought from the various stations are petrol (59.8%), kerosene (21.9%), and diesel (13.1%). The only service mentioned was tire repair (1.3%).

Average expenditure at the Station

AV. Expenditure per visit	Value
Mean	10,255.63
Std Dev	20,250.27
Minimum	200
Maximum	200,000
N	373

On average the customers spend about 10,000 shillings (Shs 10,255) per visit. However, noting that the standard deviation is extremely high (20,250), implies that there is a high variation in the amount spent by different customers. There is also a large range in the quantities purchased e.g. 200 mls vs. 20 litres purchases.

Expenditures at the station by means of transport

Means of transport	Mean	Minimum	Maximum	N	Std Dev
Foot	4,835.26	200	68,000	57	10,574.7
Car	16,177.55	1000	200,000	139	21,169.19
Motorcycle	6,448.34	300	152,000	145	20,600.6
Bicycle	11,439.06	200	115,000	32	21,728
Grand total	10,255.63	200	200,000	373	20,250.27

The vehicles spend the most per visit i.e. 16,177/=, cyclists spend 11,439/=, motorcyclist 6,448/= and then foot 4,835/=.

Visitors to the station were asked the nature of their grid connection.

Grid connected	Urban	%	Rural	%	Overall	%
Yes	101	48.79	57	34.34	158	42.36
No	106	51.21	109	65.66	215	57.64
Total	207	100	166	100	373	100

Connected status grid	No	%
Yes	158	42.4
No	215	57.6
Total	373	100

Most of the visitors to the petrol stations are not hooked to the grid (57.6%).

Source of light for the household

LIGHT	Urban	%	Rural	%	Overall	%
Pressure lamp	27	13.04	23	13.86	50	13.4
Hurricane lamp	121	58.45	105	63.25	226	60.59
Wick lamp	80	38.65	100	60.24	180	48.26
LPG gas light	3	1.449	0	0	3	0.804
UEB grid	101	48.79	57	34.34	158	42.36
Solar system	1	0.483	1	0.602	2	0.536
Generator	5	2.415	1	0.602	6	1.609
Battery	1	0.483	2	1.205	3	0.804
Others	3	1.449	1	0.602	4	1.072
Total	207	100	166	100	373	100

Source	No	%
Pressure lamp	50	7.9
Hurricane lamp	226	35.8
Wick lamp	180	28.5
LPG gas light	3	0.5
UEB grid	158	25
Solar system	2	0.3
Generator	6	0.9
Battery	3	0.5
Others	4	0.6
Total	632	100

Sources of lighting in these different households range from wick-lamps to solar systems. Most use paraffin related equipment i.e. pressure lamps (7.9%), hurricane lamps (35.9%) and wick-lamps (28.6%). A large proportion has access to electricity 24.8%.

Source of energy for cooking

COOK	Urban	%	Rural	%	Overall	%
Firewood	78	37.68	105	63.25	183	49.06
Kerosene	76	36.71	42	25.3	118	31.64
Electricity	41	19.81	13	7.831	54	14.48
Charcoal	153	73.91	99	59.64	252	67.56
Others	3	1.449	2	1.205	5	1.34

Total	207	100	166	100	373	100
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Source of energy	No	%
Firewood	183	29.9
Kerosene	118	19.3
Electricity	54	8.8
Charcoal	252	41.2
Others	5	0.8
Total	612	100

Charcoal is the main source of cooking energy (41.2%) among the station visitors. Firewood (29.9%) and kerosene (19.3%) follow next in prominence. Interestingly, the proportion of persons that use electricity to cook falls to 8.8% from 24.8% that rely on the same for lighting.

Source of energy for cooking vs. the connection status to the grid

Source of energy	Connected		Not connected		Total
	No	%	No	%	
Firewood	31	19.6	152	70.4	183
Kerosene	63	39.9	55	25.5	118
Electricity	54	34.2	0	0.0	54
Charcoal	129	81.6	123	56.9	252
Others	3	1.9	2	0.9	5
Total	158	100.0	216	100.0	373

Only 34.2% among the households connected to the grid use electricity, at least occasionally, for cooking. The majority of connected households rely on charcoal (81.6%) and kerosene (39.9) to cook. The not connected households depend on firewood (70.4%), charcoal (56.9%) and kerosene (25.5%).

KAMPALA TALLY

Rationale:

An additional study was conducted in and around Kampala in order to establish whether a potential market existed among the urban dwellers that originate from districts outside Kampala (the capital city).

The argument that emanated from the fuel station tally and the catchments surveys suggest that many of the products being promoted constituted luxuries. Therefore for these the best market is the urbanite population. Many of this class of the population occasionally travel up-country where they are denied the basic comforts they are accustomed to in the city. Such person can easily part with some funds to acquire some of these basic comforts.

Respondents home in and around Kampala

DISTRICT of RESIDENCE	NO	%
District of normal residence		
Kampala	191	92.3
Wakiso	13	6.3
Mpigi	3	1.4
Total	207	100.0

A total of 207 respondents living in and around the city of Kampala were interviewed at their places of work. 92% of these live within the city and its suburbs.

The persons interviewed included a cross section of income earners from various fields.

Characteristics of the respondents

Occupation of respondent	No.	%
Artisan/Artist/Beautician/Barber	16	7.7
Trader/Businessman/Self employed	66	31.9
Wage earner (Shop attendant/cashier)	22	10.6
Student (full-time/part-time)	4	1.9
Professional	56	27.1
Unemployed	2	1.0
Farmer	5	2.4
Housewife	2	1.0
Civil servant	34	16.4
Total	207	100.0

90% of the respondents reported that their upcountry homes could be termed to be rural.

Location

Location of home	No.	%
Urban	21	10.1
Rural	186	89.9
Total	207	100.0

Grid Connection Status at up-country home

Grid connection	No.	%
Hooked	42	20.3
Not hooked	165	79.7
Total	207	100.0

Only 20% of the respondents reported that their up-country homes are grid connected.

The plausibility of Connection in the near future was looked at in terms of the proximity of the nearest grid connection to the respondents up-country home.

Distance to power

Distance to nearest electricity connection point	No.	%
<1 km	28	17.0
1-5 km	53	32.1
5-10 km	23	13.9
10-20 km	33	20.0

20+ km	28	17.0
Total	165	100.0

More than 50% of the upcountry homes were located more than 5 Km from the closest grid connection point. Even connecting a distance of as little as 1 km is a near impossibility, this implies that over 83% of the respondents are not likely to gain access to a grid connection in the very near future.

The respondents were ask to indicate the frequency of their visits to the village/upcountry homes and it was noted that over 60% of the respondents visit their upcountry homes more than 4 times a year.

Annual Upcountry visits

Frequency of visiting upcountry home	No.	%
Once month	13	6.3
More than once month	21	10.1
Once year	32	15.5
More than 4 times a year	127	61.4
Three times a year	14	6.8
Total	207	100.0

Reasons for visiting Upcountry home

Functions Upcountry	No.	%
Xmas	161	77.8
Easter	121	58.5
Idd	36	17.4
Weddings	128	61.8
Public holidays	60	29.0
Burials	194	93.7
Others	99	47.8
Total	207	100.0

Most of the visits upcountry associated with the festive seasons of Xmas and Easter. Whole families travel upcountry for periods of 2 and more weeks. During this period one is denied the luxury of TV, radio, bright light etc. Therefore, this group makes a reasonable market.

Upcountry Household energy mix

Energy for entertainment	No.	%
Dry cells	165	80.9
Car battery	39	19.1
Electricity	42	20.6
Generator set	2	1
Solar	1	0.5
Total responses	249	122.1

Energy Source for Lighting

Energy for lighting	No.	%
Wick lamp	125	60.4
Hurricane lamp	166	80.2

Pressure lamp	28	13.5
LPG light	1	0.5
Car battery	38	18.4
Generator	1	0.5
Solar Home System	3	1.4
Other	8	3.9
Total responses (Multiple responses)	370	178.7

Energy for cooking	No.	%
Firewood	173	84
Charcoal	99	48.1
Kerosene	31	15
Electricity	19	9.2
LPG	1	0.5
Total responses (Multiple responses)	323	156.8

A number of respondents expressed willingness to purchase a number of appliances. 36% of these cited the most convenient points of sale or purchase as Kampala/Mbarara i.e. regional trading centres. Generally, over 50% preferred to do their purchases in either Kampala or Mbarara.

Customers preferred buying/shopping areas

Convenient place to buy items	No.	%
Petrol station	13	6.3
Kampala/Mbarara	74	35.9
Special outlets in Kampala	30	14.6
Special outlets in Upcountry	15	7.3
Village outlets	17	8.3
Trading centres	57	27.7
Total	206	100.0

The list of desired items is summarised below.

Desired appliances for the upcountry home

Appliances	No.	%
Incandescent bulbs	8	3.9
Deep cycle batteries	10	4.9
Kerosene (paraffin) fridge	25	12.1
Diesel generator set	20	9.7
Conventional fridge	11	5.3
Solar home system	47	22.8
Compact fluorescent lamp	32	15.5
Solar lantern	48	23.3
Pressure lamp	44	21.4
LPG	6	2.9
Television set	46	22.3
Hurricane lamp	26	12.6
Halogen lamp	5	2.4
Fluorescent lamp	14	6.8

Radio	26	12.6
Improved charcoal stoves	29	14.1
Kerosene stoves	16	7.8
Mobile phone	28	13.6
Car battery	20	9.7
Paraffin gen set	18	8.7
Gas cylinder	26	12.6
Gas burner	24	11.7
Improved wood stoves	3	1.5
Electric cooker	1	0.5
Gas lantern	4	1.9
Ni-cad battery	8	3.9
Solar fridge	10	4.9
Petrol generator set	5	2.4
Absorption fridge	4	1.9
Solar water heater	1	0.5