

# Socio-Economic Impact of Electrification: Household Perspective 2009



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2009

**Foreword**

Over the past 15 years, the Integrated National Electrification Programme (INEP) has been able to connect 4.9 million households, and to date about 75% of all households in South Africa have access to electricity. This is a remarkable achievement which was recently given recognition by the World Energy Council, a multi-energy industry organisation with member committees in 100 countries, in its publication “World Energy and Climate Policy: 2009 Assessment”. South Africa was identified as one of the top performers in the "emerging" or "fast growth" country category.

It was specifically South Africa's energy equity policies which were highly praised. While the country did not score highest for equitable access to energy (given how recently it began implementing its post-apartheid policies), its national electrification programme has transformed the level of electrification in the country, raising it from 36% to 90% among urban households, and 12% to 52% among rural households. To achieve this, South Africa had to overcome a number of hurdles, including formulating design and construction processes, perfecting the technology, and addressing social issues such as affordability.

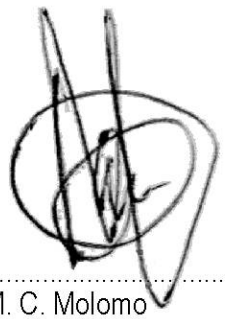
In 2007/8 the South African Department of Minerals and Energy initiated a new approach to monitoring progress, according to which repeated national surveys are utilised to produce quantitative data to measure the levels of, and changes in, access to affordable energy. The relationship between energy use and socio-economic development are also determined by this study. This specialized monitoring approach was designed in the context of the aims and delivery targets of the Integrated National Electrification Programme (INEP), which facilitates access to affordable and efficient energy as a vehicle for socio-economic empowerment and job creation especially among less privileged communities in the country.

This report presents the results of the 2008/2009 study undertaken by the Department of Energy where repeated household survey data is utilised for monitoring the socio-economic impact of the national electrification programme. The study discusses the development impacts of a national electrification programme. The report shows the value of repeated national surveys as a major source of empirical information for understanding, measuring, monitoring and evaluating the impacts of electrification programs at the household level.

The study focuses on lower income households, with the objective of assessing the impact of the electrification programme on the quality of life of low income households. The execution of the actual survey provided job opportunities to the unemployed in the sampled areas and also provided training opportunities. This was done in a bid to improve people's chances of getting employment of a similar nature in future.

The highlights as well as challenges from the 2008/2009 study are cited in detail in this report.

To enable us to enrich the report and shape future rounds of surveying, we appeal to the readers to complete the attached evaluation form.



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**Acronyms and abbreviations**

| | |
|---|---|
| AgriSA | Agriculture South Africa |
| Amps | Ampere |
| DME | Department of Minerals and Energy |
| DoE | Department of Energy |
| EA | Enumerator Area |
| EC | Eastern Cape |
| ESKOM | South African Electricity Supply Company |
| FBE | Free Basic Electricity |
| FS | Free State |
| GHS | General Household Survey |
| GPS | Global Positioning System |
| GP | Gauteng Province |
| HSRC | Human Sciences Research Council |
| IES | Income and Expenditure Suvey |
| INEP | Integrated National Electrification Programme |
| KZN | KwaZulu-Natal |
| LP | Limpopo |
| LSM | Living Standard Measurement |
| MOS | Measurement of Size |
| MP | Mpumalanga |
| NW | North West |
| NC | Northern Cape |
| PDA | Personal Digital Assistants |
| SHS | Solar Home Systems |
| TOR | Terms of Reference |
| WC | Western Cape |

**Concepts**

Per capita monthly income
The amount of money accruing to a person per month

Decile
A decile is one tenth or 10% of a given amount or number

Quintile
A quintile is one fifth or 20% of a given amount or number

Energy poverty
A person or household that spends more than 10% of their net income on energy is regarded as energy poor or in energy poverty.

Living Standard Measurement (LSM)
A wealth indicator using assets or basic services to determine a living standard measure. The measurement is classified from LSM 1 to LSM 10.

Measurement of Size (MOS)
The Measurement of Size used for sampling households in this survey was a function of of the number of households in the enumerator areas.



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Executive Summary

## EXECUTIVE SUMMARY

A total of 3960 households were interviewed for the socio-economic impact of electrification study. These households were sampled to represent low income households with a Living Standard Measure (LSM) of 1-3 which is equivalent to an income of R 1600 or less per month. Of the total sample, 2671 households were electrified and 1289 were non-electrified. This sample was representative of all nine provinces.

No significant differences in terms of household characteristics are found between electrified and non-electrified households which earn less than R1600 per month. Just over half the households have a male head. The mean age of the household head is just over 50 years. The per capita income is approximately R330 per month. Apart from a few employed household members, the majority of these households rely on child support and old age grants as income sources.

Virtually all low income households utilise pre-paid meters, and the largest proportion receives 20 Amps supply. These households have typically been electrified for a period of 7 to 12 years. With regard to the number and duration of power cuts, Gauteng, Mpumalanga and North West are the worst affected provinces. The Free State, KwaZulu Natal and Western Cape are least affected.

Although Free Basic Electricity (FBE) is an initiative aimed primarily at assisting poor households, only a third of the households indicate that they receive it. Western Cape has the highest proportion of people that are knowledgeable about FBE while those in North West, Mpumalanga, KwaZulu-Natal and Limpopo are the least knowledgeable.

In low-income electrified households, electricity is almost universally used as the main source for lighting (96%), though in fifty-one percent of households candles are used as an important secondary source in times of service interruption. As one of the most energy intensive applications, the use of electricity for cooking purposes has proliferated at a slower rate than for lighting. Slightly under two thirds of electrified households (63%) use electricity as the primary means of cooking, with only forty-two percent stating that they use electricity exclusively.

Cooking continues to be done exclusively with firewood in a fifth of households, while multiple sources are used by a third of households, usually in the form of combinations of electricity, firewood and paraffin. The reality is that electricity has not resulted in a full switch from other transitional or traditional cooking energy sources.

Space heating is another thermal application for which electricity is not being widely used. Only thirty-one percent reported space heating exclusively by electricity, with a further five percent using electricity in combination with other energy sources. Firewood continues to be the preferred energy choice, being used exclusively by thirty-four percent of households and in combination with other energy sources in a further six percent of cases. A further fifteen percent of electrified households use no specific energy source for heating, opting instead to either do without or use warm clothing. For operating domestic appliances, such as televisions and radios, seventy-four percent of electrified households use only electricity, with only nominal percentages using either other single energy sources or multiple energy combinations. The remaining one-fifth (22%) of electrified households say they do not use appliances.

Nearly seventy percent of low-income non-electrified households rely exclusively on candles for lighting purposes, with paraffin or a combination of candles and paraffin accounting for the remainder. For cooking, seventy-three percent of households rely on a single energy source, predominantly firewood (39%) and paraffin (30%). Those using multiple energy sources depend mostly on a combination of wood and paraffin. Other energy sources and combinations (gas, coal, dung, etc.) hardly feature. Non-electrified households rely extensively on firewood for space heating, which is used exclusively by sixty percent of households. Paraffin is the sole means of heating in a fifth of households (21%). The remaining fifteen percent of cases are divided between those relying on a range of energy sources and those doing without energy consumption. A third of non-electrified households provide power for their appliances through batteries alone, predominantly batteries (27%) and, to a small extent, car batteries (6%).

Multiple energy use is virtually non-existent for this purpose, while sixty percent indicate that they do not use any energy source for appliances.

The survey results provide important evidence of the enduring use of multiple energy sources by sizable percentages of electrified and non-electrified households. A fairly wide range of energy sources continues to be used, with candles, electricity, firewood, paraffin and, to a lesser extent, batteries predominating. Traditional and modern energy sources continue to coexist in the energy use patterns of electrified households, with multiple energy sources being used particularly for lighting and cooking. For lighting and for operating appliances, electricity is fairly well entrenched as the energy source of choice, though for cooking and heating energy sources other than electricity continue to play a sizable role in meeting domestic energy needs.

Non-electrified households, such as those residing in informal urban settlements and largely dependent on paraffin for many uses, especially cooking and heating, have fewer choices relating to energy use. This exposes them to a variety of risks and vulnerabilities, ranging from health risks to the disproportionately high economic burden of rising energy prices.

Low income households carry a sizable energy burden, with fifty-nine percent of electrified households and sixty percent of non-electrified households spending more than ten percent of their net income on energy; they are therefore classified as energy poor. On average, poor electrified and non-electrified households spend around one fifth of their income on energy.

Most electrified energy poor households are found in the Eastern Cape and KwaZulu-Natal. This is not surprising since these provinces have the highest proportion of poor households. Those provinces that are less densely populated, notably the Free State, Northern Cape and the Western Cape, also have the lowest share of energy poor households.

Looking at the incidence of energy poor households within each province, disproportionately high energy burdens are found for electrified households in the Eastern Cape, Gauteng, KwaZulu-Natal, North West and Western Cape. Limpopo and Northern Cape, which have lower energy burdens, generally have access to cheaper alternative energy sources such as wood.

Amongst non-electrified households, the percentage of households in energy poverty is highest in the Eastern Cape and KwaZulu-Natal. Western Cape, Gauteng and the Eastern Cape have the highest incidences of energy poverty among non-electrified households. The incidence of energy poverty is lowest in Limpopo and Northern Cape where the poor are less reliant on commercially provided energy and can make use of alternate energy sources.

The vast majority (87%:2380) of electrified householders feel that the electrification programme has benefited their households. The most frequently mentioned benefit of electrification is that electricity 'makes life easier'. About 10% of households indicated that electrification has contributed to household income generation, mainly through 'cooking' and 'cooling of products to be sold'.

In over six in ten households (2662), electrification was said to have benefited communities in providing opportunities to start businesses, and in improving security and safety in their areas.

More than a quarter of households (976) maintain that the electrification programme had led to job creation, and just over half that it had led to capacity development. The ability to start a business was a frequently mentioned example of how the electrification programme has empowered local people.

Satisfaction with the installation of electricity was generally very high in all provinces. Between 8 and 9 households in every ten indicated that they were satisfied. The few that were dissatisfied gave reasons mostly relating to meter boxes not being properly installed or to uncovered wires.

In a much larger proportion (just under half) of households, there is dissatisfaction with the level of involvement of community members in the electrification installation process. This varied significantly by province with the majority in Northern Cape, Limpopo and Western Cape expressing satisfaction, in comparison with less than a third of the people in KwaZulu-Natal and North West. The number of households satisfied with community involvement in urban formal areas was twice that in farm areas.

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Background

# 1. BACKGROUND

## 1.1. Introduction

The Integrated National Electrification Programme (INEP) receives an annual budget of over R1 billion to electrify existing formal households in order to achieve universal access by 2012. It is the Department of Energy's (DoE) intention to ensure that this budget is not only directed towards the connecting of electricity, but also towards socio-economic upliftment of all South Africans.

By the year 1994 when the ANC government came into political power in South Africa, the electrification programme of the Department of Minerals and Energy and the State electricity utility, Eskom, had already started (Marquard et al., 2007). In 2001, the Energy and Development Research Centre at the University of Cape Town was tasked with evaluating the electrification programme from 1994 to 1999. According to the report (DME, 2001) the main objectives of this evaluation were as follows:

- To document the programme's quantitative and qualitative achievements
- To investigate the programme's development impacts
- To analyse its strength and weaknesses; and
- To identify lessons learned from the programme.

The results of the study show that the programme was successful in meeting its target of providing electricity connections to 2.5 million households between 1994 and 1999. During this period, the DoE and Eskom's goals were to provide "electricity for all" (Marquard at al., 2007: 16) and to correct the inequalities inherited from the apartheid government. This is echoed in the South African Energy White Paper (South Africa, 1998) where it is stated that "energy security for low-income households can help reduce poverty, increase livelihoods and improve living standards" (1998: ix). Prior to 1994, the focus of electrification was on urban areas and it was only after 1994 that it shifted towards the poor and towards rural areas (DME, 2008).

The Integrated National Electrification Programme's next phase which started in 2000 was targeted at providing electricity to at least 300 000 households annually for 5 years, resulting in 1.5 million connections. According to the 2007 Community Survey (Statistics South Africa, 2007: 3), 80% of South African households use electricity for lighting compared to 69.7% in 2001. Using electricity for lighting is an indication that an area is electrified, whether by grid or non-grid technology.

In order to provide wider access to electricity for households situated far from the Eskom grid, in 1999 the DoE entered into contractual agreements with a number of service providers to deliver non-grid electricity services through solar home systems (SHS) to rural areas (ERC, 2004: ii). The model used by the DoE and the service providers is referred to as fee-for-service. The DoE subsidises the installation of the SHS and households pay a monthly fee to the service provider. To ensure access to such a service, the DoE has put in place the Free Basic Alternative Energy subsidy of up to R40 per household which further subsidises households and allows them to pay less for the service they receive. Households with grid electricity are also subsidised through the Free Basic Energy subsidy of up to 30KwH to 50KwH per month (depending on whether the area is serviced by Eskom or by the local municipality) towards household energy use. These initiatives resulted in connections rising from 30% (3 million households) in 1993 to 73% in March 2007 (4.5 million households).

According to the DME (2006), the electrification programme created over 12 000 job opportunities between 2002 and 2006, benefitting communities in deep rural areas. It is also shown that the electrification programme has improved the welfare of households but that in cases where households have limited resources, these benefits have been minimal.

Table 1: Electrification status by province, 2008 (row percentage)

| Province | Total Number of Households | Backlog | Households not electrified (percentage) | Number of electrified households | Electrified households (percentage) |
|---|---|---|---|---|---|
| Western Cape | 1,333,886 | 191,366 | 14% | 1,142,520 | 86% |
| Northern Cape | 272,958 | 50,405 | 18% | 222,553 | 82% |
| North West | 914,070 | 196,605 | 22% | 717,465 | 78% |
| Gauteng | 3,127,991 | 740,569 | 24% | 2,387,422 | 76% |
| Free State | 823,972 | 201,919 | 25% | 622,053 | 75% |
| Mpumalanga | 879,082 | 231,485 | 26% | 647,597 | 74% |
| Limpopo | 1,250,716 | 329,440 | 26% | 921,267 | 74% |
| Kwa Zulu-Natal | 2,405,165 | 818,708 | 34% | 1,586,457 | 66% |
| Eastern Cape | 1,667,435 | 669,421 | 40% | 998,014 | 60% |
| **Total** | **12,675,275** | **3,429,918** | **25%** | **9,245,357** | **75%** |

**Source: DoE (March 2009).**

Whilst government has therefore been able to connect up to seventy-five percent of households in South Africa, the challenge has been to determine the benefits to communities from these electrification projects. The DoE therefore embarked on a project to evaluate the socio-economic impact of electrification on poor households.

### 1.1.1 The socio-economic impact of electrification study

In 2008, the DME undertook the first phase of the planned annual longitudinal panel household electrification study. The intention of this study is to visit the same households annually to determine the socio-economic impact of electrification. There is clearly a need for such a study in South Africa which has very few large data sets on energy use, energy choices and energy transition, with theories on the topic frequently based hypothetically on data from Asia (Campbell, Vermeulen, Mangono & Mabugu, 2003).

The intention of this study is thus to determine the extent to which electrification can improve and has improved socio-economic conditions in South African households and to determine possible barriers to socio-economic upliftment.

The main differences between the 2008 and 2009 studies lie in the mode of data collection and in the sample. In the 2008 study, the mode of data collection was a paper-based questionnaire, whereas in the 2009 study the DoE purchased and programmed Personal Digital Assistants (PDAs) with the questionnaire to utilise as data collection tools. PDAs, with their Global Positioning System (GPS) facility, enabled geocoding of households. This enables these households to be revisited in subsequent years to determine the impact of electrification.

With regard to the sample, the current 2009 study is nationally representative and includes all provinces while the first (2008) study only included three provinces.

### 1.1.2 Survey objectives

The objective of the survey is to assess the impact of the electrification programme on quality of life. It aims to capture all electrification related initiatives and to determine the extent to which they contribute to the socio-economic upliftment of people in poorer communities. It will also assist with the identification of opportunities for small, micro and medium enterprises and job creation.

The specific objectives of the study as contained in the Terms of Reference are to:

- Track the extent to which electrification is improving the socio-economic conditions of the poor households; and
- Provide opportunities for job creation and skills development to the sampled communities.

### 1.1.3 Structure of the report

The first section of the report deals with how the sample was designed and with the household selection procedures. It describes the sample realisation and the replacements incurred in the study. It also contextualises the realised sample in terms of national figures using the Income and Expenditure Survey.

This section is followed by a brief description of the questionnaire and of the training that took place before data collection. The next section discusses the data collection strategies and protocol, and the data cleaning phase.

Section Five, the first section that discusses actual results, deals with household characteristics of the sample in general and also of electrified and non-electrified households. It discusses the household size, age and gender of household heads and the composition and size of households. Section Six discusses the socio-economic status of households as well as their sources of income.

The first part of Section Seven deals with electrified households and electrification status. It gives an overview of how long the households and communities have been electrified, type of connection, type of supply, metering systems, electrical appliances found in households, and issues relating to free basic electricity.

Section Eight discusses household energy sources for lighting, cooking, heating and appliances. It deals with the multiple energy use phenomenon, energy expenditure and energy poverty.

Section Nine discusses the impact of the electrification programme, and with its benefits. These are dealt with at household and at community level. Educational benefits as well as capacity development and employment creation are discussed.

The last section of the results chapter deals with satisfaction with services provided. It looks at the installation process and at involvement of community members.

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The Sample

## 2. THE SAMPLE

### 2.1 Sample Design

The project was explicitly designed to target poor households in South Africa, and as its intent was to determine the socio-economic impact of electrification on households, the sample was biased towards electrified households. Accordingly, the study attempted to realise a sample of two-thirds electrified households and one-third non- electrified poor households.

A major challenge was to obtain a database representing poor households. Initially, it was suggested that the census 2001 data should be used together with lists from the DoE indicating electrified and non-electrified areas. The problem with this approach was that the census data was dated, and the DoE list of electrified and non-electrified households was given at municipal level and not at the enumerator areas (EA) level. Another option was to use the 2007 Community Survey data but these data were also collected at municipal level and not EA level.

It was eventually decided to use the HSRC's Living Standard Measurement (LSM) dataset based on small area estimation as the sample frame. The LSM determines household assets or services and converts these into a living standard measurement scale ranging from LSM1-10. LSM 1 represents households with very low scoring wealth indicators, with LSM10 indicating wealthy households. This measurement is a proxy for income and given that the data was current 2007 data the DoE decided to use this dataset as a basis for the sample frame.

After consultation with statisticians and reviewing the literature, it was decided to use LSM1-LSM3 category households as the basis of the sample frame. These are poor households, and met the sample criteria of the study. Further consultation took place regarding the conversion of LSM into rand values. The Development Indicators 2008 report (South Africa, 2008) was used as a basis, and the qualification criterion inclusion of households in the study was a household income of R1600 or less per month.

**Table 2: Average monthly income values corresponding to LSM1-3 categories (rands).**

| Year | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
|---|---|---|---|---|---|---|---|
| LSM | Monthly Average Income | Monthly Average Income | Monthly Average Income | Monthly Average Income | Monthly Average Income | Monthly Average Income | Monthly Average Income |
| LSM1 | R742 | R804 | R860 | R878 | R911 | R999 | R1058 |
| LSM2 | R883 | R963 | R1129 | R1076 | R1103 | R1214 | R1261 |
| LSM3 | R1092 | R1200 | R1355 | R1412 | R1434 | R1521 | R1613 |

**Source: Development Indicators, Mid Term Review (South Africa, 2008).**

The initial sample frame consisted on 80787 EAs. From these, all EA types representing recreational areas, industrial areas and special institutions were deleted.

The EAs in the sample therefore represented tribal areas, farms, small holdings, and formal and informal urban settlements.

Province was used as an explicit stratification variable with a sample size of 450, viz. 50 EAs per province and 9 households per EA. The total expected was 4050 households nationally.

Each province was further stratified, giving more weight to informal urban and rural areas (if any) and less weight to formal urban areas. An appropriate type of pps (probability proportional to size) systematic sampling of the EAs was used, with measure of size (MOS) equal to a function of the estimated number of households in the EA.

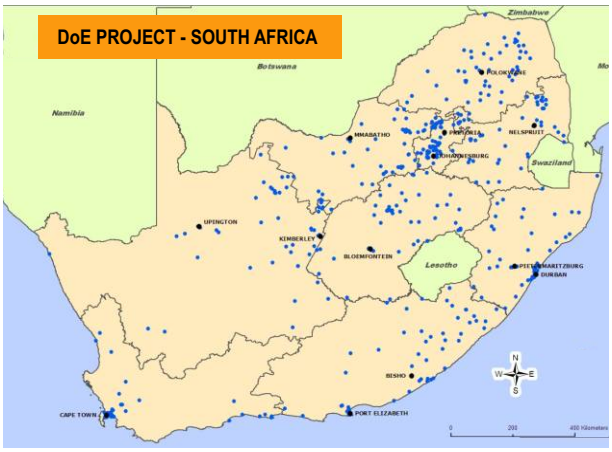
A sample was drawn but subsequently it was realised that it used the 2001 provincial boundaries. Provincial boundary changes had an effect on 17 EAs; retaining this sample would have meant that these were displaced from their current provinces. A decision was then made to redraw the sample using the 2006 provincial boundaries. Since it was not possible only to redraw certain provinces, the full national sample had to be redrawn. The graphical representation below shows the final sampled Eas.

[1] An enumeration area is the geographical area enumerated by one census representative. An EA is the smallest geographical area for which census data are reported.

[2] The Living Standard Measurement groups people according to their living standard using wealth indicators such as degree of urbanisation, ownership of cars and major appliances and access to basic services such as water and electricity.

Since the sample was manipulated to represent two-thirds electrified and one third non-electrified households, this sample is not proportionally representative of the electrified and non-electrified households in South Africa amongst LSM1- LSM3 households. These samples should therefore be analysed as electrified and non-electrified entities.

**Figure 1: A graphical representation of selected Enumeration Areas**




## 2.2 Household selection

This section explains how the households inside the sampled EAs were selected.

When arriving in the EA, 25 households were selected randomly within its boundaries, using the serpentine way of moving through it.

Once the households had been selected, fieldworkers were advised to screen each household using a screening sheet. Each of the households had to indicate whether it was electrified or not, and whether the household's total income was above or below R1600 p.m. For a household to qualify, the monthly income of the household had to be below R1600 p.m. If fewer than 15 of the 25 households had an income of R1600 and below, the EA was to be regarded as a high-income area for the purposes of this study. In such cases, fieldworkers were told to request replacement Eas.

Once the 25 households had been screened, the field teams were required to select a sub-sample of nine households where the interviews were to be conducted. They were advised to try to obtain a ratio of six electrified and three non-electrified from the 25 eligible houses.

In cases where they had visited the selected household three different times during the day and no person from the household was available, they could substitute using one of the other 25 households.

They were also advised to write any additional information which might be useful during the data analysis phase in the 'comments' section of the questionnaire. This was used by field workers to record possible challenges; or interesting experiences or obstacles encountered in the field.

## 2.3 Replacements and sample realisation

In the course of the study, 64 EAs had to be replaced. This was for three main reasons: high income areas, refusals or uninhabited EAs. Since the study was based on poor households earning R1600 or less per month, EAs not meeting the qualifying criteria had to be replaced. Refusals were encountered mainly on farms, partly due to Agri South Africa (AgriSA) not acceding on time to the request for assistance in gaining entry to farms. Some farm owners seemed suspicious of the study and did not take kindly to efforts to interview workers on farms.

The problem of uninhabited farms also occurred frequently, especially in the Northern Cape where very few people other than the farm owner or manager reside on the farms. However, despite the replacement of EAs, a very high realisation rate was achieved.

**Table 3: Sample realisation**

| Province | Number of replaced EAs | Ideal sample (N Households) | Realised sample (N Households) | % Realisation |
|---|---|---|---|---|
| Eastern Cape | 5 | 450 | 435 | 97 |
| Free State | 5 | 450 | 450 | 100 |
| Gauteng | 7 | 450 | 433 | 96 |
| KwaZulu-Natal | 10 | 450 | 432 | 96 |
| Limpopo | 5 | 450 | 447 | 99 |
| Mpumalanga | 6 | 450 | 448 | 99 |
| North West | 14 | 450 | 425 | 94 |
| Northern Cape | 3 | 450 | 447 | 99 |
| Western Cape | 9 | 450 | 443 | 98 |
| **Total** | 64 | 4050 | 3960 | 98 |

The table below shows that, in line with the study's decisions on household selection, electrified households made up approximately two-thirds of the sample and non-electrified households approximately a third.

**Table 4: Sample realisation of electrified and non-electrified households**

| Province | Electrified (N Households) | Non-electrified (N Households) | Total |
|---|---|---|---|
| Eastern Cape | 273 | 162 | 435 |
| Free State | 279 | 171 | 450 |
| Gauteng | 309 | 124 | 433 |
| KwaZulu-Natal | 251 | 181 | 432 |
| Limpopo | 317 | 130 | 447 |
| Mpumalanga | 308 | 140 | 448 |
| North West | 268 | 157 | 425 |
| Northern Cape | 339 | 108 | 447 |
| Western Cape | 327 | 116 | 443 |
| **Total** | 2671 | 1289 | 3960 |

## 2.4 Poor households

This survey was aimed at poor households, with the sample criteria households with an LSM 1- LSM 3, earning R1600 or less per month. In order to verify that this sample reflected poor households in the country, an analysis was done to determine the proportion of households falling into deciles of per capita monthly income derived from the Income and Expenditure Survey (IES) of South Africa.

**Table 5: Percentage of DME sample households falling into deciles of per capita monthly income derived from the 2005/06 IES, expressed in September 2008 prices**

| DME 2008 Sample | Income thresholds | All Sampled HH | | Electrified | | Non-electrified | |
|---|---|---|---|---|---|---|---|
| | | % | Cum % | % | Cum % | % | Cum % |
| % in poorest IES decile | Less than R 214 | 46 | - | 44 | - | 51 | - |
| % in IES decile 2 | R 214-R 333 | 19 | 66 | 20 | 64 | 19 | 69 |
| % in IES decile 3 | R 333-R 465 | 19 | 84 | 20 | 84 | 16 | 85 |
| % in IES decile 4 | R 465-R 640 | 4 | 88 | 5 | 88 | 3 | 88 |
| % in IES decile 5 | R 640-R 923 | 6 | 94 | 5 | 93 | 8 | 96 |
| % in IES decile 6 | R 923-R 1316 | 4 | 98 | 4 | 98 | 3 | 99 |
| % in IES decile 7 | R 1316-R 2137 | 2 | 100 | 2 | 100 | 1 | 100 |
| % in IES decile 8 | R 2137-R 3812 | 0 | 100 | 0 | 100 | 0 | 100 |
| % in IES decile 9 | R 3812-R 7801 | 0 | 100 | 0 | 100 | 0 | 100 |
| % in welthiest IES decile | More than R 7801 | 0 | 100 | - | - | 0 | 100 |

**Sources: StatsSA IES 2005/06, StatsSA CPI series.**

As can be seen from Table 5, the sample does reflect poor households and adheres to the sampling requirements in this regard, with close to half of the sample (46%) falling within the poorest income decile nationally. Approximately two-thirds of the sample (66%) falls within the poorest income quintile nationally. Furthermore, 84% of the sample (including electrified and non-electrified sub-samples) falls into the poorest 30% of the national income distribution, and 88% of the sample (including the electrified and non-electrified sub-samples) falls into the poorest 40% of the national income distribution. It can therefore confidently be said that this is a survey of poor households in South Africa.

## 2.5 The weighted sample

In order to represent all LSM1-LSM3 households in South Africa, the sample was weighted to the total population of LSM1-LSM3 households.

Table 6 provides both the total unweighted and weighted sample sizes for households in the lowest three living standards measure categories (LSM1-3), disaggregated by province.

**Table 6: Weighted and unweighted sample by province (number of Households)**

| Province | No. Of Households (Sample) | No. Of Households (Weighted) |
|---|---|---|
| Eastern Cape | 435 | 493,837 |
| Free State | 450 | 56,410 |
| Gauteng | 433 | 182,570 |
| KwaZulu-Natal | 432 | 425,907 |
| Limpopo | 447 | 329,143 |
| Mpumalanga | 448 | 194,418 |
| North West | 425 | 127,940 |
| Northern Cape | 447 | 16,255 |
| Western Cape | 443 | 20,517 |
| **Total** | **3960** | **1,846,996** |

In Table 7, the relationship between electrification status at the household and community levels, as observed in the survey sample, is presented. Almost all electrified households selected for inclusion in the study were located in communities that are electrified, with only one percent situated in communities that remain without electricity. With respect to non-electrified households included in the survey sample, approximately a third were drawn from electrified communities, while 69% were in non-electrified communities.

**Table 7: Composition of electrified households within electrified communities (row percentage)**

| Electrification status | Electrified community | Non-electrified community | Total |
|---|---|---|---|
| Electrified household | 99 | 1 | 100 |
| Non-electrified household | 31 | 69 | 100 |
| **Total** | 75 | 25 | 100 |

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Questionnaire & Training

## 3. THE QUESTIONNAIRE AND TRAINING

### 3.1 The questionnaire

During the first round of the survey in 2007/2008, a paper-based questionnaire was used. The questions were developed by the DoE to capture as much information as possible relating to the socio-economic conditions of the households as well as to measure the impact of electrification on the households.

For the current study, the first-round questionnaire was slightly revised to incorporate certain issues that came up during the first round, but in essence it remained the same. For the 2008/2009 survey round, the questionnaire was programmed onto a PDA and electronic data capturing took place. Although the questionnaire was electronically captured in English, the questionnaire was translated into six languages: isiZulu, isiXhosa, Tshivenda, Xitsonga, Setswana, and Afrikaans. Fieldworkers were issued with hard copies of the translated templates to ensure consistency of translations for the various languages. After having administered the questionnaire in the 2008/2009 round, some changes to the questionnaire are suggested in order to maximise analysis and add value to the impact of the study. These suggestions are taken to the DoE.


### 3.2 The training

The training took place from 1 to 5 September 2008. It was mainly conducted by the DoE, and it included training field workers in the selection and sampling of households and in fieldwork operating procedures. The five days of training were designed to be participatory, practical and interactive, and gave field workers the opportunity to seek clarification on questions.

The programme was as follows:

| | |
|---|---|
| Day one: | Training content (questionnaire) |
| Day two: | Training on the PDAs |
| Day three: | The pilot (field visits) |
| Day four: | Feedback and trouble shooting |
| Day five: | Sampling and protocol |

Sixty fieldworkers, twenty sub-supervisors and ten provincial supervisors attended the training. During this training week, the fieldworkers not only familiarised themselves with the content of the questionnaire and with the PDAs, but also took part in a pilot survey and were trained in research ethics and protocol.

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# Data Collection & Cleaning

## 4. DATA COLLECTION AND CLEANING

### 4.1 Introducing the survey to communities

Once the sample was available, the first stage in the data collection was to make contact with a variety of stakeholders in order to gain support for the project. Supervisors were instructed to contact local councillors, indunas, chiefs, municipal managers and other role players in the various areas to ensure that these authorities were aware of the project and of its intent. Official letters described the project, its duration and ethical issues relating to it.

Since the terms of reference (TOR) specified that the data collection should be done by local field workers in order to provide work and training opportunities to local unemployed people, the various stakeholders were generally receptive towards the project. Only eight field workers were selected per province, and so it was impractical to include people from all selected areas. Therefore, in order to get a representative group of field workers, provinces were demarcated into the various district municipalities. The number of selected EAs selected per district municipality was counted in order to get proportional representation. The total number of field workers needed proportionally per district municipality was then calculated. Provincial supervisors were requested to use these district municipality totals as a guide when recruiting field workers.

### 4.2 Navigation to the selected areas

In order to assist in locating the selected visiting points, fieldwork kits were issued to the supervisors. These kits included:

- Route descriptions, to assist the team to navigate their way into the selected enumerator areas.
- Maps that, using aerial photographs as a base, identified the exact geographic location of the enumerator areas to be sampled throughout the country.
- More detailed maps that identified the exact visiting points, randomly selected by the office-based sampling team, within the EAs where respondents would be interviewed.

### 4.3 Data collection protocol

The following general protocol guidelines for data gathering were implemented:

- Field workers were issued with name tags and letters of introduction to be used in the field.

- The introduction letter was translated into different languages.
- They had to present their identity cards when introducing themselves.
- Fieldworkers and supervisors were required to notify the relevant local authorities that they would be working in the specific area. The purpose was to assist with their own safety and to reassure respondents, especially the elderly or suspicious, that the survey was official.
- They were advised to inform the inkosi or induna in a tribal area, whilst in urban formal or urban informal areas a visit the local police and if possible the local councillor was to be made prior to commencing work in the area.
- They were further advised that farms should be entered with caution and that they should report to the local AgriSA offices before doing so. Field supervisors were issued with 'Farm letters' which contained information on the purpose of the study and contact details in case they had queries.
- Consent forms needed to be completed upon successfully finishing each interview. While verbal consent was to be secured from the respondent before beginning with the interview, a written consent form had to be signed afterwards.

A comprehensive fieldwork manual was also developed for use by field workers.

Figure 2: Example of an area map used to select households


## 4.4 Data cleaning

One of the biggest unanticipated challenges of this project was the data cleaning phase. Since data is electronically captured the assumption was that very little time would be needed for cleaning. This proved to be the wrong assumption and data cleaning was a big challenge. Some of the procedures and challenges are discussed in this section.

Data from the PDAs were sent to the DME database via wireless transmission. Since some very remote areas with no reception were visited, transmissions could often not take place instantaneously. However, these records were stored on the PDAs and were automatically send once wireless technology was picked up by the PDA. This however made progress reporting very difficult since the database constantly reflected an undercount of interviews conducted. Verification of the numbers of completed interviews could only be done once all interviews had been completed and all PDAs downloaded.

In some instances fieldworkers had reconfigured some of the installations on the PDAs and they could not send the completed questionnaires.

Once returned, these PDAs were reconfigured and data downloaded. Once all the data was downloaded, final verification figures could be reported.

The biggest challenges facing the data cleaning team was correcting the EA numbers. This eight digit EA number was not programmed in advance, so field workers had to enter it themselves and in many cases it was entered incorrectly. This was a huge challenge. To correct the EA numbers, the data cleaning team had to rely on actual field plans submitted by the various fieldwork teams. These field plans gave an indication of where the teams were working on specific days. This information guided the data cleaning team in terms of locating the EAs.

Problems were also experienced with district and municipality numbers. A large number of entries were incorrect as field workers did not have sufficient knowledge to select the correct district or municipality. Data from the original sample file (data from Stats SA) were used to correct the district and municipality codes.

Since place names had to be inserted and spelled by the field workers themselves, many variations of one place name was found, resulting in hours of data cleaning. District and municipality code descriptions were obtained from DoE and applied to the variables.

Some data coding problems were also picked up regarding the actual completion of the questionnaire. For instance, in a few cases field workers indicated the age of the person, and not the number of people in the specific age category. Where they had to indicate time, such as hours for vending machines, in some instances a.m. and p.m. were found to have been confused.

For weighting purposes, screening sheets had to be completed and in some cases the information on these and on PDAs differed. Decisions regarding data cleaning had to be taken in such instances.

Recommendations for future rounds:

- Determine how EA numbers can be accommodated in the questionnaire software without field workers having to enter the 8-digit number.
- Before interviewing starts, supervisors should study the areas and investigate the district and municipality codes, and area codes, that will be applied for each EA.
- Place names could be added to the dataset using sample information.
- Restrictions should be placed on the age of household head; no person younger than ten should be considered a household head.
- Insert pre-coded time categories

Above are listed only some of the main challenges and potential solutions, with some suggestions for changes in the questionnaire also being based on experienced gained from the data cleaning phase. Other challenges will be discussed with the DoE.

Despite these challenges, a clean dataset was handed over to the DoE. All PDAs and kits were returned to the DoE at the end of the data gathering phase. This was unexpected since one of the biggest anticipated challenges was lost or stolen PDAs. Strict fieldwork control and supervision were the main reason for this achievement.

**Eziko, a township in KwaZulu Natal visited during fieldwork**

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Household Characteristics

# 5. HOUSEHOLD CHARACTERISTICS

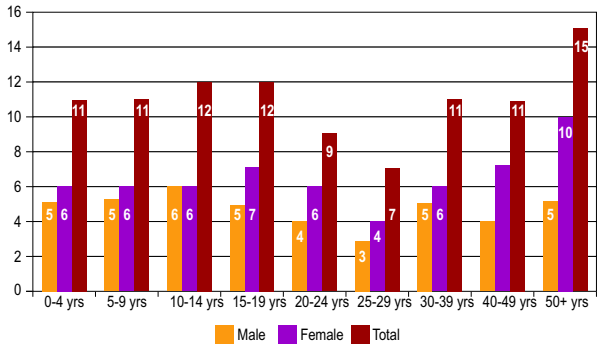
## 5.1 The total population share of households interviewed for this study

In order to contextualise the findings of this study, some details of household characteristics are given in this section. The composition and size of households, and the age and gender of household heads, are discussed. This is followed by a section on the socio-economic status of the households, disaggregated by electrified and non-electrified households.

The Base N values in this report are based on unweighted data, and other statistics are based on weighted data.

The figure below shows the distribution of the total population in the households interviewed, distinguishing by age and gender. Per definition, household members are regarded as those residing in the household more than 15 days in the month or 4 days in a week and eating together.

**Figure 3: Total household population share by age group and gender (percentage)**

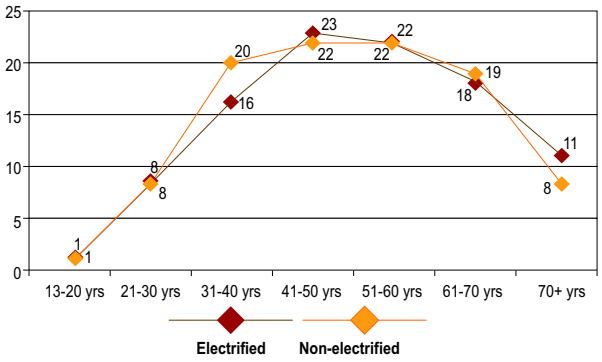



The composition of households in this study presents a fairly equal distribution of age groups. It is however notable that people aged from 20 to 29 years comprised the smallest proportion of the sample. This is not surprising since this group is generally most mobile, tending to seek employment and economic opportunities elsewhere. Regarding gender, there were more females in each age group, the proportion increasing with age.

## 5.2 Age group and gender of household Heads

Analysis of the age groups of heads of households revealed that the majority in both electrified and non-electrified areas are above the age 30, with only a small minority of households headed by people younger than 20 years (1.3 % in the case of electrified households and 0.5% in the case of non-electrified households).

**Figure 4: Age group of household head (percentage)**




The study found that more than half of the households (55%) are headed by males and under half (45%) by females. In terms of marital status, just over a third (36%) of the household heads have never been married and just under a third (33%) are currently married. The rest are either widowed (22%), living together with a partner but not married (6%), separated (4%) or divorced (1%). Almost a third (32%) of all household heads have no formal education, whilst just more than a quarter (27%) have some form of primary school education, 30% have secondary education and 12% have matric or a post-matric qualification.

A provincial breakdown of female and male-headed households for electrified and non-electrified households is portrayed in Table 8. The mean age of the household head is also given per province. In the electrified communities, household heads are, on average, more likely to be females than males and to be a few years older than those in the non-electrified communities.

The only exceptions are the Free State and Western Cape, where household heads in electrified communities are predominantly young and male. Conversely, in the non-electrified communities, it is only in the Eastern Cape and KwaZulu-Natal that there are more female than male heads of households.

These patterns are likely to be attributable to electrified communities being mainly more settled and established than the non-electrified communities. It may be that the Free State and Western Cape exceptions can be explained by more recent settlements being more rapidly electrified in those provinces. In the cases of the Eastern Cape and KwaZulu-Natal, the domination of female heads of households could be explained by the large out-migration of males in search of work in other provinces. These patterns would need to be verified by further research.

## 5.3 Composition and size of household

The composition of households in terms of the number of adults and children per household was similar for electrified and non-electrified households. The average national household size for households earning R1600 per month or less was just under three children per household and just more than two adults per household.

In general, households with fewer members tended to have younger heads and vice-versa. Thus, Free State electrified households have, on average, the smallest numbers of children and the youngest heads of households. Conversely, non-electrified households in KwaZulu-Natal and the Eastern Cape have the oldest heads of households and the largest numbers of children (and adults in the case of KwaZulu-Natal).

**Table 8: Profile of the head of the household per province for electrified and non-electrified households (row percentage)**

| Province | % Male | % Female | Mean age of household head | Base N | Province | % Male | % Female | Mean age of household head | Base N |
|---|---|---|---|---|---|---|---|---|---|
| **Electrified** | | | | | **Non-electrified** | | | | |
| Eastern Cape | 44 | 56 | 55 | 273 | Eastern Cape | 35 | 65 | 54 | 162 |
| Free State | 65 | 35 | 47 | 279 | Free State | 81 | 19 | 46 | 171 |
| Gauteng | 46 | 54 | 50 | 309 | Gauteng | 67 | 33 | 44 | 124 |
| KwaZulu-Natal | 33 | 67 | 50 | 251 | KwaZulu-Natal | 35 | 65 | 53 | 181 |
| Limpopo | 44 | 56 | 52 | 317 | Limpopo | 58 | 42 | 50 | 130 |
| Mpumalanga | 44 | 56 | 52 | 308 | Mpumalanga | 72 | 28 | 45 | 140 |
| North West | 49 | 51 | 52 | 268 | North West | 56 | 45 | 41 | 157 |
| Northern Cape | 50 | 50 | 49 | 339 | Northern Cape | 58 | 42 | 45 | 108 |
| Western Cape | 58 | 42 | 46 | 327 | Western Cape | 68 | 32 | 42 | 116 |

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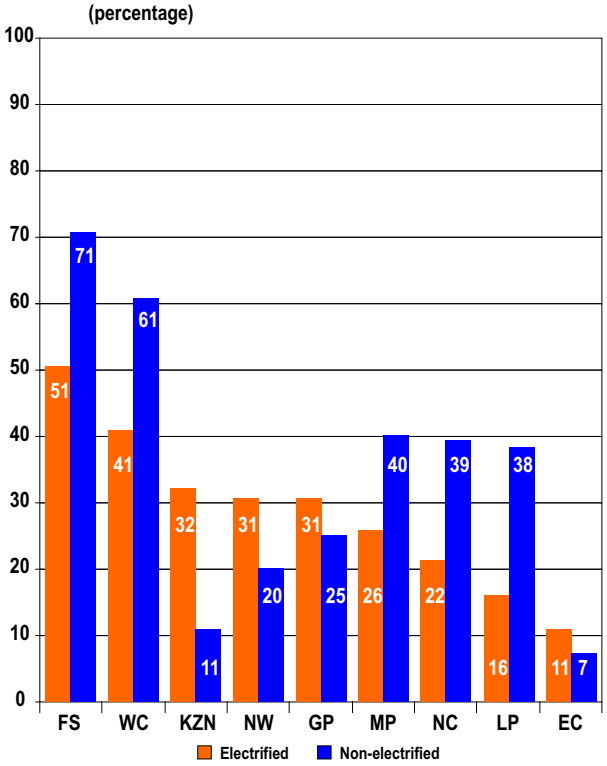
Socio-economic Status

# 6. SOCIO-ECONOMIC STATUS OF HOUSEHOLDS

## 6.1 Employment status of the household Head

In order to understand the socio-economic status of the households, an analysis was done to gauge the employment status of the household head for both electrified and non-electrified communities.

**Figure 5: Household heads in full time employment by province (percentage)**




The highest percentage of full time employed household heads is found in the Free State and Western Cape non-electrified communities, where seven in ten and six in ten households respectively have a household head in full time employment. Further analysis reveals that although these proportions are relatively high in comparison to the other provinces, the jobs involved are mostly manual labour on farms where people are employed full time but at low salaries. In all other provinces, a maximum of four in ten of the households have a household head in full time employment, whether in electrified or non-electrified communities.

## 6.2 Employment status and per capita Income of household members

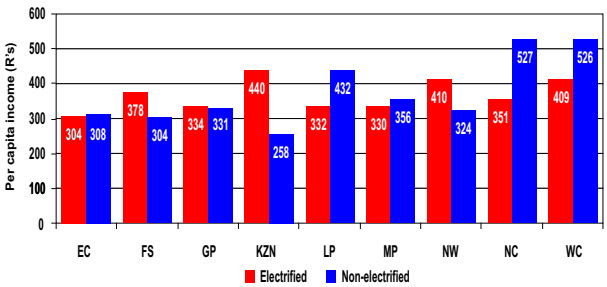
When the employment status of all household members was taken into consideration, it was found that on average fewer than one person per household was in either full time or part time employment, in both electrified and non-electrified communities.

**Table 9: Mean number of household members employed, by electrification status and province**

| Province | Mean number in part time employment | Mean number in full time employment | Mean number in employment (part or full time) | Base N |
|---|---|---|---|---|
| **Electrified** | **0.3** | **0.3** | **0.6** | **2671** |
| Eastern Cape | 0.2 | 0.1 | 0.3 | 273 |
| Free State | 0.1 | 0.6 | 0.7 | 279 |
| Gauteng | 0.4 | 0.4 | 0.8 | 309 |
| KwaZulu-Natal | 0.3 | 0.4 | 0.6 | 251 |
| Limpopo | 0.3 | 0.3 | 0.6 | 317 |
| Mpumalanga | 0.2 | 0.4 | 0.7 | 308 |
| North West | 0.3 | 0.4 | 0.7 | 268 |
| Northern Cape | 0.2 | 0.3 | 0.5 | 339 |
| Western Cape | 0.4 | 0.6 | 0.9 | 327 |
| **Non-electrified** | **0.3** | **0.3** | **0.6** | **1289** |
| Eastern Cape | 0.2 | 0.1 | 0.3 | 162 |
| Free State | 0.1 | 1.0 | 1.0 | 171 |
| Gauteng | 0.4 | 0.3 | 0.7 | 124 |
| KwaZulu-Natal | 0.4 | 0.2 | 0.6 | 181 |
| Limpopo | 0.3 | 0.4 | 0.7 | 130 |
| Mpumalanga | 0.3 | 0.5 | 0.8 | 140 |
| North West | 0.4 | 0.2 | 0.6 | 157 |
| Northern Cape | 0.2 | 0.6 | 0.8 | 108 |
| Western Cape | 0.3 | 0.7 | 1.0 | 116 |

In order to get a better understanding of income per household, the per capita income was calculated in order to make provision for variation in household size. The per capita income was derived by calculating the midpoint value for each income bracket, using the upper and lower bound values. For the highest income bracket, the lower bound value was used. These new values were then divided by the number of household members. The average per capita income for households in electrified areas was R 353 per month and slightly less, at R 311, for non-electrified households. Analysing per province and per location gave the following results.

**Figure 6: Mean per capita monthly income for households by province (Rands)**



The per capita income varies per province. Counter-intuitively, in Limpopo, Northern Cape and Western Cape electrified households have a lower per capita income than non-electrified households. Since the electrification programme is aimed at facilitating access to the poorest of the poor, the poorest communities in these provinces may have benefited from this approach.

When this same analysis was done per geographic location, it was found that the highest proportions of employed people live in farming areas. Also, farm workers whose households are electrified are paid higher salaries than farm workers who do not have electricity.

**Table 10: Mean number of household members employed and per capita monthly income, by electrification status and location**

| Area | Mean number in part time employment | Mean number in full time employment | Mean number in employment (part or full time) | Per capita income | Base N |
|---|---|---|---|---|---|
| **Electrified** | **0.3** | **0.3** | **0.6** | **R 353** | **2664** |
| Rural | 0.2 | 0.3 | 0.5 | R298 | 847 |
| Urban formal | 0.3 | 0.3 | 0.6 | R384 | 1218 |
| Urban informal | 0.3 | 0.4 | 0.7 | R 434 | 297 |
| Farm | 0.2 | 0.6 | 0.8 | R 531 | 302 |
| **Non-electrified** | **0.2** | **0.3** | **0.6** | **R 311** | **1288** |
| Rural | 0.3 | 0.1 | 0.4 | R 256 | 374 |
| Urban formal | 0.3 | 0.4 | 0.7 | R 450 | 228 |
| Urban informal | 0.5 | 0.3 | 0.8 | R 427 | 324 |
| Farm | 0.2 | 0.8 | 1 | R 397 | 362 |

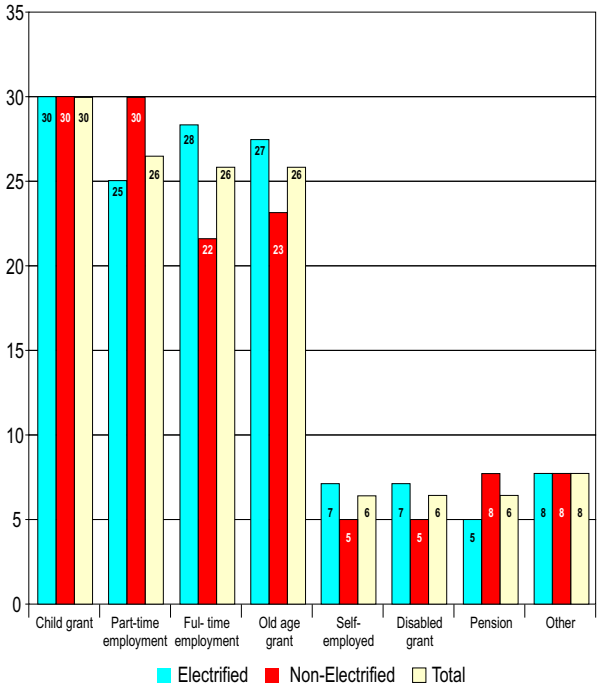
## 6.3 Sources of income

In poorer households, on average no more than one person in the household has any form of employment. The income generated from employment is also low and in order to understand the income stream of these households a question was asked about all the sources of income for the households.

Figure 7 indicates the percentage of people that receive a certain income; this does not make provision for amounts or frequencies involved.

Just under a third of all households have a child support grant as a source of income. Just more than a quarter of households stated that some members in the households were in part-time employment or full time employment. Similarly, 26% of households have a member that receives an old age grant.

**Figure 7: Sources of household income (percentage)**



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# Electrification Status

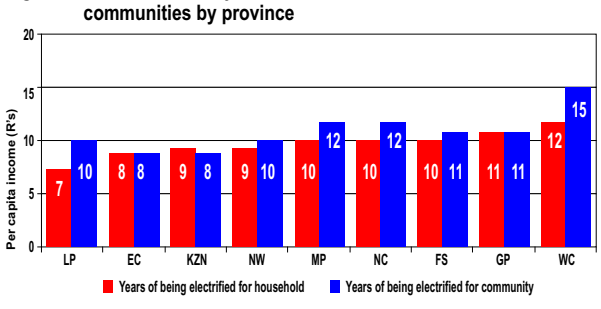
# 7. ELECTRIFICATION STATUS, APPLIANCE OWNERSHIP, FREE BASIC ELECTRICITY AND SERVICE INTERRUPTIONS

This section describes the utilisation of electricity amongst households. It gives information about the number of years that households and communities have been electrified, types of connections, electricity supply and types of metering systems. It discusses appliance ownership as well as FBE. Electricity interruptions are also dealt with in this section as these could be a potential barrier to the use of electricity. There are two main potential barriers to the use of electricity. The first is actual access to electricity supply; and the second is the ability to make use of it. Households without access to electricity can make use of alternative energy sources such as firewood or candles to satisfy energy needs, but some energy services, notably electrical appliances, require an electricity supply. In electrified households, the first barrier has been overcome, but they may face the second barrier: the ability to use the electricity. Reasons for this can include poor and unreliable service, lack of appliances and limited knowledge of how to use electricity and appliances (Davis, 1998). This section explores these issues as possible barriers to the use of electricity.

## 7.1 Number of years electrified

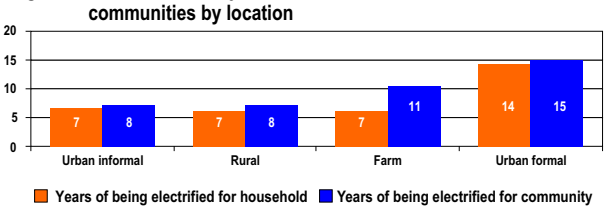
In order to contextualise the electrification programme and its impact on households, information was sought about the number of years that households and communities had been electrified. On average, households in Limpopo were electrified more recently (7 years) with those in the Western Cape electrified the longest. There is little variation between the provinces in relation to numbers of years that households have been electrified as opposed to the number of years that the community have been electrified, with the largest variation being between Limpopo and the Western Cape.

**Figure 8: Mean number of years electrified for households and communities by province**




When the length of time of electrification is disaggregated by location, it was found that urban formal areas had been electrified almost twice as long the other geographical areas. KwaZulu-Natal shows the reverse trend. This is difficult to explain but could be due to a definitional issue pertaining to community or the urban town development where formal and informal settlements are more integrated, making definitional issues about communities difficult.

**Figure 9: Mean number of years electrified for households and communities by location**




The significance of the length of time of electrification becomes apparent when two factors contributing to the use of electricity are analysed. A correlation between the per capita monthly spend on electricity, per capita monthly income and years of being electrified showed that the number of years of being electrified contributed more to monthly spending on electricity than any of the other mentioned factors[3]. The number of years that a household has been electrified therefore relates directly to the amount of electricity used by the household.

## 7.2 Type of connection

In terms of what type of electricity connections households have, it was found that the vast majority of households (95%) have grid electricity. KwaZulu-Natal households had the highest reporting of non-grid electricity; this was mostly in the urban informal areas.

## 7.3 Type of electricity supply

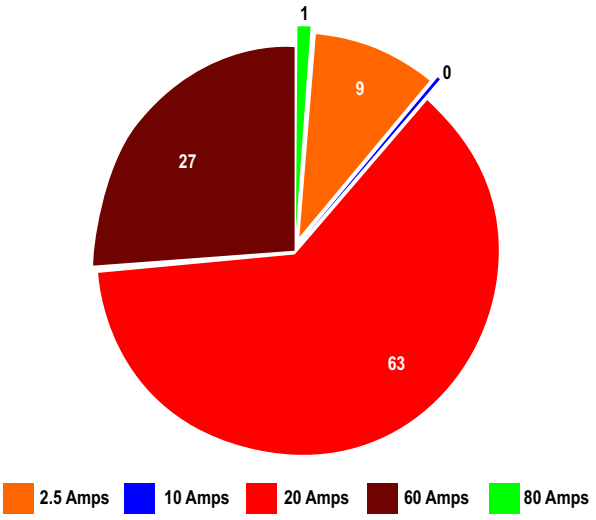
The Ampere, in practice often shortened to Amps, is a unit of electrical current amount of electric charge per unit time, in coulombs per second. According to the DME (2003), low levels of supply (10 amps) are suited to municipalities with lower capacity and large proportions of poorer consumers.

[3] Correlation between per capita spend on electricity and monthly income (0.049), per capita income (0.059) and length of electrification (.123).

However, government acknowledges that 10 amps supply will not be suitable for households with many members and that frequent tripping of the control systems will be experienced (Ruiters, 2009).

In order to gain an understanding of types of electricity supply, households were asked to indicate their electricity supply in terms of Amps. More than three fifths (63%) of households are supplied with 20 Amps, and just more than a quarter (27%) with 60 Amps. Nine percent have a 2.5 Amps supply; these are mostly in KwaZulu Natal, Limpopo and the Northern Cape. Only one in a hundred houses has 80 Amps and only 0.5% 10 Amps.

**Figure 10: Type of electricity supply (percentage)**




When disaggregated per province, the 20 Amps supply predominated in all provinces except Mpumalanga where the majority of households reported a 60 Amps supply.

**Table 11: Type of electricity supply by province (percentage)**

| Province | 2.5 Amps | 10 Amps | 20 Amps | 60 Amps | 80 Amps and more | Total | 2Base N |
|---|---|---|---|---|---|---|---|
| Eastern Cape | 1 | 0 | 76 | 23 | 1 | 100 | 270 |
| Free State | 0 | 0 | 84 | 13 | 4 | 100 | 270 |
| Gauteng | 1 | 1 | 57 | 36 | 5 | 100 | 307 |
| KwaZulu-Natal | 29 | 1 | 40 | 30 | 1 | 100 | 213 |
| Limpopo | 18 | 0 | 69 | 12 | 0 | 100 | 308 |
| Mpumalanga | 4 | 1 | 45 | 51 | 0 | 100 | 307 |
| North West | 0 | 0 | 71 | 28 | 1 | 100 | 259 |
| Northern Cape | 11 | 1 | 61 | 27 | 0 | 100 | 331 |
| Western Cape | 8 | 13 | 64 | 15 | 0 | 100 | 296 |
| **TOTAL** | **9** | **0** | **63** | **27** | **1** | **100** | **2561** |

In farming areas, 78% reported a 20 Amps supply, and 15% a 60 Amps supply.

In rural communities, 20 Amps supply was most commonly reported (67%) with 21% having 60 Amps. In urban informal areas, 59% of households had a 20 Amps supply and 30% a 60 Amps supply. In urban formal areas, the majority of households indicated a supply of 20 Amps, and 41% a 60 Amps supply. Low Amps supply (2.5 Amps) was mostly found in rural and urban informal areas.

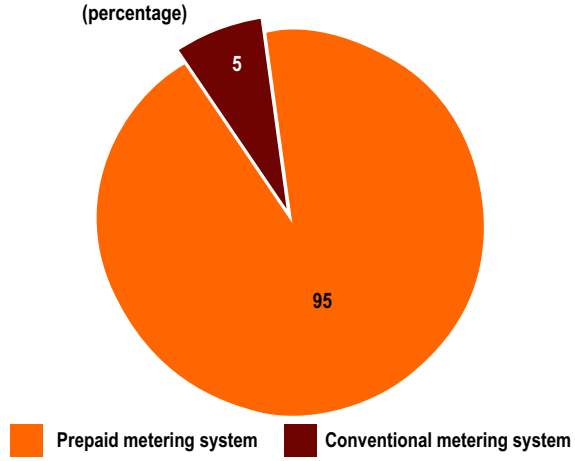
**Table 12: Type of electricity supply by location (percentage)**

| Province | 2.5 Amps | 10 Amps | 20 Amps | 60 Amps | 80 Amps and more | Total | 2Base N |
|---|---|---|---|---|---|---|---|
| Rural | 11 | 0 | 67 | 21 | 0 | 100 | 832 |
| Urban Formal | 5 | 1 | 50 | 41 | 4 | 100 | 1186 |
| Urban informal | 11 | 0 | 59 | 30 | 0 | 100 | 271 |
| Farm | 5 | 0 | 78 | 15 | 2 | 100 | 272 |
| **TOTAL** | **9** | **0** | **63** | **27** | **1** | **100** | **2561** |

## 7.4 Type of metering system

Up to the 1980s, the majority of electricity supply to domestic consumers was supplied by the so called "credit meters". These meters recorded consumption, meter readers collected the records, and bills were then issued on the basis of metered or estimated consumption. This process of reading meters, distributing bills, dealing with arrears and disconnections, proved to be costly not only economically but also politically. Payment boycotts and difficulty in collecting arrears gave rise to the development and installation of pre-paid meters. Since the late 1980s and the 1990s, pre-paid meters have been associated with the "Electricity for All" initiative. It is therefore not surprising that the majority of households in this survey have a pre-paid metering system for electricity supply. Only 5% of the sample has a conventional metering system.

**Figure 11: Type of metering system among electrified households (percentage)**



Since these pre-paid meters make use of tokens (cards or printed payment slips), a household needs to purchase tokens if it wishes to use electricity. Some research (Tewari & Shah, 2003; van Heusden, 2009) shows that to get to vending machines people had to walk considerable distances and stand in long queues in order to get the tokens. Also, vending machines were not always in working order. Given this, households were asked about satisfaction with vending hours.

An overwhelming majority of households, 96% (2170) indicated that they were satisfied with vending hours with the remaining 4% (90) not satisfied. Residents in the Western Cape were most satisfied with the vending hours at 99%, closely followed by Mpumalanga, North West and KwaZulu-Natal (97%), Limpopo, Gauteng and Eastern Cape (96%), Northern Cape (92%) and Free State (90%).

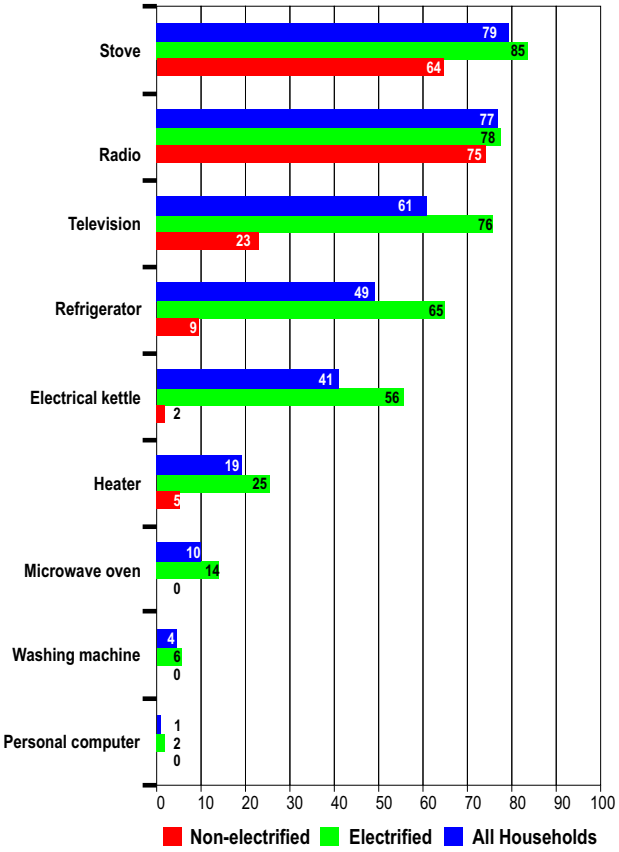
Households on farms were most satisfied with the vending hours, with 99% saying they are satisfied followed by rural and urban informal (97%) and urban formal (94%) households.

Most people who did not find the vending hours acceptable wanted the hours extended from 07:00 to 20:00 on weekdays, on Saturdays and at month end. For Sundays, they indicated preferred extended hours from 08:00 to 13:00.

## 7.5 Appliance ownership

Clearly a barrier to the use of electricity is the lack of equipment associated with electricity use. Across all households, the most-owned appliance owned is a stove (79%), followed by a radio (77%), television (61%), refrigerator (49%), electric kettle (41%), heater (19%), microwave oven (10%), washing machine (5%) and a personal computer (2%). In electrified households, the most-owned appliance is a stove, followed by a radio, television, refrigerator and electric kettle. Some non-electrified households also indicated that they owned a stove, radio, television, refrigerator, kettle and heater. Most of these appliances were in working order, with at most a three percent difference between appliances in working order and those not in working order.

Figure 12: Ownership of electrical appliances (percentage)




## 7.6 Public communication

### 7.6.1 Knowledge of Free Basic Electricity (FBE)

As part of the manifesto of the government, free basic water and electricity services were promised to very poor households. Up to 50 kWh per month per household delivered as part of the FBE was deemed sufficient to provide basic services to these households (DME, 2003). The intention of the FBE was to provide households with the ability to use electricity for the basic needs of lighting and boiling water. The government argued that this amount was suitable given that households that are poor generally have a low demand for electricity and that on average more than 50% of poor households do not consume more than 50kWh of electricity per month (Ruiters, 2009). Some academics and theorists argue that this amount of FBE is inadequate to meet the needs of the poor (Ruiters, 2009), and that a small refrigerator would use more than 50 kWh if run for 24 hours a day. The table below shows the energy used by appliances.

**Table 13: Energy used by various appliances**

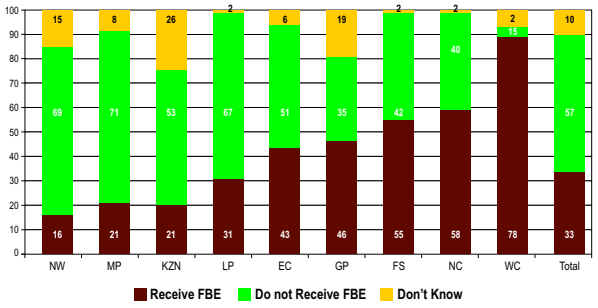
| Item | Watts | Hours used | Days used | kWh |
|---|---|---|---|---|
| 1X energy-saver light | 11 | 5.0 | 30 | 1.7 |
| 1X TV (B&W) | 35 | 6.0 | 30 | 7.0 |
| 1X iron | 1000 | 4.0 | 6 | 24.0 |
| 1X kettle | 1000 | 0.5 | 30 | 15.0 |
| 1X hotplate | 1000 | 1.0 | 25 | 25.0 |
| 1X regular light | 100 | 5.0 | 30 | 15.0 |
| 1X refrigerator (small) | 250 | 6.5 | 30 | 49.0 |

**Source: DoE: Free Basic Electricity Policy, (2003)**

The table shows that a household would use up the FBE if it was running a hot plate for 2 hours every day in a month. The limited amount of FBE would therefore explain the multiple energy- use phenomenon in South Africa. Very few poor households use only electricity for cooking, lighting and heating.

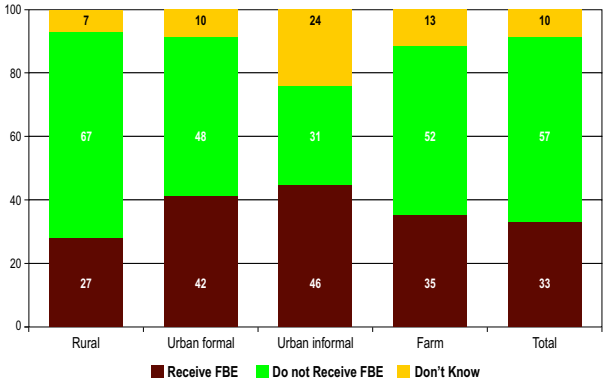
Since the FBE initiative is aimed at poor households, it is surprising that only a third indicated that they receive free basic electricity. The rest indicated that they do not receive it (57%) or do not know if they receive it (10%).

**Figure 13: Households receiving FBE by province (percentage)**




There were clear variations between provinces in terms of receipt of FBE. Almost eight in ten (78%) households in the Western Cape indicated that they receive FBE, with just over than half of the households in Northern Cape (58%) and Free State (55%) indicating that they receive FBE. Less than half of the households in Gauteng (46%) and the Eastern Cape (46%) believe that they receive FBE, followed by Limpopo (31%), KwaZulu-Natal (21%), Mpumalanga (21%) and North West (16%).

**Figure 14: Households receiving FBE by location (percentage)**




More than two thirds (67%) of rural households indicated that they do not receive FBE, as do just over half (52%) of farm households, 48% of households in urban formal areas and 31% in urban informal areas. The highest proportion of households stating "don't know" were amongst urban informal dwellers.

In most provinces, poor electrified households are more aware that they are receiving FBE than electrified households in general. This is encouraging, since the message about free electricity appears to be reaching those whom it is intended to benefit. However, the knowledge gap is still large in certain provinces, and has implications for the communication strategies of DoE and other service providers.

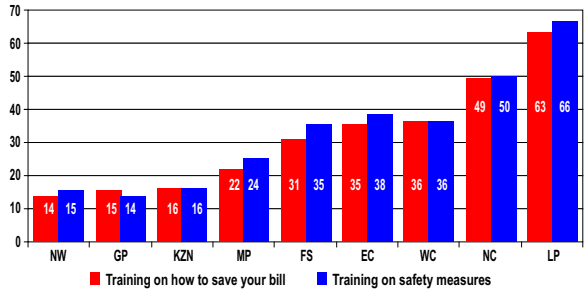
**Table 14: Comparison between the DoE 2008/2009 study and General Household Survey (2007) regarding knowledge of FBE (percentage)**

| Province | GHS 2007 | DoE Survey 2008/2009 | Difference |
|---|---|---|---|
| Free State | 57 | 55 | -2 |
| Western Cape | 50 | 78 | 28 |
| Gauteng | 27 | 46 | 19 |
| Eastern Cape | 27 | 43 | 16 |
| Northern Cape | 24 | 58 | 34 |
| Mpumalanga | 22 | 21 | -1 |
| North West | 19 | 16 | -3 |
| Limpopo | 16 | 31 | 15 |
| KwaZulu-Natal | 9 | 21 | 12 |

### 7.6.2 Training on electricity usage

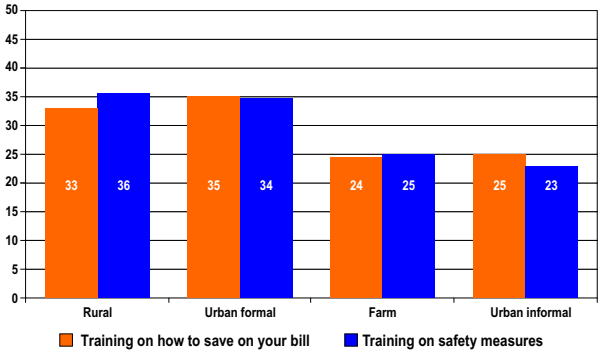
In general, a third of households (33%) indicated that they had received training on how to use electricity safely, whilst 31% indicated they had received training on how to save on electricity costs. Receiving training in one was highly correlated with training in the other: if a household received training in safety aspects, it was highly likely that it also received training in the general use of electricity, including how to save on its use, and vice versa.

**Figure 15: Training on electricity use and safe use of electricity by province (percentage)**




On average, six in ten households in Limpopo indicated that they received training on issues of electrification. By contrast, in KwaZulu-Natal, Gauteng and North West on average fewer than two in ten households indicated that they received any form of training.

**Figure 16: Training on electricity use and safe use of electricity by location (percentage)**

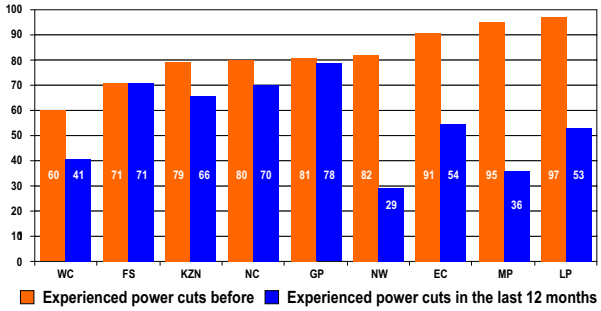



Training was more frequent in rural and urban formal areas, where about a third of households indicated that they got some form of training. About a quarter of households on farms and in urban informal areas had received training.

### 7.7 Power failures

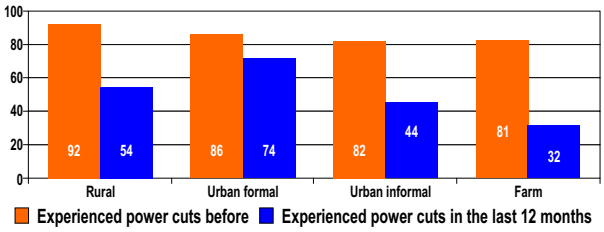
In order to gauge the possible barriers to the use of electricity, households were asked to indicate if they had ever experienced power failures in the household. Nine in ten (88%) indicated that they had, and 12% indicated that they had not. Per province, it was found that almost all (97%) households in Limpopo had experienced power failures, followed by Mpumalanga (95%) and Eastern Cape (91%). Other provinces reported fewer incidences of power failure.

**Figure 17: Power failures experienced by province (percentage)**




Households were asked if they had experienced power failures in the past twelve months. Gauteng, Free State, Northern Cape and KwaZulu-Natal reported the most failures, with seven in ten households experiencing a power cut during this period.

**Figure 18: Power failures experienced by location (percentage)**




Taking geographic spread into consideration, rural areas reported the highest incidences of power failures, followed by urban formal areas, urban informal areas and farms. However, asked about power failures in the last twelve months, urban formal areas reported the highest rates, with seven in ten households in these areas reporting power failures.

Table 15: Number of times power failures experienced (row percentage)

| Province | 1 to 12 times | 13 to 24 times | 25 to 36 times | 37 to 48 times | 50+ times | Total | Base N |
|---|---|---|---|---|---|---|---|
| Eastern Cape | 86 | 10 | 3 | 1 | 0 | 100 | 241 |
| Free State | 96 | 4 | 0 | 0 | 0 | 100 | 210 |
| Gauteng | 64 | 10 | 15 | 9 | 2 | 100 | 237 |
| KwaZulu-Natal | 89 | 9 | 2 | 0 | 0 | 100 | 153 |
| Limpopo | 44 | 36 | 16 | 2 | 3 | 100 | 292 |
| Mpumalanga | 49 | 40 | 10 | 1 | 0 | 100 | 287 |
| North West | 66 | 26 | 4 | 2 | 1 | 100 | 215 |
| Northern Cape | 73 | 14 | 5 | 5 | 2 | 100 | 268 |
| Western Cape | 96 | 4 | 0 | 0 | 0 | 100 | 185 |
| TOTAL | 67 | 22 | 8 | 2 | 1 | 100 | 2088 |

Across the entire sample, the majority (67%) of households indicating that they had experienced power cuts in the last twelve months stated that it had happened between one and twelve times.

Analysis of power failures by province indicates that more than half of households in Limpopo and Mpumalanga experienced power failures more than 13 times in the last twelve months.

### 7.7.1 Length of power cuts

More than half (51%) of power failures lasted from 1-4 hours, a quarter (26%) from 5-8 hours, less than a tenth (6%) from 9-12 hours and just under a fifth (17%) 13+ hours.

A substantial proportion of households in North West, Mpumalanga, Gauteng and Eastern Cape experienced power cuts lasting for more than 13 hours. Analysed by location, the duration of power failures was similar for all locations, but farms seemed to experience power cuts lasting slightly longer than other geographical areas.

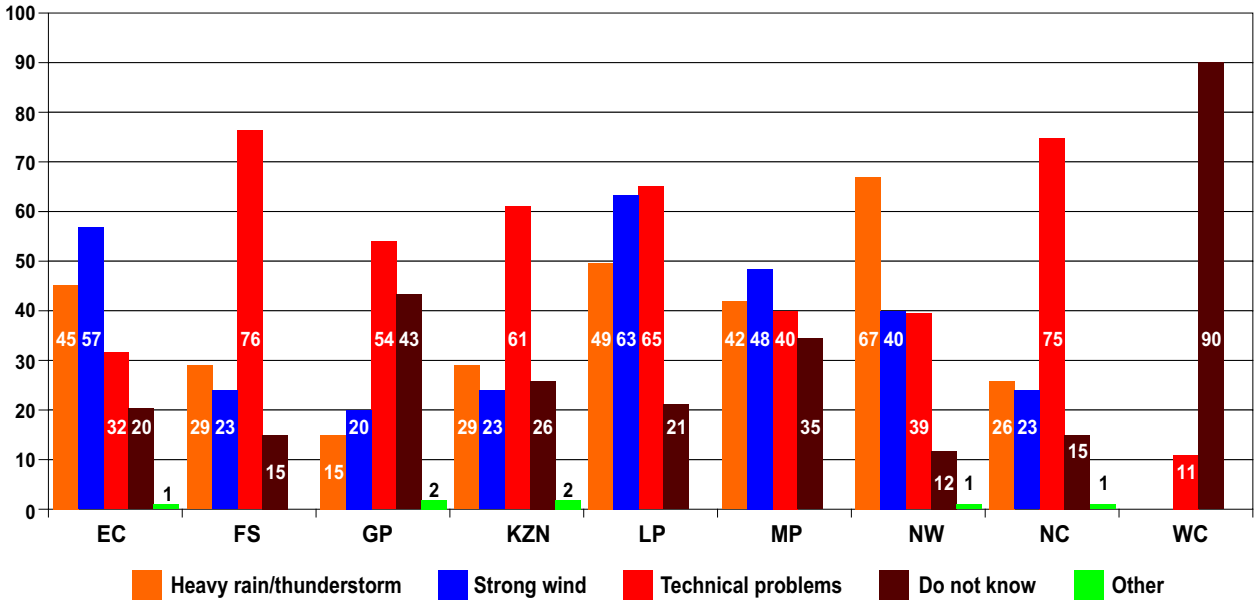
Table 16: Length of power failures by province (percentage)

| Province | 1 to 4 hours | 5 to 8 hours | 9 to 12 hours | 13+ hours | Total | Base N |
|---|---|---|---|---|---|---|
| Eastern Cape | 42 | 25 | 5 | 28 | 100 | 241 |
| Free State | 60 | 33 | 2 | 5 | 100 | 208 |
| Gauteng | 40 | 27 | 7 | 26 | 100 | 238 |
| KwaZulu-Natal | 73 | 17 | 3 | 7 | 100 | 153 |
| Limpopo | 62 | 29 | 5 | 4 | 100 | 292 |
| Mpumalanga | 39 | 29 | 12 | 20 | 100 | 287 |
| North West | 36 | 28 | 10 | 26 | 100 | 215 |
| Northern Cape | 67 | 19 | 4 | 11 | 100 | 267 |
| Western Cape | 74 | 12 | 2 | 12 | 100 | 185 |
| TOTAL | 51 | 26 | 6 | 17 | 100 | 2086 |

### 7.7.2 Reasons for power failures

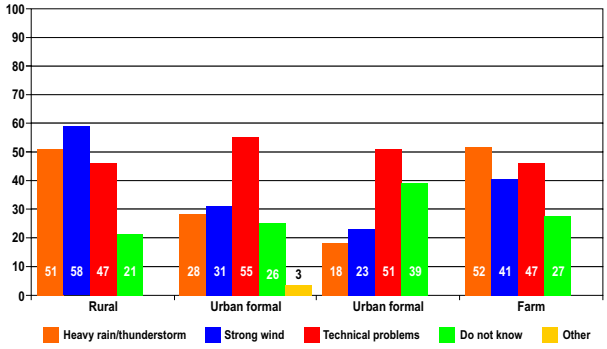
People in the households were asked what they thought the reasons for power failures were. Technical problems were cited most frequently (30%), followed by strong winds (29%) and heavy thunderstorms (26%). Just under one-seventh (15%) did not know the reasons for the power failures and less than one percent cited other reasons. The other reasons mainly related to load shedding and cable theft.

Figure 19: Perceived reasons for the power failures by province (percentage)



Reasons for the power failures varied per province and some interesting differences emerge. In the Free State and Northern Cape, the majority (three quarters) cited technical problems as the main perceived reason for power failures. To a lesser extent, these were also cited in Gauteng, KwaZulu-Natal and Limpopo. Strong winds and heavy rain and thunderstorms were quite frequently given as reasons for power failures in North West, Limpopo and the Eastern Cape. Notably, nine in ten households in the Western Cape indicated that they did not know the reason for power failures in their areas. This could imply a weak communication strategy on power failures in poor electrified communities in the Western Cape and may be something for the authorities in the Western Cape to address.

**Figure 20: Perceived reasons for the power failures by location (percentage)**

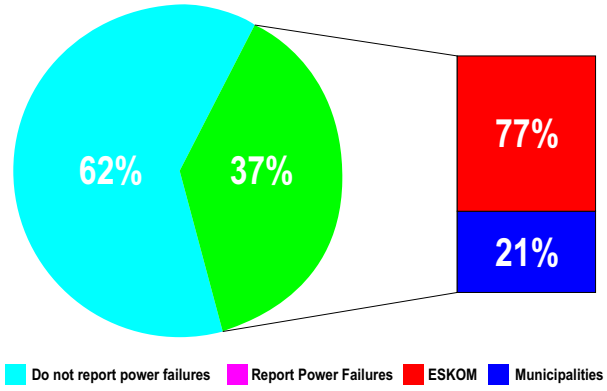



In rural areas and on farms, natural phenomena are more likely to be perceived as causing power failures than in urban formal and urban informal areas, where technical problems are most commonly blamed.

### 7.7.3 Reporting of power failures

More than a third of the households (37%) report power failures whilst almost two thirds (62%) do not report. Of those that do, the majority (77%) report to Eskom. Just over one-fifth (21%) report to a municipality and a very small percentage 2% to other structures. More than four-fifths (83%) report failures telephonically and less than one-fifth (17%) in person.

**Figure 21: Reporting of power failures**



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

ELECTRICITY

Household Survey

## 8. HOUSEHOLD ENERGY CONSUMPTION AND POVERTY

As a means of understanding current energy use patterns and of influencing policy decisions relating to basic energy services, this section of the report examines patterns of energy consumption among urban and rural poor households.

### 8.1 Household energy sources

Research on energy use patterns in South Africa over the last two decades has revealed fairly consistently that poor households tend to rely for their energy needs on multiple energy sources, and that this applies to electrified households and to non-electrified households. This provides a strong empirical challenge to prevailing energy transition theories and the 'energy ladder' model, which presuppose a uni-directional progression from traditional to modern energy sources and appliances once households receive an electrical connection.

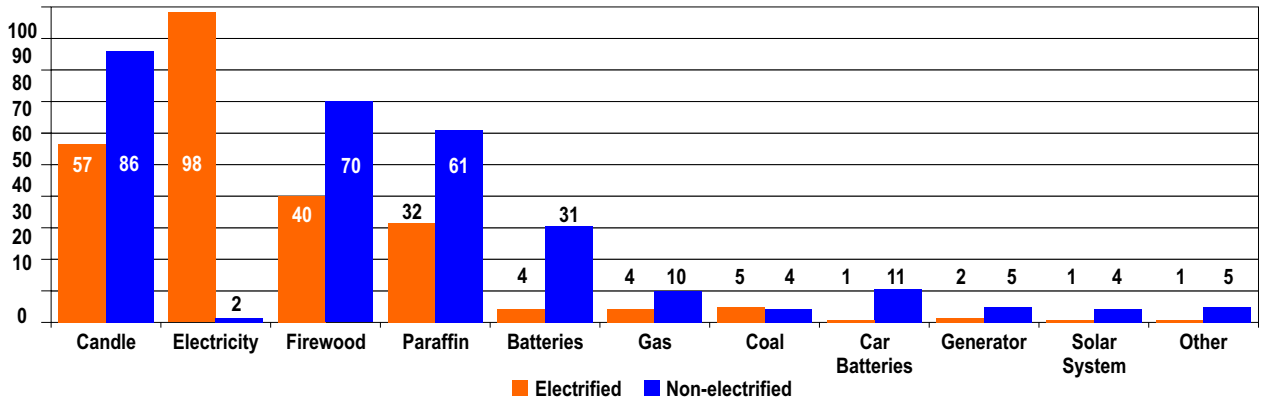
Fifteen years into democracy, the survey results provide important corroborating evidence of the enduring multiple energy use phenomenon for sizable percentages of electrified and non-electrified households. Figure 22 shows the percentage of households in the sample that reported using a range of energy sources, disaggregated according to electrification status.

The results show that poor South Africans use a wide range of energy sources including candles, electricity, firewood, paraffin and, to a lesser extent, batteries.

The use of a range of sources among poor electrified households can also be noted, though the use of energy sources other than electricity tends to be higher among poor non-electrified households. Irrespective of whether they are electrified, energy sources such as gas, coal, car batteries, generators, solar electricity and other non-commercial sources such as dung and crop residues are used by only small percentage of poor households (generally less than 5%).

In relation to multiple energy-source use, it is important to consider the different purposes for which households employ energy sources; these include lighting, space heating, cooking, heating water and powering appliances such as radios, hi-fis and televisions. For electrified households, the relatively widespread use of candles (57%) is probably part of a energy substitution strategy in which candles are used to light homes during electricity interruptions, or if the household exhausts its budget for prepaid electricity meters. Approximately half (48%) of electrified households indicate that they use firewood and a third (32%) use paraffin, most likely in the case of paraffin for cooking and possibly for lighting. In non-electrified households, there is a pronounced use of candles (86%), firewood (70%) and paraffin (61%) for lighting, cooking and heating. The use of batteries is more than eight times higher among non-electrified (31%) than among electrified (4%) households, presumably reflecting the importance of this energy source for powering appliances, in particular radios and hi-fis. A fuller analysis of energy sources for different purposes, and how these vary according to location and other household characteristics, is provided later in this section of the report.

**Figure 22: Use of energy sources among poor households, by electrification status (percent using)**



### 8.1.1 Geographic location and energy Sources

The study shows a strong correlation between energy consumption patterns and geographic location of households.

Historically, three factors in particular have proven significant: rural or urban location; climatic conditions and associated space heating requirements in winter; and, in the cases of North West, Gauteng, Free State, Mpumalanga, Limpopo and northern KwaZulu-Natal proximity to the country's coalfields (Eberhard and Van Horen, 1995). The extent to which such factors emerge as important in the 2009 survey is discussed below.

In Table 17, the statistics on multiple energy use are further disaggregated by geographic location of the sampled households. The intention of this part of the survey was to illustrate all energy sources used by households; they could therefore report various energy sources and therefore the percentages do not sum to 100%.

**Table 17: Households reporting use of energy source, by electrification status and location (percent)**

| Energy source | Non- electrified | | | | Non- electrified | | | |
|---|---|---|---|---|---|---|---|---|
| | Rural | Urban formal | Urban informal | Farm | Rural | Urban formal | Urban informal | Farm |
| Candle | 67 | 46 | 50 | 32 | 87 | 82 | 79 | 87 |
| Electricity | 98 | 99 | 100 | 99 | 3 | 0 | 0 | 0 |
| Firewood | 73 | 15 | 8 | 43 | 85 | 28 | 22 | 73 |
| Paraffin | 32 | 37 | 26 | 20 | 56 | 81 | 92 | 40 |
| Batteries | 3 | 3 | 7 | 1 | 33 | 24 | 29 | 26 |
| Gas | 4 | 6 | 2 | 0 | 12 | 8 | 7 | 5 |
| Coal | 3 | 9 | 7 | 0 | 4 | 13 | 4 | 4 |
| Car batteries | 1 | 1 | 0 | | 10 | 9 | 11 | 18 |
| Generator | 1 | 1 | 7 | 0 | 6 | 3 | 4 | 1 |
| Solar system | 1 | 1 | 0 | 3 | 5 | 2 | 0 | 1 |
| Other | 1 | 1 | 0 | 1 | 6 | 2 | 2 | 8 |
| Base N | 849 | 1221 | 298 | 303 | 375 | 228 | 324 | 362 |

Note: 'Other' includes mainly other non-commercial sources such as dung and crop residue. The column percentages do not sum up to 100 percent, since the table is reporting on multiple-response items.

Rural households clearly depend substantially more on biomass resources, especially firewood, than those in small towns and cities.

Among non-electrified households, 85% in rural areas and 73% in farm areas use firewood as an energy source, compared with only 28% in formal urban areas and 22% in informal settlements. Similarly, close to three-quarters of electrified households in rural areas and half of those on farms use firewood. In formal urban areas, 15% of electrified households use firewood and in informal settlements 8% do so.

The use of other forms of non-commercial biomass resources such as dung and crop residue is generally not widespread, with their highest rate of use in non-electrified households in rural contexts. In urban areas, these energy sources are hardly used as sources of domestic energy. In electrified households, whether rural or urban, dung and crop residue use is virtually non-existent.

Candles and paraffin are fairly commonly used in rural and urban households, although to different degrees. Candles are almost universally employed by non-electrified households. In informal settlements, paraffin is used by 92% of households and is the most common energy source, ahead of candles. This is in spite of the rapid rise in the price of paraffin in recent years. It is also used by more than eight out of ten non-electrified households in formal urban areas. It is also used by 56% of non-electrified households in rural areas and by 40% of households on farms. This suggests that a percentage of rural households use a certain amount of paraffin for specific purposes such as rapidly heating food or boiling water.

Candle usage among electrified households is lower than in non-electrified households, though approximately two-thirds of electrified households based in rural areas use them. Candles are also used in close to half of the electrified households in formal and informal urban areas. The use of candles is lowest among electrified households on farms. Paraffin use in electrified households is most prevalent in formal urban areas (37%), followed by rural areas (32%). It is used by between a fifth and a quarter of households in informal settlements and on farms.

Table 18: Households reporting use of energy source, by province (percent)

| Energy source | EC | FS | GP | KZN | LP | MP | NW | NC | WC | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Candles | 66 | 35 | 58 | 67 | 75 | 88 | 62 | 31 | 24 | 67 |
| Electricity | 57 | 55 | 67 | 51 | 80 | 74 | 80 | 91 | 76 | 64 |
| Firewood | 63 | 47 | 16 | 48 | 82 | 64 | 42 | 40 | 6 | 56 |
| Paraffin | 74 | 34 | 49 | 32 | 16 | 26 | 39 | 11 | 39 | 42 |
| Batteries | 17 | 14 | 6 | 22 | 5 | 12 | 4 | 4 | 7 | 13 |
| Gas | 8 | 4 | 3 | 11 | 1 | 3 | 4 | 3 | 7 | 6 |
| Coal | 0 | 7 | 9 | 6 | 0 | 20 | 2 | 0 | 0 | 5 |
| Car batteries | 1 | 1 | 5 | 10 | 2 | 7 | 1 | 0 | 3 | 4 |
| Generator | 0 | 0 | 3 | 10 | 1 | 1 | 0 | 0 | 0 | 3 |
| Solar system | 1 | 1 | 0 | 5 | 2 | 1 | 0 | 1 | 0 | 2 |
| Other | 3 | 1 | 0 | 6 | 0 | 4 | 0 | 0 | 0 | 2 |
| Base N | 435 | 450 | 433 | 432 | 447 | 448 | 425 | 447 | 443 | 3960 |

Note: The column percentages do not sum up to 100 percent, since the table reports on multiple-response items.

In electrified households, no other energy source had a prevalence exceeding ten percent. Batteries, coal and generator electricity are used in 7% of electrified households in informal settlements. In non-electrified households, batteries and car batteries are more common energy sources, particularly for powering appliances such has radios and televisions. Gas is more widespread among non-electrified households in rural areas and coal in formal urban areas.

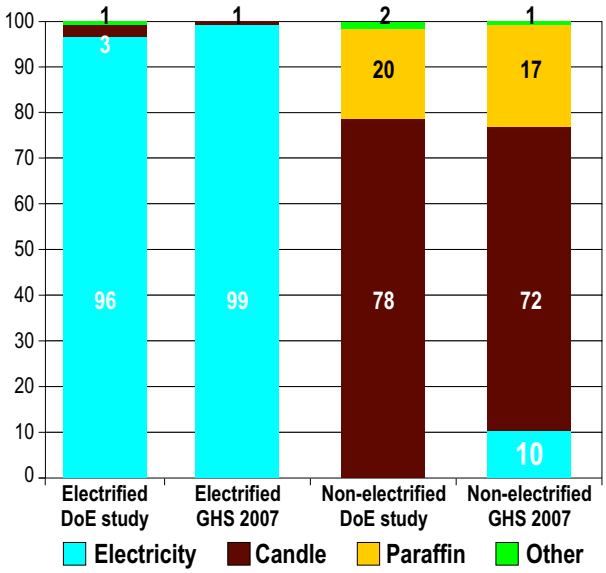
There is a notable variation in energy consumption patterns between provinces (Table 18). In Limpopo and Mpumalanga, relatively high electricity usage (80% and 75% respectively) coexists with equally high usage of candles and firewood. Mpumalanga has the highest rate of coal use, at 20%. In KwaZulu-Natal and Eastern Cape, the provinces with relatively lower electrification rates, a range of energy sources is used. In the Eastern Cape, firewood usage is above average, while paraffin is used in three-quarters of homes, a figure that exceeds the average by more than 30 percentage points. In both provinces, the use of dung and crop residue, gas, and batteries is higher than in other parts of the country. In Gauteng and the Western Cape, traditional non-commercial energy sources are used in a small percentage of households, with transitional energy sources such as paraffin used in between 40% and 50% of households. Electricity however remains the dominant household energy source in these two provinces.

## 8.2 Main use of energy sources

### 8.2.1 Main energy source for lighting.

As Figure 23 demonstrates, households that have been electrified almost exclusively use electricity for lighting purposes, with a small percentage using candles. By contrast, more than three-quarters of non-electrified households use candles as the main energy source for lighting, with paraffin the main source in most of the remaining cases. Compared to the main energy sources used for lighting nationally in electrified and non-electrified households included in the General Household Survey of 2007, the observed differences for low income households are not particularly pronounced.

Figure 23: Main energy source used for lighting, by electrification status (percent)




Note: The South African data for 2007 provided in the figure is based on analysis of all electrified households in the 2007 round of the General Household Survey (irrespective of income status).

For electrified households, the pattern shown in the figure above applies in the urban and the rural environment (Table 19). Among non-electrified households, paraffin is more typically used for lighting in informal settlements (28%) and in rural areas (20%) than in formal urban localities and on farms. Nonetheless, candle use remains the single most important energy form for lighting. Household energy sources such as paraffin and candles pose significant health risks in that they can cause accidents resulting in injury or death, through poisoning of children who drink fluid fuels or when shacks are razed by a paraffin stove fire in a single household (Howells et al., 2006).

Electricity is generally viewed as the cleanest energy source for households, thereby reducing health risk but also bringing other gains such as providing a more efficient lighting source for children to perform homework tasks.

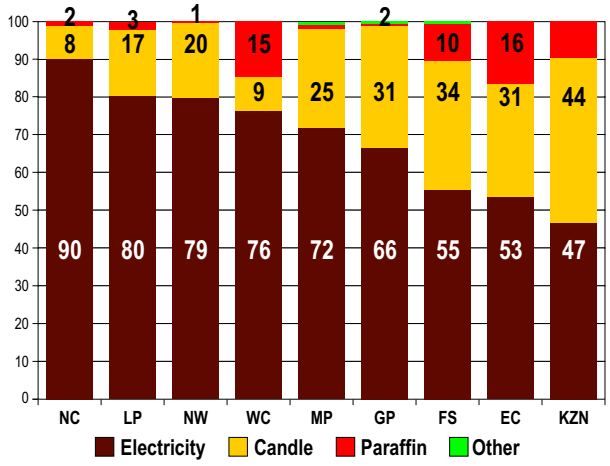
**Table 19: Main energy sources used for lighting, by electrification status and location**

| Energy source | Non- electrified | | | | Non- electrified | | | |
|---|---|---|---|---|---|---|---|---|
| | Rural | Urban formal | Urban informal | Farm | Rural | Urban formal | Urban informal | Farm |
| Electricity | 94 | 97 | 100 | 99 | - | - | - | - |
| Candle | 5 | 2 | 0 | 1 | 79 | 79 | 70 | 86 |
| Paraffin | 1 | 1 | 0 | - | 20 | 15 | 28 | 13 |
| Generator | - | - | - | - | 1 | 2 | 2 | 1 |
| Solar system | - | - | - | - | 1 | 2 | - | 0 |
| Firewood | - | - | - | 0 | 0 | 0 | - | 0 |
| Gas | - | - | - | - | - | 2 | - | - |
| Car batteries | - | - | - | - | - | 0 | - | 0 |
| Other | - | - | - | - | - | 0 | 0 | - |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 848 | 1221 | 298 | 303 | 375 | 228 | 324 | 361 |

**Note: Cells with '-' indicate that no households in this group reported using that energy source for lighting.**

Figure 24 shows the main source of energy for lighting by province. Electricity is used by more than two-thirds of households for lighting in six of the nine provinces, with the figure increasing to more than 80% of households in Limpopo and the Northern Cape. In KwaZulu-Natal, the Eastern Cape and the Free State, barely half of the sampled households rely on electricity, with candles and paraffin being important sources of energy for lighting. In the Western Cape, a notable percentage of households use paraffin.

**Figure 24: Main energy source used for lighting, by province (percent)**



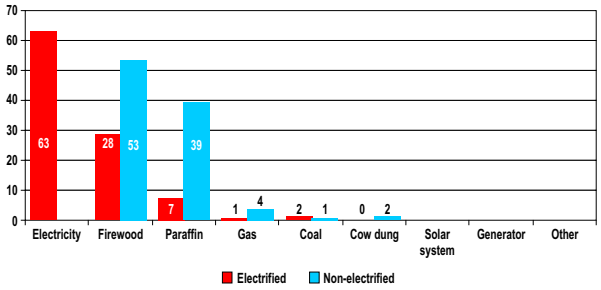

### 8.2.2 Main energy source for cooking

Cooking is one of the most energy-intensive applications (Howells et al, 2006) and it is therefore unsurprising that slightly more than 60 percent of electrified households use electricity for cooking, although this is substantially below the 94 percent reported for lighting (Figure 25). Previous research has shown that the take-up of electricity for cooking has been increasing, but at a much slower rate than for lighting and media uses (Bekker et al, 2008). Once a household has been electrified, a complex set of factors is said to govern the decision whether to adopt electricity for thermal applications, ranging from cultural inertia to change to the perceived lack of affordability of electricity (White et al, 1997; Sebitosi and Pillay, 2005; Bekker et al, 2008). In consequence, close to 30 percent of electrified households continue to use firewood as a main cooking source, with a small percentage using paraffin (7-8%) and other sources.

The low-income, electrified households included in the study are more likely to be relying on firewood and less on electricity than the average electrified household. In the 2007 General Household Survey, 79% of electrified households use electricity as the main source for cooking with only 10% depending on wood. Similar shares are reported using other energy sources. This suggests the existence of barriers or practices among poorer households that inhibit a fuller transition from firewood to electricity for this end use.

Among non-electrified households, firewood (53%) and paraffin (39%) are the main energy sources for cooking. Gas, coal and dung are the main source in a small percentage of households. The non-electrified households surveyed were more likely to be using firewood and less likely to be using paraffin than the average non-electrified household, with the 2007 General Household Survey reporting that 38% were primarily using wood and 47% paraffin to meet their cooking needs.

**Figure 25: Main energy source used for cooking, by electrification status (percent)**




Note: The South African data for 2007 provided in the figure is based on analysis of all electrified households in the 2007 round of the General Household Survey (irrespective of income status).

Between provinces, there are considerable differences in terms of the main energy source for cooking. In the Western Cape, KwaZulu-Natal and Gauteng, more than 90 percent of electrified households use electricity for cooking, in the Free State and the Northern Cape more than 80 percent, and in the Eastern Cape 65 percent, which is marginally above the national average (Table 20). Only in Limpopo (25%) and Mpumalanga (47%) do relatively small percentages use electricity for cooking. In almost all provinces, firewood is the second most common energy source for cooking. In Limpopo, wood is used by close to three-quarters of electrified households as the main energy source for cooking, and in Mpumalanga by more than a third of such households. Paraffin is the primary energy source for cooking in around a tenth of households in Mpumalanga, North West and Eastern Cape, with very small percentages using gas and other sources. In Mpumalanga, coal is used as the energy source for cooking by a larger than average percentage of households (10%).

**Table 20: Main energy source used for cooking in electrified households, by province (row percent)**

| Province | Electricity | Firewood | Paraffin | Coal | Gas | Other | Total | Base N |
|---|---|---|---|---|---|---|---|---|
| Western Cape | 92 | 0 | 2 | - | 5 | - | 100 | 327 |
| KwaZulu-Natal | 91 | 7 | 2 | - | - | 0 | 100 | 251 |
| Gauteng | 91 | 3 | 4 | 2 | 0 | 0 | 100 | 309 |
| Free State | 86 | 5 | 4 | 5 | 0 | - | 100 | 279 |
| Northern Cape | 81 | 15 | 3 | - | 1 | 0 | 100 | 339 |
| North West | 71 | 16 | 11 | 0 | 2 | - | 100 | 268 |
| Eastern Cape | 65 | 18 | 15 | - | 2 | - | 100 | 273 |
| Mpumalanga | 47 | 35 | 8 | 10 | 1 | 1 | 100 | 308 |
| Limpopo | 25 | 72 | 2 | - | - | - | 100 | 317 |
| All electrified households | 63 | 28 | 7 | 2 | 0 | 0 | 100 | 2671 |
| RSA (2007) | 79 | 10 | 7 | 2 | 0 | 0 | 100 | 23262 |

Note: the provinces have been ranked in descending order according to reported use of electricity as the main energy source for cooking. Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes. The South African data for 2007 provided in the bottom row is based on analysis of all electrified households in the 2007 round of the General Household Survey (irrespective of income status).

In Limpopo and the Northern Cape, more than 80 percent of non-electrified households use firewood as the primary energy source for cooking; and between half and two-thirds of such households in Free State, Mpumalanga, and KwaZulu-Natal. In the Eastern Cape, firewood and paraffin are used to a similar extent as the main energy source for cooking, while in the North West, Western Cape and Gauteng more than two-thirds of non-electrified households use paraffin as the main energy source for this purpose. In the latter two provinces, cooking is almost exclusively with paraffin (more than 85% of households). Gas is hardly used in any of the provinces. Coal remains an energy source of note in Mpumalanga, where 13 percent use it as a main energy source for cooking. Non-commercial biomass resources such as dung and crop residue are the main energy source for cooking in approximately a tenth of non-electrified households in Mpumalanga, but are hardly used in the other eight provinces.

**Table 21: Main energy source used for cooking in non-electrified households, by province (row percent)**

| Province | Firewood | Paraffin | Gas | Coal | Animal dung | Other | Total | Base N |
|---|---|---|---|---|---|---|---|---|
| Limpopo | 86 | 12 | 1 | - | - | - | 100 | 130 |
| Northern Cape | 82 | 12 | 6 | - | - | - | 100 | 108 |
| KwaZulu-Natal | 66 | 29 | 4 | - | 1 | 0 | 100 | 180 |
| Mpumalanga | 54 | 21 | 0 | 13 | 10 | 2 | 100 | 140 |
| Free State | 53 | 43 | 3 | 1 | - | - | 100 | 171 |
| Eastern Cape | 46 | 43 | 7 | - | 4 | - | 100 | 162 |
| North West | 33 | 65 | 2 | - | - | - | 100 | 157 |
| Western Cape | 8 | 86 | 6 | - | - | - | 100 | 116 |
| Gauteng | 3 | 91 | 4 | 2 | - | 1 | 100 | 124 |
| All non-electrified households | 53 | 39 | 4 | 1 | 2 | 0 | 100 | 1288 |
| RSA 2007 | 38 | 47 | 3 | 3 | 1 | 9 | 100 | 5942 |

Note: the provinces have been ranked in descending order according to reported use of firewood as the main energy source for cooking. Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes. The South African data for 2007 provided in the bottom row is based on analysis of all non-electrified households in the 2007 round of the General Household Survey (irrespective of income status). Of the 'other' category, 8 or the 9% is accounted for by electricity use.

There are significant variations in main cooking energy patterns between types of location (Table 22). In electrified households in formal urban areas (83%) and informal settlements (94%), electricity is the main energy source for cooking. Close to three-quarters of households on farms (73%) use electricity for cooking, with a fifth using firewood. In rural areas, firewood is as common as electricity as the main energy source for cooking. Paraffin, gas, coal and other sources are the main energy source in only a small percentage of electrified households.

**Table 22: Main energy source used for cooking, by electrification status and location (column percent)**

| Energy source | Non- electrified | | | | Non- electrified | | | |
|---|---|---|---|---|---|---|---|---|
| | Rural | Urban formal | Urban informal | Farm | Rural | Urban formal | Urban informal | Farm |
| Electricity | 44 | 83 | 94 | 73 | - | - | - | - |
| Firewood | 46 | 4 | 1 | 20 | 66 | 9 | 5 | 61 |
| Paraffin | 8 | 8 | 3 | 7 | 28 | 75 | 87 | 25 |
| Gas | 1 | 1 | 0 | 0 | 4 | 6 | 5 | 3 |
| Coal | 1 | 4 | 2 | - | 0 | 6 | 2 | 3 |
| Animal dung | - | 0 | 0 | - | 2 | 0 | - | 7 |
| Solar system | - | - | - | - | - | 2 | - | - |
| Generator | - | - | - | - | - | 1 | - | - |
| Other | 0 | 0 | - | - | 0 | 1 | - | 0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 848 | 1221 | 298 | 303 | 375 | 228 | 324 | 361 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes.

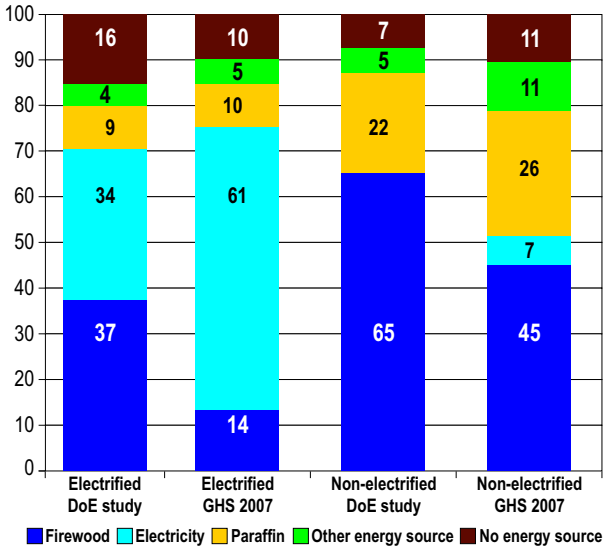
There is a clear rural-urban difference among non-electrified households in terms of their use of firewood and paraffin as the main energy sources for cooking. In formal urban areas and informal settlements, paraffin is mainly used. Firewood is used by less than a tenth of non-electrified urban households as the main energy source for this purpose. By contrast, firewood is the main energy source for cooking in more than 60 percent of non-electrified households in rural areas and on farms, with paraffin being used in about a quarter of these households.

### 8.2.3 Main Energy Source for Heating

The main form of energy for domestic space heating[4], another energy intensive thermal application, is firewood (Figure 26).

Even in electrified households, close to two-fifths (37%) use firewood for heating, with electricity being used in another third of cases (34%). In non-electrified households, approximately two-thirds (65%) primarily use firewood for heating, with 22 % using paraffin. Paraffin is the main source of energy for heating in fewer than one-tenth of electrified households. The 'other energy source' category includes coal and gas, used by a small percentage. Those indicating that they use 'no energy source' opt instead to make use of blankets, warm clothing or nothing at all.

**Figure 26: Main energy source used for heating, by electrification status (percent)**




Note: The South African data for 2007 is based on analysis of all electrified and non-electrified households in the 2007 General Household Survey (irrespective of income status).

Relative to the average electrified and non-electrified household surveyed in the 2007 General Household Survey, low-income households are substantially more reliant on firewood, with a difference of at least 20 percentage points.

Since the survey questionnaire did not explicitly ask respondents not using an energy source for heating purposes to describe how they keep themselves warm, it is not possible to disaggregate this category with any degree of precision. Nonetheless, it does seem that the use of blankets is common. Given the relative size of the 'no energy use' category, it is recommended that future surveys capture heating practices in the absence of energy use.

[4] In the survey instrument, no distinction was made between space heating and water heating. For the purposes of this analysis, it is assumed that the results refer foremost to space heating.

At a provincial level, seven out of ten electrified households in Limpopo use firewood for heating, which is two-thirds higher than in Eastern Cape and Mpumalanga where slightly more than 40 percent use this energy source (Table 23). In five of the other six provinces, electricity is the main energy source for heating, ranging from 39 percent of electrified households in the Free State to 78 percent in KwaZulu-Natal. The use of paraffin is mainly confined to the Eastern Cape, Western Cape and Free State, with coal being used for heating in Mpumalanga, Free State and Gauteng, a reflection of their proximity to coalfields. In the Northern Cape, a relatively high percentage (13%) reported 'other' energy sources for heating, but these were not specified.

Energy use for space heating is likely to be influenced by climate, especially during winter months. The 'no energy source' category provides a sense of this relationship, given that it generally consists of those who do not heat spaces using an energy source. North West has the largest percentage of electrified households using no energy source for heating (36%), which falls mainly in the country's temperate interior zone. Mpumalanga also has a higher than average percentage of respondents stating they do not heat their homes, and is divided between the hot interior and cold interior zones (Eberhard & Van Horen, 1995).

In five provinces, more than two-thirds of non-electrified households use wood as the main source of energy for heating, up to a high of 84 percent of households in Limpopo depending on this energy source. In Mpumalanga and North West, approximately half of the non-electrified households use firewood, with sizable shares reliant on other sources in the form of blankets and warm clothing. Coal is again a notable source in Mpumalanga, the comparably high share indicating 'other energy source' is accounted for by reliance on animal dung and, to some extent, crop residue (mealie-crops). Paraffin is employed for heating in almost a fifth of households in the North West.

In Gauteng and the Western Cape, paraffin is the principal source used for this thermal application in 63 and 72 percent of non-electrified households respectively, with comparatively small proportion of households using firewood.

**Table 23: Main energy source used for heating, by electrification status and province (row percent)**

| Province | Firewood | Electricity | Paraffin | Coal | Gas | Other | No energy source | Total | Base N |
|---|---|---|---|---|---|---|---|---|---|
| ***Electrified*** | | | | | | | | | |
| Eastern Cape | 42 | 14 | 29 | - | 0 | - | 14 | 100 | 273 |
| Free State | 23 | 39 | 12 | 11 | 3 | - | 12 | 100 | 278 |
| Gauteng | 6 | 68 | 7 | 10 | 2 | - | 7 | 100 | 308 |
| KwaZulu-Natal | 12 | 78 | 0 | 0 | - | - | 9 | 100 | 251 |
| Limpopo | 70 | 15 | 0 | 0 | 0 | - | 14 | 100 | 317 |
| Mpumalanga | 42 | 15 | 0 | 15 | - | 0 | 27 | 100 | 307 |
| North West | 27 | 31 | 6 | 0 | - | - | 36 | 100 | 268 |
| Northern Cape | 23 | 50 | 3 | - | 1 | 13 | 11 | 100 | 339 |
| Western Cape | 2 | 63 | 21 | - | 0 | - | 15 | 100 | 327 |
| All electrified households | 37 | 34 | 9 | 3 | 0 | 0 | 16 | 100 | 2668 |
| RSA 2007 | 14 | 61 | 10 | 3 | 1 | 1 | 10 | 100 | 23262 |
| ***Non-electrified*** | | | | | | | | | |
| Eastern Cape | 78 | - | 14 | - | - | 2 | 6 | 100 | 162 |
| Free State | 73 | - | 20 | 2 | - | - | 5 | 100 | 171 |
| Gauteng | 18 | - | 63 | 3 | 3 | 1 | 11 | 100 | 124 |
| KwaZulu-Natal | 66 | - | 26 | - | 5 | 0 | 3 | 100 | 181 |
| Limpopo | 84 | - | 7 | - | 0 | - | 9 | 100 | 130 |
| Mpumalanga | 51 | - | 5 | 20 | 0 | 12 | 13 | 100 | 140 |
| North West | 47 | - | 17 | 0 | | - | 36 | 100 | 157 |
| Northern Cape | 81 | - | 6 | - | 4 | 5 | 5 | 100 | 108 |
| Western Cape | 12 | - | 72 | - | 2 | 0 | 14 | 100 | 116 |
| All non-electrified households | 65 | - | 22 | 2 | 2 | 2 | 7 | 100 | 1289 |
| RSA 2007 | 45 | 7 | 26 | 8 | 1 | 2 | 11 | 100 | 5942 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes. The South African data for 2007 provided is based on analysis of electrified and non-electrified households in the 2007 round of the General Household Survey (irrespective of income status).

As with other end-uses, the energy use patterns for heating differ across locations (Table 24). The majority of electrified households in rural areas (59%) use wood as the main source of energy for heating, followed by a smaller percentage (18%) for electricity and other sources such as blankets. On farms, there is a fairly even split between wood and electricity, with each being the main source of heating energy in about a third of cases. Electric heating is more common in electrified households in formal urban areas, with little use of firewood. Paraffin is also used in these households, along with 'other' sources of heat. Seventy-four percent of electrified households in urban informal areas use electricity for heating.

By contrast, only one-third (33%) of electrified households on farms uses electricity for heating, just over one-third (36%) wood and 13 percent paraffin.

**Table 24: Main energy source used for heating, by electrification status and location (column percent)**

| Energy source | Electrified | | | | Non- electrified | | | |
|---|---|---|---|---|---|---|---|---|
| | Rural | Urban formal | Urban informal | Farm | Rural | Urban formal | Urban informal | Farm |
| Firewood | 59 | 7 | 4 | 36 | 79 | 20 | 17 | 67 |
| Electricity | 18 | 45 | 74 | 35 | - | - | - | - |
| Paraffin | 5 | 17 | 10 | 13 | 15 | 42 | 57 | 11 |
| Coal | 1 | 7 | 6 | 0 | 0 | 12 | 4 | 3 |
| Gas | 0 | 1 | 1 | 0 | 1 | 4 | 5 | 0 |
| Other | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 7 |
| No energy source | 17 | 23 | 5 | 16 | 3 | 19 | 16 | 12 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 848 | 1221 | 298 | 303 | 375 | 228 | 324 | 361 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes.

Among non-electrified households, there is little difference between those in rural areas and those on farms. Wood is the dominant energy source for space heating in more than two-thirds of these households, followed by paraffin. Among non-electrified households in formal and informal urban areas, paraffin is the main heating source, followed to a lesser extent by firewood and 'no energy source'.

## 8.3 Multiple energy use revisited

Earlier in this section of the report, it was shown that multiple energy use remains a feature of the energy consumption patterns of electrified and non-electrified households in South Africa. More detail about the variety of energy sources used by households for four different end-uses is now given.

In electrified households, almost all lighting is by electricity, although candles are used by more than half of households (57%) and paraffin by six percent, as secondary sources (Table 25). The three main energy sources for heating, in descending order, are electricity, firewood and paraffin. Most domestic appliances (77%) make use of electricity for their operation; batteries are used in fewer than five percent of households.

For non-electrified households, candles and paraffin are the primary and secondary lighting sources, with firewood and paraffin the main energy sources for cooking and heating purposes. Batteries in particular and car batteries to a smaller extent are the main energy sources used for running household appliances.

**Table 25: Percentage of households that report using each energy source for different purposes, by electrification status**

| Energy source | Electrified | | | | Non-electrified | | | |
|---|---|---|---|---|---|---|---|---|
| | Light | Cook | Heat | Appliances | Light | Cook | Heat | Appliances |
| Electricity | 98 | 72 | 38 | 77 | 2 | 2 | 2 | 2 |
| Firewood | - | 42 | 42 | - | - | 65 | 67 | - |
| Paraffin | 6 | 27 | 12 | - | 27 | 55 | 27 | - |
| Candle | 57 | - | - | - | 86 | - | - | - |
| Gas | 1 | 3 | 1 | 1 | 2 | 9 | 5 | 4 |
| Coal | - | 3 | 4 | 1 | - | 4 | 5 | 3 |
| Batteries | 1 | - | 1 | 3 | 4 | - | 2 | 31 |
| Car Batteries | 1 | - | 1 | 1 | 3 | - | 2 | 11 |
| Generator | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 4 |
| Solar system | 1 | 1 | 1 | 1 | 3 | 2 | 3 | 3 |
| Other | 1 | 1 | 1 | 1 | 2 | 5 | 4 | 2 |

Note: shaded cells indicate that the energy use for that particular purpose is not applicable.

The patterns of single and multiple energy use are explored in greater detail in the following sub-sections which deal with the four main end-uses included in the survey.

### 8.3.1 Lighting

With respect to energy for lighting homes, multiple energy use is characteristic of electrified households (58% of cases) and single energy use of non-electrified households (Table 26).

With respect to energy choice and preferences for lighting homes, multiple energy use is characteristic of electrified households (58% of cases), though single energy use is the overwhelming reality for non-electrified households (Table 26). Two-fifths (41%) of electrified households use electricity for lighting, while nearly 70 percent of non-electrified households depend entirely on candles for lighting. The latter is not only an inefficient form of lighting but also poses the risk of domestic fire.

For electrified households, the norm is to use a combination of electricity and candles (51% of cases), with the latter forming a critical secondary source in times of interruption of service, whether for technical reasons or due to cut-offs for reasons such as prepaid vouchers running out. In non-electrified households, paraffin and candles are the principal form of multiple energy uses for lighting (12%).

**Table 26: Energy choice for lighting by electrification status (column percentage)**

| Energy source | Electrified | Non-electrified | All households |
|---|---|---|---|
| ***Single energy use*** | ***43*** | ***83*** | ***57*** |
| Electricity only | 41 | - | 26 |
| Candles only | 1 | 69 | 25 |
| Paraffin only | 0 | 13 | 5 |
| Solar System only | - | 0 | 0 |
| Generator only | - | 0 | 0 |
| Car batteries only | - | 0 | 0 |
| Other source only | - | 0 | 0 |
| **Energy source** | **Electrified** | **Non-electrified** | **All households** |
| ***Multiple energy use*** | ***58*** | ***17*** | ***43*** |
| Electricity & candles | 51 | - | 33 |
| Paraffin & candles | 0 | 12 | 4 |
| Electricity, candles & Paraffin | 3 | - | 2 |
| Electricity & paraffin | 2 | - | 1 |
| Candles & batteries | - | 1 | 0 |
| Candles & generator | - | 1 | 0 |
| Other energy combinations | 1 | 3 | 2 |
| **Total** | 100 | 100 | 100 |
| Base N | 2644 | 1272 | 3916 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for lighting purposes.

More than half of electrified households in five of the nine provinces use electricity as the single source of energy for lighting (Table 27). In the Northern Cape, Western Cape and Free State, over 70 percent of electrified households use only electricity for lighting. In the North West and Eastern Cape, between 40 and 50 percent of electrified households use a single energy source, principally electricity.

**Table 27: Energy choice for lighting by province electrification status (column percentage)**

| Energy source | EC | FS | GP | KZN | LP | MP | NW | NC | WC |
|---|---|---|---|---|---|---|---|---|---|
| **Electrified** | | | | | | | | | |
| ***Single energy use*** | **44** | **99** | **59** | **53** | **29** | **11** | **48** | **74** | **81** |
| Electricity only | 39 | 98 | 58 | 53 | 29 | 11 | 44 | 72 | 81 |
| Candles only | 4 | 1 | 1 | - | - | 0 | 3 | 1 | 0 |
| Paraffin only | 0 | - | 0 | - | - | - | 1 | 1 | 0 |
| Solar system only | - | - | - | - | - | - | - | - | - |
| Generator only | - | - | - | - | - | - | - | - | - |
| Car batteries only | - | - | - | - | - | - | - | - | - |
| Other source only | - | - | - | - | - | - | - | - | - |
| ***Multiple energy use*** | **56** | **1** | **41** | **47** | **71** | **89** | **52** | **26** | **19** |
| Electricity & candles | 41 | 0 | 38 | 42 | 67 | 84 | 51 | 22 | 14 |
| Paraffin & Candles | 2 | - | - | - | - | 0 | - | - | - |
| Electricity, candles & Paraffin | 9 | - | 2 | 1 | 3 | 1 | 0 | 3 | 2 |
| Electricity & paraffin | 5 | 1 | 1 | 0 | 1 | 2 | 1 | - | 2 |
| Candles & batteries | - | - | - | - | - | - | - | - | - |
| Candles & generator | - | - | - | - | - | - | - | - | - |
| Other energy combinations | 1 | - | 1 | 4 | - | 1 | - | 1 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 273 | 278 | 307 | 247 | 311 | 300 | 268 | 335 | 325 |
| ***Non-electrified*** | | | | | | | | | |
| ***Single energy use*** | **75** | **95** | **95** | **83** | **87** | **91** | **92** | **90** | **90** |
| Candles only | 55 | 73 | 88 | 69 | 78 | 84 | 90 | 81 | 39 |
| Paraffin only | 19 | 21 | 3 | 14 | 9 | 4 | 2 | 2 | 51 |
| Solar system only | 1 | - | 0 | - | - | 3 | - | 6 | - |
| Generator only | 0 | - | 4 | - | 0 | - | - | - | - |
| Car batteries only | - | - | | - | - | - | - | 0 | - |
| Other source only | - | 0 | 0 | - | - | - | - | - | - |
| ***Multiple energy use*** | ***25*** | ***5*** | ***5*** | ***17*** | ***13*** | ***9*** | ***8*** | ***10*** | ***10*** |
| Paraffin & candles | 24 | 4 | 3 | 6 | 10 | 4 | 7 | 10 | 10 |
| Candles & batteries | - | - | - | 4 | - | - | 0 | - | - |
| Candles & generator | 0 | - | 1 | - | 2 | 1 | - | - | - |
| Other energy combinations | 0 | 1 | - | 7 | 2 | 3 | 0 | 0 | - |
| Total | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |
| Base N | *162* | *167* | *122* | *179* | *127* | *138* | *155* | *106* | *116* |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for lighting purposes.

In Limpopo (29%) and Mpumalanga (11%), there are comparatively low levels of single energy use. In all provinces, non-electrified households largely use a single source of energy for lighting.

The Eastern Cape has the lowest percentage with 75 percent; in six of the nine provinces the percentage is above 90 percent. Candles are the main source of light in all provinces except the Western Cape, where 51 percent use only paraffin. Paraffin is an important secondary source of lighting energy for non-electrified households in the Eastern Cape, the Free State and KwaZulu-Natal. The highest rates of multiple energy use for lighting in non-electrified households are in the Eastern Cape (25%) and KwaZulu-Natal (17%), with paraffin and candles being the main energy source combination.

**Table 28: Energy choice for lighting by electrification status and location (column percentage)**

| Energy source | Rural | Urban formal | Urban informal | Farm |
|---|---|---|---|---|
| **Electrified** | | | | |
| ***Single energy use*** | **34** | **52** | **48** | **68** |
| Electricity only | 32 | 51 | 48 | 68 |
| Candles only | 2 | 1 | - | 1 |
| Paraffin only | 0 | 0 | - | |
| ***Multiple energy use*** | **66** | **48** | **52** | **32** |
| Electricity & candles | 58 | 41 | 48 | 32 |
| Paraffin & candles | 1 | 0 | - | - |
| Electricity, candles & paraffin | 5 | 2 | 1 | - |
| Electricity & paraffin | 1 | 3 | 3 | 0 |
| Other energy combinations | 1 | 2 | 1 | - |
| **Total** | **100** | **100** | **100** | **100** |
| Base N | 837 | 1212 | 295 | 300 |
| **Non-electrified** | | | | |
| ***Single energy use*** | **80** | **93** | **86** | **92** |
| Candles only | 67 | 77 | 65 | 80 |
| Paraffin only | 12 | 13 | 18 | 12 |
| Solar system only | 1 | 2 | - | 0 |
| Generator only | - | 2 | 2 | - |
| Car batteries only | - | - | - | 0 |
| Other source only | - | 0 | 0 | - |
| ***Multiple energy use*** | **20** | **7** | **14** | **8** |
| Paraffin & candles | 13 | 4 | 13 | 4 |
| Candles & batteries | 1 | - | 1 | 1 |
| Candles & generator | 2 | 0 | 1 | 1 |
| Other energy combinations | 4 | 4 | 0 | 2 |
| **Total** | **100** | **100** | **100** | **100** |
| *Base N* | *373* | *226* | *321* | *352* |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for lighting purposes.

In terms of type of geographic location, electrified households in formal urban areas and informal settlements are fairly evenly divided between those using electricity as the sole energy source for lighting, and those using electricity together with candles (Table 28). Slightly more than two-thirds (68%) of households on farms use electricity exclusively, with the remaining third using a combination of electricity and candles. For low-income, electrified households in rural areas, the opposite is true, with two-thirds using multiple sources of energy for lighting, largely in the form of electricity and candles, with the other third using only electricity. More than eight out of ten non-electrified households use only a single source of energy for lighting, irrespective of the type of geographic location in which they are located. Candles are the main energy source for lighting in all categories, with paraffin being the sole source in between one-tenth and one-fifth of households in both urban and rural localities. Rural dwellers are somewhat more reliant on multiple energy sources for lighting, using in particular a combination of paraffin and candles. Households in informal settlement also use this combination in similar percentages.

### 8.3.2 Cooking

In Table 29, the energy sources for cooking are presented by electrification status. Among electrified households, close to two-thirds (65%) rely on a single energy source for cooking, with electricity as the main one (42%) followed by wood (19%). Of the third of electrified households using multiple energy sources for cooking, the principal combinations are electricity and paraffin (10%), electricity and wood (8%) and electricity, wood and paraffin (8%). This suggests that provision of electricity has not displaced other energy sources for cooking, with firewood and paraffin being used as supplementary energy sources. In non-electrified households, approximately three-quarters (73%) use a single energy source for cooking, principally wood (39%) and paraffin (30%). Eighteen percent of non-electrified households using more than one energy source for cooking use a combination of wood and paraffin, with seven percent using other energy combinations.

**Table 29: Energy choice for cooking by electrification status (column percentage)**

| Energy source | Electrified | Non-electrified |
|---|---|---|
| ***Single energy use*** | **65** | **73** |
| Electricity only | 42 | - |
| Wood only | 19 | 39 |
| Paraffin only | 3 | 30 |
| Gas only | 0 | 2 |
| Coal only | 1 | 1 |
| Solar system only | - | 0 |
| Generator only | - | 0 |
| Other source only | 0 | 1 |
| ***Multiple energy use*** | **35** | 27 |
| Paraffin & wood | 4 | 18 |
| Electricity & paraffin | 10 | - |
| Electricity & wood | 8 | - |
| Electricity, wood & paraffin | 8 | - |
| Gas & electricity | 1 | 0 |
| Paraffin & Gas | 0 | 1 |
| Other energy combinations | 4 | 7 |
| **Total** | **100** | **100** |
| Base N | 2643 | 1276 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes.

In six of the nine provinces, over three-quarters of electrified households use a single cooking energy source (Table 30). In the Western Cape and the Free State, this figure exceeds 90 percent. For five of these six provinces, electricity is the principal energy source for cooking; percentages range from 63 percent in the Northern Cape to 86 percent in the Western Cape. By contrast, among electrified households in Limpopo, wood has not been displaced by electricity as the main energy source for cooking, and is used exclusively in 61 percent of households. In this province, only 16 percent of households use only electricity for cooking. Among electrified households, a single cooking energy source is used by sixty-two percent in the North West, fifty-two percent in Mpumalanga and forty-four percent in Eastern Cape. In Mpumalanga, the main single energy sources for cooking are electricity (23%) and wood (22%). In the Eastern Cape, electricity solely is used for cooking by approximately one-third of electrified households.

**Table 30: Energy choice for cooking by electrification status and province (column percentage)**

| Energy source | EC | FS | GP | KZN | LP | MP | NW | NC | WC |
|---|---|---|---|---|---|---|---|---|---|
| **Electrified** | | | | | | | | | |
| ***Single energy use*** | **44** | **93** | **75** | **76** | **79** | **52** | **62** | **77** | **92** |
| Electricity only | 34 | 82 | 69 | 70 | 16 | 23 | 49 | 63 | 86 |
| Wood only | 4 | 4 | 3 | 5 | 61 | 22 | 6 | 12 | 0 |
| Paraffin only | 6 | 3 | 2 | 1 | 1 | 3 | 6 | 2 | 2 |
| Gas only | 0 | 0 | 0 | - | 0 | - | - | 1 | 5 |
| Coal only | - | 5 | 1 | - | - | 3 | - | - | - |
| Other source only | - | - | - | - | - | 0 | - | 0 | - |
| ***Multiple energy use*** | **56** | **7** | **25** | **24** | **21** | **48** | **38** | **23** | **8** |
| Paraffin & wood | 9 | - | - | 0 | 4 | 3 | 3 | 1 | 1 |
| Electricity & paraffin | 16 | 3 | 21 | 10 | 1 | 8 | 8 | 2 | 5 |
| Electricity & wood | 4 | 2 | 1 | 4 | 12 | 19 | 15 | 17 | 0 |
| Electricity, wood & paraffin | 22 | - | 0 | 4 | 2 | 4 | 8 | 1 | - |
| Gas & electricity | 2 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 2 |
| Paraffin & gas | 0 | 0 | - | - | - | - | 0 | - | - |
| Other energy combinations | 3 | 1 | 2 | 5 | 2 | 12 | 4 | 1 | 0 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| Base N | 273 | 276 | 306 | 250 | 311 | 302 | 267 | 334 | 324 |
| ***Non-electrified*** | | | | | | | | | |
| ***Single energy use*** | **46** | **90** | **95** | **85** | **86** | **82** | **70** | **75** | **97** |
| Wood only | 18 | 50 | 3 | 58 | 73 | 50 | 24 | 61 | 8 |
| Paraffin only | 22 | 37 | 89 | 26 | 12 | 16 | 46 | 11 | 82 |
| Gas only | 5 | 3 | 4 | 1 | 1 | 0 | 1 | 4 | 6 |
| Coal only | - | - | - | - | - | 8 | - | - | - |
| Solar system only | - | - | - | - | - | 1 | - | - | - |
| Generator only | - | - | 1 | - | - | - | - | - | - |
| Other source only | 1 | - | - | 0 | - | 7 | - | - | - |
| ***Multiple energy use*** | ***54*** | ***10*** | ***5*** | ***15*** | ***14*** | ***18*** | ***30*** | ***25*** | ***3*** |
| Paraffin & wood | 46 | 9 | 2 | 3 | 14 | 2 | 26 | 17 | 3 |
| Paraffin & gas only | 1 | 0 | - | 3 | 0 | 1 | 3 | - | 0 |
| Other energy combinations | 7 | 1 | 2 | 10 | - | 16 | 1 | 8 | - |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| Base N | *162* | *169* | *122* | *179* | *128* | *138* | *155* | *107* | *116* |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes.

Among electrified households using multiple energy sources for cooking, approximately half do so in Mpumalanga, and close to 60 percent in Eastern Cape.

Together, these are the energy sources used by almost half the provincial sub-sample. In Gauteng and KwaZulu-Natal, the main cooking energy source combination is electricity and paraffin, while in Limpopo, Mpumalanga, North West and Northern Cape it is electricity and wood. In Mpumalanga, the comparatively large percentage using 'other energy source combinations' is attributable to the availability of coal in the province.

A similar use pattern emerges for non-electrified households, with single energy use the norm for more than three-quarters of cases in seven provinces. Paraffin or firewood are the main energy sources used. In Free State, Mpumalanga, KwaZulu-Natal, Northern Cape and Limpopo, firewood is the sole energy source used for cooking in 50 percent or more of non-electrified households. Paraffin is dominant and it is the exclusively used source of energy for cooking by low-income, non-electrified households in Gauteng (89%), Western Cape (82%) and North West (46%). It is also the single energy source used in marginally more than a third of Free State households, though use of wood is more prevalent.

In relation to multiple energy use, Eastern Cape and North West stand out. In the former province, the combination of paraffin and wood is the most common energy source (46% of households). The use of paraffin and wood is also the main energy combination in North West, reported by a quarter of households, though the exclusive use of paraffin is the principal energy form in the province.

In terms of type of location, most electrified households on farms and in informal settlements use a single energy source; to a slightly lesser extent this applies also to formal urban areas (Table 31). In all three contexts, electricity is the main single energy source for cooking, though wood is important for a smaller cohort of households on farms.

Multiple energy use is more common for cooking in electrified rural households, though six in every ten households use a single energy source, with wood ranked first (32%) followed by electricity (23%).

For rural households, the main multiple energy combinations for cooking are electricity and wood, and electricity, wood and paraffin, while in formal and informal urban settings it is electricity and paraffin.

**Table 31: Energy choice for cooking by electrification status and location (column percentage)**

| Energy source | Rural | Urban formal | Urban informal | Farm |
|---|---|---|---|---|
| **Electrified** | | | | |
| ***Single energy use*** | **58** | **69** | **79** | **81** |
| Electricity only | 23 | 61 | 75 | 61 |
| Wood only | 32 | 2 | 1 | 15 |
| Paraffin only | 3 | 5 | 2 | 6 |
| Gas only | 0 | 1 | 0 | 0 |
| Coal only | 0 | 1 | 1 | - |
| Other source only | 0 | 0 | 0 | - |
| ***Multiple energy use*** | **42** | **31** | **21** | **19** |
| Paraffin & wood | 6 | 1 | - | - |
| Paraffin & candles | 1 | 0 | - | - |
| Electricity & paraffin | 6 | 16 | 18 | 4 |
| Electricity & wood | 13 | 2 | 0 | 9 |
| Electricity, wood & paraffin | 13 | 2 | 0 | 3 |
| Gas & electricity | 1 | 3 | 0 | 0 |
| Paraffin & gas | - | 0 | - | - |
| Other energy combinations | 4 | 5 | 2 | 3 |
| **Total** | **100** | **100** | **100** | **100** |
| Base N | 836 | 1213 | 295 | 299 |
| **Non-electrified** | | | | |
| ***Single energy use*** | **66** | **83** | **90** | **86** |
| Wood only | 47 | 7 | 5 | 53 |
| Paraffin only | 16 | 64 | 82 | 24 |
| Gas only | 2 | 5 | 2 | 3 |
| Coal only | 0 | 3 | 1 | 1 |
| Generator only | - | 1 | - | - |
| Other source only | 1 | 2 | - | 4 |
| ***Multiple energy use*** | **34** | **17** | **10** | **14** |
| Paraffin & wood | 25 | 7 | 4 | 8 |
| Paraffin & gas only | 1 | 2 | 4 | 0 |
| Other energy combinations | 9 | 8 | 2 | 5 |
| **Total** | **100** | **100** | **100** | **100** |
| *Base N* | *374* | *227* | *321* | *354* |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for cooking purposes.

### 8.3.3 Heating

In terms of space heating, a greater percentage (75%) of electrified households use a single energy source use than is the case with lighting and cooking (Table 32). Nonetheless, households are moderately less reliant only on electricity than is the case with the other two end uses. There is an equal split between the exclusive use of firewood and electricity, with open fires still the preferred energy choice. The use of paraffin solely for heating purposes is found in slightly under a tenth of electrified households. Only a tenth of households use multiple energy sources for heating, spread across a number of different combinations. Fifteen percent of electrified households indicated no specific energy source for heating, opting instead to either do without or use warm clothing.

**Table 32: Energy choice for heating by province electrification status (column percentage)**

| Energy source | Electrified | Non-electrified | All households |
|---|---|---|---|
| ***Single energy use*** | **75** | **85** | **79** |
| Wood only | 34 | 60 | 43 |
| Electricity only | 31 | - | 20 |
| Paraffin only | 8 | 21 | 13 |
| Coal only | 2 | 1 | 2 |
| Gas only | 0 | 2 | 1 |
| Other source only | 0 | 1 | 0 |
| Solar system only | - | 0 | 0 |
| Generator only | 0 | 0 | 0 |
| ***Multiple energy use*** | **10** | **8** | **9** |
| Electricity & wood only | 3 | - | 2 |
| Paraffin & wood only | 1 | 3 | 2 |
| Coal & wood | 2 | 1 | 1 |
| Electricity & paraffin only | 1 | - | 1 |
| Electricity & generator | 1 | - | 1 |
| Other energy combinations | 2 | 4 | 3 |
| **No energy source used for space heating** | **15** | **7** | **12** |
| **Total** | 100 | 100 | 100 |
| Base N | 2641 | 1274 | 3915 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for heating purposes.

Eighty-five percent of non-electrified households use a single source of energy for heat, with nearly two-thirds using wood and a fifth paraffin. Of the remaining 15 percent of non-electrified households, about half use a range of energy sources and the remainder do without energy for heating.

**Table 33: Energy choice for heating by electrification status and province (column percentage)**

| Energy source | EC | FS | GP | KZN | LP | MP | NW | NC | WC |
|---|---|---|---|---|---|---|---|---|---|
| **Electrified** | | | | | | | | | |
| ***Single energy use*** | **79** | **87** | **84** | **73** | **78** | **67** | **56** | **72** | **79** |
| Wood only | 39 | 23 | 5 | 9 | 65 | 41 | 25 | 22 | 2 |
| Electricity only | 13 | 39 | 68 | 63 | 12 | 17 | 27 | 47 | 61 |
| Paraffin only | 27 | 12 | 6 | 0 | 0 | 0 | 4 | 3 | 16 |
| Coal only | - | 9 | 3 | 0 | 0 | 10 | 0 | - | - |
| Gas only | 0 | 3 | 2 | - | 0 | - | - | 1 | 0 |
| Other source only | - | - | - | - | - | 0 | - | - | - |
| ***Multiple energy use*** | **8** | **2** | **9** | **18** | **9** | **10** | **9** | **5** | **9** |
| Electricity & wood only | 3 | | 1 | 3 | 4 | 4 | 5 | 3 | 1 |
| Paraffin & wood only | 3 | - | - | - | 2 | - | 2 | - | 1 |
| Coal & wood | - | 0 | 6 | 0 | 1 | 6 | 1 | 0 | - |
| Electricity & paraffin only | 2 | 0 | 2 | 0 | 1 | - | 0 | 0 | 7 |
| Electricity & generator | - | - | 0 | 6 | - | - | - | - | - |
| Other energy combinations | - | 1 | 1 | 8 | 2 | 1 | 1 | 2 | 1 |
| **No energy source used for space heating** | **13** | **10** | **6** | **9** | **13** | **22** | **36** | **22** | **12** |
| **Total** | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 273 | 276 | 306 | 248 | 312 | 300 | 268 | 334 | 324 |
| ***Non-electrified*** | | | | | | | | | |
| ***Single energy use*** | ***87*** | ***90*** | ***86*** | ***87*** | ***87*** | ***74*** | ***60*** | ***91*** | ***85*** |
| Wood only | 74 | 69 | 18 | 57 | 80 | 48 | 44 | 81 | 12 |
| Paraffin only | 12 | 19 | 64 | 25 | 6 | 4 | 16 | 6 | 71 |
| Coal only | - | 2 | 1 | - | - | 13 | 0 | - | - |
| Gas only | - | - | 3 | 5 | 0 | 2 | - | 4 | 2 |
| Other source only | 1 | - | - | 0 | - | 5 | - | - | - |
| Solar system only | - | - | - | - | - | 1 | - | - | - |
| Generator only | - | - | 1 | - | - | - | - | - | - |
| ***Multiple energy use*** | **7** | **6** | **3** | **10** | **4** | **15** | **4** | **0** | **1** |
| Paraffin & wood only | 5 | 3 | 0 | 2 | 4 | | 3 | - | 1 |
| Coal & wood | - | - | 2 | - | - | 7 | 1 | - | - |
| Other energy combinations | 2 | 3 | 0 | 8 | 0 | 9 | - | - | 1 |
| **No energy source used for space heating** | **6** | **5** | **12** | **3** | **9** | **11** | **36** | **9** | **14** |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| *Base N* | *162* | *169* | *122* | *179* | *127* | *137* | *155* | *107* | *116* |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for heating purposes.

At the sub-national level of analysis, at least 75 percent of electrified households in five of the nine provinces (Gauteng, Free State, Western Cape, Eastern Cape and Limpopo) use a single energy source for space heating (Table 33). More than 70 percent of electrified households in an additional two provinces (KwaZulu-Natal and Northern Cape) also use a single energy source.

There is however some variation in the types of single energy used for heating. In Limpopo and Mpumalanga, wood is the main exclusive energy source used, while in Gauteng, KwaZulu-Natal and Western Cape it is electricity. Electricity is also the most used single energy source among electrified households in the Free State and Northern Cape, though to a lesser extent than the previously mentioned provinces, with, in Northern Cape, more than fifth of households using firewood heating and a similar percentage no source of energy.

Among electrified households in the Eastern Cape, the main single energy sources are firewood and paraffin. In the North West, thirty-six percent of households use no energy source for heating, followed by the exclusive use of electricity (27%) and wood (25%). Notable percentages of electrified households in Mpumalanga and the Northern Cape do not use any heating energy source. This may be related to climatic conditions in those provinces, with poorer households able to make do with wearing warmer clothing during inclement months or cold spells.

Approximately 90 percent of non-electrified households in seven provinces use only one form of energy for heating. In Limpopo, Northern Cape, Eastern Cape, Free State and KwaZulu-Natal the main source is wood, and paraffin in Gauteng and the Western Cape. In the North West, a lower percentage of non-electrified households uses as single source of heating energy, with thirty-six percent using no energy sources for heating. In Mpumalanga, the percentage of non-electrified households using a single energy source is lower, due to larger than average shares declaring multiple energy use (coal and wood being a key combination) and non-use instead.

Table 34 shows that single energy use is more prevalent among electrified households in informal settlements and on farms than in rural areas and formal urban areas. Firewood is exclusively used for space heating in fifty-four percent of electrified households in rural areas, posing serious health risks. In formal and informal urban areas, electricity is the main single energy source, with small percentages of households using exclusively paraffin for heating. For electrified households on farms, single energy use is evenly split between wood and electricity as the most common energy sources. Multiple energy use is typical of around a tenth in households in all four types of geographic location.

In non-electrified households, single energy use is more prevalent for space heating in rural areas (89%) and in households on farms than in formal and informal urban settings. The former two use exclusively firewood. More than half of non-electrified households in informal settlements use solely paraffin, followed by wood. Paraffin is exclusively used for heating by two-fifths of non-electrified formal urban households, with other sizable proportions using wood alone or no energy sources. Non-use is also above-average for those in informal settlements.

**Table 34: Energy choice for heating by electrification status and location (column percentage)**

| Energy source | Rural | Urban formal | Urban informal | Farm |
|---|---|---|---|---|
| **Electrified** | | | | |
| ***Single energy use*** | **74** | **71** | **83** | **78** |
| Wood only | 54 | 7 | 3 | 34 |
| Electricity only | 15 | 42 | 67 | 32 |
| Paraffin only | 4 | 16 | 10 | 12 |
| Coal only | 1 | 5 | 2 | 0 |
| Gas only | 0 | 1 | 1 | 0 |
| Other source only | - | 0 | 0 | - |
| Generator only | - | - | - | 0 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for heating purposes.

Table 34: Energy choice for heating by electrification status and location (column percentage)

| Energy source | Rural | Urban formal | Urban informal | Farm |
|---|---|---|---|---|
| ***Multiple energy use*** | **11** | **8** | **12** | **7** |
| Electricity & wood only | 5 | 1 | 0 | 3 |
| Paraffin & wood only | 2 | 0 | - | 2 |
| Coal & wood | 1 | 2 | 4 | - |
| Electricity & paraffin only | 1 | 2 | 1 | 0 |
| Electricity & generator | - | 0 | 7 | - |
| Other energy combinations | 2 | 2 | 1 | 3 |
| **No energy source used for space heating** | **15** | **21** | **5** | **15** |
| **Total** | 100 | 100 | 100 | 100 |
| Base N | 836 | 1211 | 295 | 299 |
| **Non-electrified** | | | | |
| ***Single energy use*** | **89** | **73** | **77** | **82** |
| Wood only | 73 | 19 | 16 | 65 |
| Paraffin only | 13 | 39 | 54 | 11 |
| Coal only | 0 | 8 | 2 | 1 |
| Gas only | 1 | 4 | 5 | 1 |
| Other source only | 1 | 0 | - | 3 |
| Solar system only | - | 2 | - | - |
| Generator only | - | 1 | - | - |
| ***Multiple energy use*** | **8** | **9** | **6** | **6** |
| Paraffin & wood only | 3 | 3 | 2 | 0 |
| Coal & wood | 0 | 4 | 2 | 1 |
| Other energy combinations | 5 | 2 | 2 | 5 |
| **No energy source used for space heating** | **3** | **19** | **17** | **12** |
| Total | 100 | 100 | 100 | 100 |
| *Base N* | *374* | *226* | *321* | *353* |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for heating purposes.

### 8.3.4 Appliances

To operate domestic appliances such as televisions and radios, almost three-quarters of electrified households (74%) make exclusive use of electricity (Table 35), with only nominal percentages using either other single energy sources or multiple energy combinations. The remaining approximately one-fifth (22%) of electrified households do not use appliances.

Around a third of non-electrified households use batteries alone to power their appliances; these include batteries (27%) and car batteries (6%). Multiple energy use to power appliances is virtually non-existent among non-low-income, electrified households. Sixty percent indicate that they do not use any energy source for appliances.

Table 35: Energy choice for appliances by electrification status (column percentage)

| Energy source | Electrified | Non-electrified | All households |
|---|---|---|---|
| ***Single energy use*** | **75** | **35** | **61** |
| Electricity only | 74 | - | 48 |
| Batteries only | 1 | 27 | 10 |
| Car batteries only | - | 6 | 2 |
| Generator only | - | 1 | 0 |
| Gas only | 0 | 0 | 0 |
| Solar system only | - | 0 | 0 |
| Coal only | 0 | 0 | 0 |
| Other source only | 0 | 0 | 0 |
| **Multiple energy use** | **3** | **5** | **4** |
| Electricity & batteries | 2 | - | 1 |
| All sources | 1 | 2 | 1 |
| Batteries & car batteries | - | 1 | 0 |
| Gas & car batteries | - | 0 | 0 |
| Gas & electricity | 0 | - | 0 |
| Gas & batteries | - | 0 | 0 |
| Other energy combinations | 0 | 1 | 1 |
| **No energy source used for appliances** | **22** | **60** | **36** |
| **Total** | 100 | 100 | 100 |
| Base N | 2643 | 1276 | 3919 |

Note: Cells with '-' indicate that no households in this group reported using that specific energy source for operating appliances.

In terms of provincial differentiation (results not shown), electricity is solely used by more than 70 percent of electrified households in all provinces except the Eastern Cape, and by more than 90 percent in the North West and Western Cape. Multiple energy use is only significant in electrified KwaZulu-Natal households, where electricity and batteries are used in combination for powering appliances in around one-tenth of households. In the Eastern Cape, 40 percent of electrified households do not use any energy source for this purpose, and in the Free State, Limpopo and Gauteng this figure is between 20 percent and 30 percent.

The majority share of non-electrified households in all provinces except Mpumalanga reports non-use of energy sources for appliances, ranging from a low of 49 percent in Northern Cape to a high of 73 percent in the North West. In the case of Mpumalanga, proportionately more report single energy use (54%) than non-use (44%), with the former being split mainly between the sole use of dry cell (30%) and car batteries (19%). Looking at the aggregate consumption patterns, multiple energy use is not widespread, with only a maximum of around ten percent of non-electrified households in KwaZulu-Natal and Northern Cape reporting combined energy usage for operating appliances

## 8.4 Use and collection of firewood

More than half (56%:1601) of all households in this study indicated that they use firewood for lighting, cooking or heating. The use of firewood as an energy source is much more prominent amongst non-electrified households (70%) than electrified households (48%).

**Table 36: Use of firewood**

| | Do not use firewood | Use firewood | Total |
|---|---|---|---|
| **Electrified** | 52 | 48 | 100 |
| **Non-electrified** | 30 | 70 | 100 |
| **Total** | 44 | 56 | 100 |
| **Base N** | 2355 | 1601 | 3956 |

Of those households that do use firewood, the majority (77%:1247) collect their own firewood.

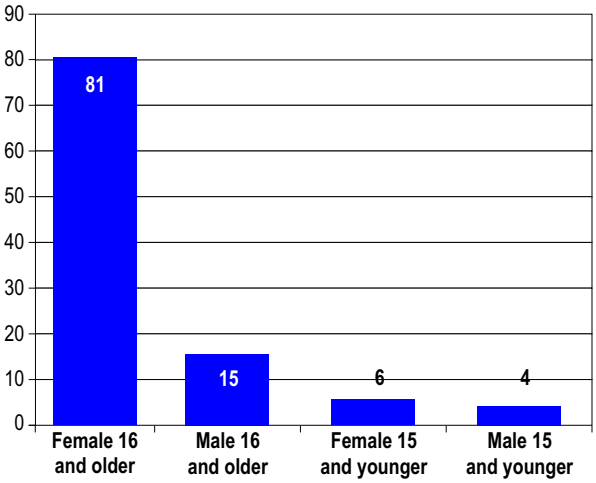
**Table 37: Collection of firewood**

| | Collect firewood | Do not collect firewood | Total | Base N |
|---|---|---|---|---|
| **Electrified** | 74 | 26 | 100 | 868 |
| **Non-electrified** | 81 | 19 | 100 | 726 |
| **Total** | 77 | 23 | 100 | 1594 |
| **Base N** | 1247 | 347 | 1594 | 3188 |

Female adults are largely responsible for firewood collection in households. In 15% of households it is a male adult that collects firewood.

In 10% of the households it is children (15 years and younger) that is responsible for the firewood collection. Female children are slightly more likely to be collecting firewood than male children. Adult females are primarily responsible for wood collection in all provinces, except Western Cape where male adults are mostly responsible for wood collection.

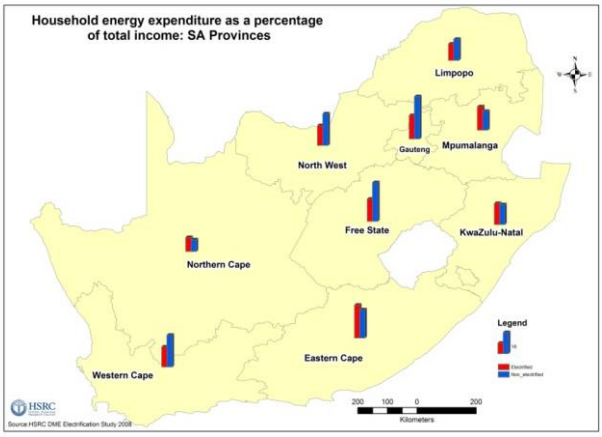
**Figure 27: People responsible for collecting firewood**




## 8.5 Energy Expenditure

This section directs the focus away from energy consumption patterns per se to energy expenditure among the low-income households included in the survey. The emergent patterns unequivocally reaffirm the prominent place of energy spending in household budgets to ensure that basic energy needs are satisfied (Eberhard and Van Horen, 1995). A common indicator of energy poverty or energy burden is the share of total household income or expenditure devoted to energy. In the literature, the threshold for determining energy poverty is between 10-15 percent of income spent on domestic energy needs, with 10 percent being the norm (Boardman, 1991; Sefton, 2002; Lamech & O'Sullivan, 2002; Buzar, 2006; Fankhauser & Tepic, 2007). Households with an energy expenditure above this threshold are considered energy poor and likely to be confronted with difficult choices between meeting energy requirements and spending on competing. The indicator is therefore often linked conceptually to the measurement of affordability (WHO, 2004).

According to Statistics South Africa's 2005/06 Income and Expenditure Survey, expenditure on 'electricity, gas and other energy sources accounts for 2.4 percent of annual consumption expenditure on average for households in the country (Statistics South Africa, 2008:46). Therefore, assuming a 10 percent energy expenditure threshold for poor households seems a reasonable assumption, given that it is approximately four-times the national average.




From Table 36, it is apparent that for both low-income electrified and non-electrified households the energy burden is on average at least double that of the 10 percent threshold. For electrified households, energy poverty is higher than average in the Eastern Cape, Gauteng and Mpumalanga, and in rural areas and formal urban areas.

The poorest electrified households have especially high energy burdens, with the poorest quintile spending on average more than a third of total income on energy needs. Among non-electrified households, energy poverty is highest in the Eastern Cape, Free State, Gauteng and North West, and in informal settlement, with poorer households carrying a disproportionately high energy burden.

**Table 38: Energy expenditure as a percentage of total monthly household income, by province, location and income status**

| | Electrified | Non-electrified | Total |
|---|---|---|---|
| **Province** | | | |
| Eastern Cape | 28 | 24 | 26 |
| Free State | 19 | 33 | 25 |
| Gauteng | 20 | 36 | 25 |
| KwaZulu-Natal | 18 | 17 | 18 |
| Limpopo | 14 | 18 | 15 |
| Mpumalanga | 20 | 16 | 19 |
| North West | 17 | 27 | 18 |
| Northern Cape | 12 | 10 | 12 |
| Western Cape | 17 | 27 | 19 |
| **Location** | | | |
| Rural | 21 | 21 | 21 |
| Urban formal | 20 | 21 | 20 |
| Urban informal | 17 | 35 | 24 |
| Farm | 13 | 12 | 12 |
| **Per capita income** | | | |
| Poorest quintile | 35 | 31 | 34 |
| Quintile 2 | 22 | 23 | 22 |
| Quintile 3 | 17 | 21 | 18 |
| Quintile 4 | 19 | 20 | 20 |
| Least poor quintile | 11 | 16 | 13 |
| ***Total*** | ***20*** | ***22*** | ***21*** |

The preceding analysis gives a general picture of where the energy burden is highest amongst the sampled households. Table 37 gives more detailed information by showing the incidence as well as the share of energy poverty based on the following characteristics: provincial and rural-urban location, family type, the presence of employed household members, and level of income poverty. This enables a more precise identification of who is energy poor. The energy poverty rate refers to the percentage of a specific population or sub-population spending more than 10 percent of their net income on energy, while the composition of the households in energy poverty, or energy poverty shares, refers to the percentage of all energy poor households in the country accounted for by different sub-populations. Thus, for example, the energy poverty rate among electrified households in the Eastern Cape would refer to the percentage of all electrified Eastern Cape households in the survey sample that spend more than 10 percent of their income on energy.

By contrast, the poverty share among electrified households in the Eastern Cape refers to the percentage of all the energy poor electrified households in the country found in the Eastern Cape.

Among households in the study, 59 percent of electrified households and 60 percent of non-electrified households spent more than 10 percent of their reported net income on energy (Table 37). The energy poverty rate for electrified households at the time of survey was highest among households in the Eastern Cape and in formal urban areas, and in the poorest quintile of the income distribution. There is a similar pattern for the energy poverty rate among non-electrified households, though with some geographic variation. The incidence of energy poverty was highest among households in the Western Cape, Gauteng and Eastern Cape, in informal settlements and formal urban areas, and in households in the poorest quintile of the income distribution.

The composition of the households in energy poverty (or energy poverty shares) is shown in Table 37. Of the electrified households classified as energy poor, 31 percent are in the Eastern Cape with a further 54 percent spread across KwaZulu-Natal, Limpopo, Mpumalanga and Gauteng. Fifty-three percent are in rural locations. Non-electrified households exhibit a relatively similar pattern, with large energy poverty shares accounted for by households in the Eastern Cape, KwaZulu-Natal and rural areas.

Looking at differences in energy poverty according to demographic characteristics of households (Table 38), the results show that the energy poverty rate among electrified households is highest for families consisting of single adults and either one child or three or more children under 20 years of age, and among households with no-one in full-time or part-time employment. As for the energy poverty rate among non-electrified households, the incidence of energy poverty was highest among families with a single adult and either one or two children younger than 20 years of age, though no discernible pattern was observed with regard to the number of full- or part-time employed people in the household.

**Table 39: Energy Poverty among low-income households, by province, location and income status**

| | Energy poverty rate (% spending more than 10% of net income on energy) | | | | Composition of households in energy poverty (%) (Share) | |
|---|---|---|---|---|---|---|
| | Electrified | | Non-electrified | | Electrified | Non-electrified |
| | % | *Base N* | % | *Base N* | % | % |
| **Province** | | | | | | |
| Eastern Cape | 74 | 264 | 79 | 156 | 31 | 41 |
| Free State | 54 | 272 | 55 | 168 | 2 | 4 |
| Gauteng | 64 | 274 | 84 | 110 | 10 | 11 |
| KwaZulu-Natal | 62 | 241 | 45 | 176 | 17 | 27 |
| Limpopo | 40 | 313 | 39 | 127 | 16 | 7 |
| Mpumalanga | 56 | 296 | 48 | 135 | 11 | 6 |
| Northern Cape | 40 | 255 | 28 | 143 | 1 | 0 |
| North West | 61 | 325 | 67 | 102 | 9 | 3 |
| Western Cape | 60 | 315 | 84 | 110 | 1 | 1 |
| Total | 59 | 2555 | 60 | 1227 | 100 | 100 |
| **Location** | | | | | | |
| Rural | 55 | 806 | 56 | 357 | 53 | 66 |
| Urban formal | 70 | 1169 | 71 | 215 | 27 | 6 |
| Urban informal | 60 | 280 | 78 | 305 | 15 | 20 |
| Farm | 41 | 300 | 39 | 350 | 4 | 9 |
| Total | 59 | 2555 | 60 | 1227 | 100 | 100 |
| **Quintiles of per capita monthly income:** | | | | | | |
| Poorest quintile | 78 | 310 | 73 | 153 | 20 | 21 |
| Quintile 2 | 68 | 345 | 51 | 159 | 18 | 14 |
| Quintile 3 | 53 | 423 | 62 | 218 | 16 | 20 |
| Quintile 4 | 63 | 742 | 57 | 342 | 31 | 26 |
| Least poor quintile | 38 | 735 | 57 | 355 | 15 | 19 |
| Total | 59 | 2555 | 60 | 1227 | 100 | 100 |

As for energy poverty shares, 78 percent of the electrified households identified as energy poor included children, 21 percent were in households with three adults and children, 77 percent contained no formally employed workers, 56 percent had female heads, and 54 percent were households with no-one in part-time or full-time employment. There are large energy poverty shares among non-electrified households consisting of three adults and children, and in households with no-one in full- or part-time employment, and female headed households. Twenty-six percent of energy-poor non-electrified households consisted of a single adult caring for one or more children.

**Table 40: Energy Poverty among low-income households, by demographic characteristics**

| | Energy poverty rate (% spending more than 10% of net income on energy) | | | | Composition of households in energy poverty (%) (Share) | |
|---|---|---|---|---|---|---|
| | Electrified | | Non-electrified | | Electrified | Non-electrified |
| | % | *Base N* | % | *Base N* | % | % |
| **Household Head** | | | | | | |
| Male | 61 | 1308 | 53 | 769 | 44 | 40 |
| Female | 57 | 1360 | 65 | 518 | 56 | 60 |
| Total | 59 | 2668 | 60 | 1287 | 100 | 100 |
| **Family type** | | | | | | |
| Single | 51 | 223 | 62 | 175 | 7 | 11 |
| One adult & one child | 69 | 103 | 78 | 59 | 4 | 7 |
| One adult & two children | 61 | 124 | 83 | 61 | 6 | 9 |
| One adult & three or more children | 69 | 120 | 68 | 76 | 6 | 9 |
| Two adults | 65 | 282 | 62 | 161 | 10 | 7 |
| Two adults & one child | 65 | 254 | 62 | 143 | 9 | 6 |
| Two adults & two children | 52 | 266 | 69 | 135 | 9 | 7 |
| Two adults & three or more children | 50 | 330 | 42 | 162 | 11 | 10 |
| Three or more adults | 61 | 174 | 56 | 41 | 5 | 5 |
| Three adults with children | 65 | 451 | 57 | 158 | 21 | 17 |
| Four adults with children | 53 | 183 | 60 | 76 | 5 | 7 |
| Five adults with children | 50 | 154 | 39 | 39 | 6 | 4 |
| Total | 59 | 2664 | 60 | 1286 | 100 | 100 |
| **Number of full-time employed workers in household:** | | | | | | |
| 0 | 62 | 1696 | 61 | 795 | 77 | 79 |
| 1 | 50 | 850 | 54 | 440 | 21 | 19 |
| 2+ | 41 | 125 | 61 | 54 | 2 | 2 |
| Total | 59 | 2671 | 60 | 1289 | 100 | 100 |
| **Number of workers (full-time or part-time) in household:** | | | | | | |
| 0 | 63 | 1169 | 64 | 462 | 54 | 53 |
| 1 | 55 | 1219 | 54 | 701 | 40 | 40 |
| 2+ | 50 | 283 | 65 | 126 | 6 | 7 |
| Total | 59 | 2671 | 60 | 1289 | 100 | 100 |

Micro simulation was undertaken to examine what effect a 20 percent increase in electricity prices would have on the level of energy poverty among electrified households. This increase is in line with current tariff adjustment proposals being made by Eskom for 2009. The assumptions behind this modeling exercise were that other energy prices remain constant, that household earnings have not changed since the survey was conducted, and there is no behavioural change in response to energy price hikes such as reducing electricity consumption or switching to alternative cheaper energy sources.

Based on these assumptions, energy poverty increases from 58.6 percent to 64.1 percent of low income electrified households, an increase of 5.5 percent. While policy measures could be introduced to ensure that poor households are protected from high tariff increases, such measures would be need to be supplemented by immediate assistance to help those already affected by energy poverty (Bradshaw, 2008).

Having determined who the energy poor are, it is important to understand what forms of energy expenditure predominate. Among low-income electrified households, approximately two-thirds (65%) of household energy expenditure is on electricity, followed by paraffin (13%) and firewood (11%) (Table 39). Expenditure on candles, coal and gas is low, at less than five percent. Energy expenditure in non-electrified households is on paraffin (43%), candles (19%), firewood (16%) and gas (11%).

**Table 41: Percentage of total household energy expenditure on energy sources, by electrification status and province (column percentage)**

| Energy source | EC | FS | GP | KZN | LP | MP | NW | NC | WC | ALL |
|---|---|---|---|---|---|---|---|---|---|---|
| **Electrified** | | | | | | | | | | |
| Paraffin | 24 | 11 | 9 | 3 | 4 | 7 | 19 | 4 | 19 | 13 |
| Gas | 4 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 5 | 3 |
| Candles | 5 | 0 | 4 | 3 | 6 | 5 | 8 | 5 | 1 | 5 |
| Coal | 0 | 7 | 6 | 0 | 0 | 12 | 2 | 0 | 0 | 3 |
| Firewood | 6 | 1 | 1 | 6 | 27 | 25 | 9 | 5 | 0 | 11 |
| Solar system | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Electricity | 60 | 77 | 77 | 84 | 60 | 48 | 60 | 83 | 74 | 65 |
| Batteries | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| Car batteries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Generator | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 271 | 279 | 307 | 250 | 315 | 304 | 267 | 339 | 325 | 2657 |
| **Non-electrified** | | | | | | | | | | |
| Paraffin | 43 | 83 | 57 | 33 | 19 | 21 | 65 | 32 | 76 | 43 |
| Gas | 10 | 1 | 4 | 17 | 14 | 9 | 3 | 28 | 4 | 11 |
| Candles | 13 | 12 | 21 | 27 | 16 | 25 | 23 | 25 | 5 | 19 |
| Coal | 0 | 0 | 4 | 0 | 0 | 21 | 0 | 0 | 0 | 2 |
| Firewood | 25 | 1 | 2 | 11 | 38 | 8 | 2 | 5 | 4 | 16 |
| Solar system | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Electricity | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Batteries | 7 | 2 | 2 | 8 | 5 | 7 | 3 | 10 | 3 | 6 |
| Car batteries | 1 | 0 | 2 | 3 | 2 | 3 | 2 | 0 | 8 | 2 |
| Generator | 1 | 0 | 8 | 1 | 6 | 5 | 2 | 0 | 1 | 3 |
| Other | 3 | - | - | - | 2 | - | 2 | - | 1 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 160 | 171 | 123 | 180 | 130 | 140 | 156 | 107 | 116 | 1283 |

Electrified households in KwaZulu-Natal and Northern Cape spend more than 80 percent of their energy budget on electricity. In the Free State, Gauteng and Western Cape, the proportion is around the 75 percent, with moderate shares of paraffin expenditure being recorded. In North West and the Eastern Cape, even larger shares are devoted to paraffin relative to electricity, accounting for between 20-25 percent of energy spending. In Mpumalanga and Limpopo, firewood constitutes about a quarter of energy expenditure, with little spending on paraffin. Spending on coal is also present in slightly more than one tenth of electrified households in Mpumalanga.

Non-electrified households in the Free State and Western Cape spend almost all of their domestic energy budget on paraffin, with modest amounts on candles in the former and on car batteries in the latter. Households in the North West and Gauteng also spend considerable percentages on paraffin, and spend larger percentages (20-25%) on candles compared with the Free State and Western Cape. In Limpopo, the largest share of energy spending (38%) is on firewood, with approximately 50 percent of expenditure on paraffin, candles and gas collectively. Among low-income, non-electrified households in the Eastern Cape, twenty-five percent of energy expenditure is on wood, with paraffin the single largest item of energy expenditure. In Mpumalanga, spending on coal equals that on candles and paraffin, with the three energy sources accounting for two-thirds of the domestic energy budget; smaller percentages are spent on gas, wood and batteries. Among non-electrified households in the Northern Cape, paraffin accounts for a third of energy spending, gas and candles each about a quarter, and car batteries about one-tenth.

As for type of geographic location, the share of the household energy budget devoted to electricity is highest among electrified households in informal settlements (80%), with small shares going to paraffin, coal and candles (Table 41). Electricity expenditure remains high in electrified households in formal urban areas and on farms, though with larger shares of spending on paraffin. Electrified households in rural areas spend proportionately less (59%) on electricity, with firewood remaining an important energy expenditure item.

**Table 42: Percentage of total household energy expenditure on energy sources, by electrification status and province (column percentage)**

| Energy source | EC | FS | GP | KZN | LP | MP | NW | NC | WC | ALL |
|---|---|---|---|---|---|---|---|---|---|---|
| **Electrified** | | | | | | | | | | |
| Paraffin | 24 | 11 | 9 | 3 | 4 | 7 | 19 | 4 | 19 | 13 |
| Gas | 4 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 5 | 3 |
| Candles | 5 | 0 | 4 | 3 | 6 | 5 | 8 | 5 | 1 | 5 |
| Coal | 0 | 7 | 6 | 0 | 0 | 12 | 2 | 0 | 0 | 3 |
| Firewood | 6 | 1 | 1 | 6 | 27 | 25 | 9 | 5 | 0 | 11 |
| Solar system | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Electricity | 60 | 77 | 77 | 84 | 60 | 48 | 60 | 83 | 74 | 65 |
| Batteries | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| Car batteries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Generator | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Mean monthly energy expenditure (Rands) | 265 | 183 | 220 | 175 | 132 | 201 | 166 | 113 | 191 | 194 |
| Base N | 271 | 279 | 307 | 250 | 315 | 304 | 267 | 339 | 325 | 2657 |
| **Non-electrified** | | | | | | | | | | |
| Paraffin | 43 | 83 | 57 | 33 | 19 | 21 | 65 | 32 | 76 | 43 |
| Gas | 10 | 1 | 4 | 17 | 14 | 9 | 3 | 28 | 4 | 11 |
| Candles | 13 | 12 | 21 | 27 | 16 | 25 | 23 | 25 | 5 | 19 |
| Coal | 0 | 0 | 4 | 0 | 0 | 21 | 0 | 0 | 0 | 2 |
| Firewood | 25 | 1 | 2 | 11 | 38 | 8 | 2 | 5 | 4 | 16 |
| Solar system | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Electricity | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Batteries | 7 | 2 | 2 | 8 | 5 | 7 | 3 | 10 | 3 | 6 |
| Car batteries | 1 | 0 | 2 | 3 | 2 | 3 | 2 | 0 | 8 | 2 |
| Generator | 1 | 0 | 8 | 1 | 6 | 5 | 2 | 0 | 1 | 3 |
| Other | 3 | - | - | - | 2 | - | 2 | - | 1 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Mean monthly energy expenditure (Rands) | 206 | 275 | 306 | 145 | 161 | 135 | 183 | 125 | 244 | 187 |
| Base N | 160 | 171 | 123 | 180 | 130 | 140 | 156 | 107 | 116 | 1283 |

For non-electrified households, the proportion spent by those in informal settlements on paraffin (67%) stands out, especially when one compares the situation with electrified households in similar contexts. For those in informal settlements who have been electrified, paraffin is almost completely substituted by electricity.

Non-electrified households in formal urban areas continue to spend primarily on paraffin, with candles and coal representing the other main forms of expenditure. Paraffin spending is lower for non-electrified households in rural settings. In rural areas, wood and candles assume increased importance in energy budgets, while among households on farms candles form the main complement to paraffin spending.

**Table 43: Percentage of total household energy expenditure on energy sources, by electrification status and location (column percentage)**

| Energy source | Rural | Urban formal | Urban informal | Farm | All HH |
|---|---|---|---|---|---|
| **Electrified** | | | | | |
| Paraffin | 13 | 14 | 8 | 21 | 13 |
| Gas | 3 | 4 | 1 | 1 | 3 |
| Candles | 5 | 4 | 4 | 4 | 5 |
| Coal | 1 | 5 | 5 | 0 | 3 |
| Firewood | 18 | 2 | 1 | 4 | 11 |
| Solar system | 0 | 0 | 0 | 0 | 0 |
| Electricity | 59 | 70 | 80 | 71 | 65 |
| Batteries | 0 | 0 | 1 | 0 | 0 |
| Car batteries | 0 | 0 | 0 | 0 | 0 |
| Generator | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Mean monthly energy expenditure (Rands) | 173 | 226 | 167 | 105 | 189 |
| Base N | 842 | 1216 | 296 | 303 | 2657 |
| **Non-electrified** | | | | | |
| Paraffin | 32 | 58 | 67 | 38 | 43 |
| Gas | 14 | 5 | 4 | 11 | 11 |
| Candles | 20 | 16 | 15 | 26 | 19 |
| Coal | 0 | 8 | 3 | 6 | 2 |
| Firewood | 24 | 3 | 2 | 6 | 16 |
| Solar system | 0 | 0 | 0 | 0 | 0 |
| Electricity | 0 | 0 | 0 | 0 | 0 |
| Batteries | 7 | 3 | 3 | 6 | 6 |
| Car batteries | 2 | 2 | 2 | 3 | 2 |
| Generator | 2 | 4 | 5 | 3 | 3 |
| Other | 0 | 0 | 0 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Mean monthly energy expenditure (Rands) | 185 | 215 | 708 | 114 | 302 |
| *Base N* | *371* | *228* | *324* | *360* | *1283* |

In terms of poverty status, as assessed by per capita income quintiles, the poorest electrified households spend a larger percentage of their energy budget on paraffin and wood than do those that are relatively better off (Table 42). In contrast, electrified households in the top quintiles (recognising that these are still poor households) spend proportionally more on electricity, which accounts for more than 70 percent of their household energy expenditure. The profiles of energy budget shares among poorer and better-off, non-electrified households are relatively similar, with paraffin dominating spending for all quintiles and the remaining expenditure spread across candles, wood and gas.

**Table 44: Percentage of total household energy expenditure on energy sources, by electrification status and quintile of per capita monthly income (column percentage)**

| Energy source | Poorest quintile | Quintile 2 | Quintile 3 | Quintile 4 | Least poor quintile | All HH |
|---|---|---|---|---|---|---|
| **Electrified** | | | | | | |
| Paraffin | 20 | 11 | 17 | 12 | 9 | 13 |
| Gas | 3 | 2 | 6 | 3 | 2 | 3 |
| Candles | 6 | 6 | 5 | 4 | 4 | 5 |
| Coal | 3 | 5 | 2 | 3 | 1 | 3 |
| Firewood | 18 | 16 | 13 | 8 | 6 | 11 |
| Solar system | 0 | 0 | 0 | 0 | 0 | 0 |
| Electricity | 51 | 60 | 56 | 71 | 76 | 65 |
| Batteries | 0 | 0 | 0 | 0 | 1 | 0 |
| Car batteries | 0 | 0 | 0 | 0 | 0 | 0 |
| Generator | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 405 | 345 | 423 | 742 | 735 | 2650 |
| **Non-electrified** | | | | | | |
| Paraffin | 50 | 43 | 34 | 38 | 51 | 43 |
| Gas | 1 | 15 | 18 | 8 | 9 | 11 |
| Candles | 26 | 16 | 19 | 21 | 13 | 19 |
| Coal | 1 | 0 | 5 | 0 | 3 | 2 |
| Firewood | 14 | 15 | 15 | 22 | 10 | 16 |
| Solar system | 0 | 0 | 0 | 0 | 1 | 0 |
| Electricity | 0 | 0 | 0 | 0 | 0 | 0 |
| Batteries | 4 | 7 | 4 | 7 | 5 | 6 |
| Car batteries | 3 | 2 | 1 | 2 | 1 | 2 |
| Generator | 1 | 1 | 5 | 1 | 6 | 3 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |
| *Base N* | *208* | *159* | *218* | *342* | *355* | *1282* |

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ELECTRICITY

Impact of Electrification

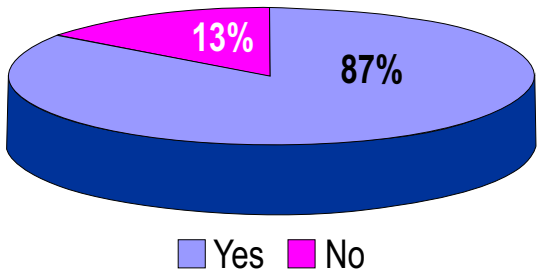
## 9. IMPACT OF ELECTRIFICATION PROGRAMME

Irrespective of the households' electrification status, respondents from the selected households were asked a series of questions in order to tap into their perceptions about benefits of electrification process to their households and communities.

### 9.1 Household Benefits

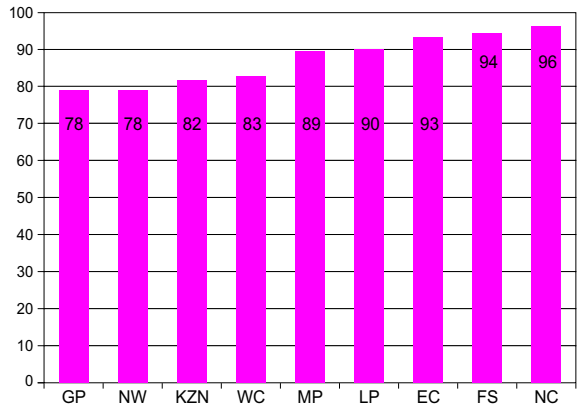
Eighty-five percent (2383) of households said that electrification had benefited them, with the remainder (15%:370) saying that they had not benefited. Whilst analysing responses to this question, it was noted that a large majority of households that were non-electrified did not give a response. The question was consequently further analysed for the electrified households only. Eighty-seven percent (2380) of electrified households said that electrification had benefited them, with the remainder (13%:290) saying that they had not benefited.

**Figure 28: Perceived household benefits of Electrification Programme (percentage)**



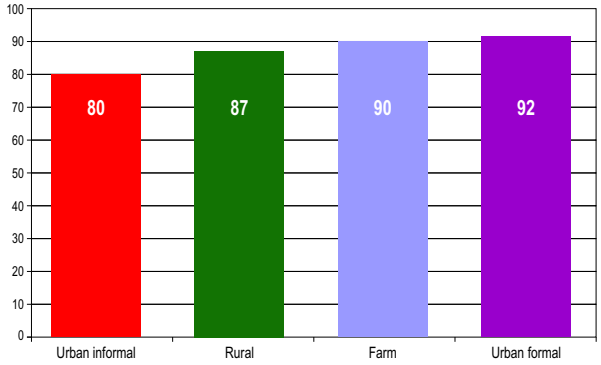

For those that noted benefits (87%), responses were disaggregated by province and by geographic location. Across all provinces In general, between 78 and 96 percent stated that electrification had benefitted their households.

**Figure 29: Household benefits by province (percentage)**



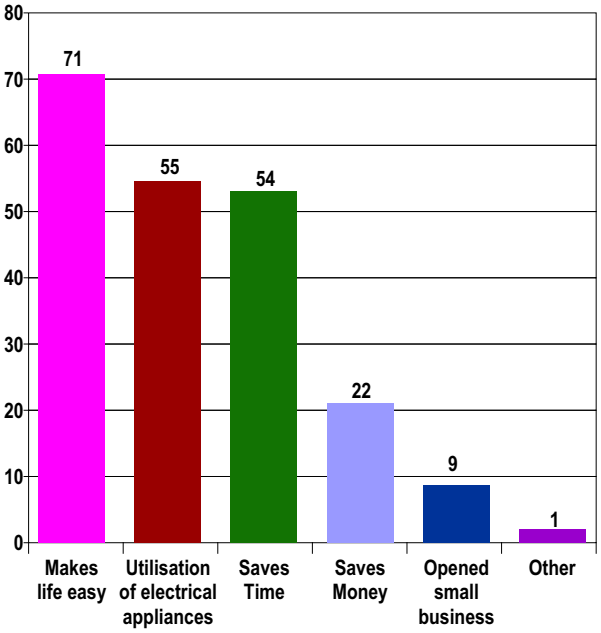

There was little variation in responses across geographic location, with a large percentage reporting a positive impact from the electrification programme; the highest percentage (92%) was in urban formal areas.

**Figure 30: Household benefits by geographic location**




The eighty-seven percent of respondents from electrified households who indicated that the electrification process had benefited their households were asked to give examples of how it has done so.

**Figure 31: Self-reported household benefits (percentage)**




The most frequently mentioned benefit was that having electricity 'makes life easy'. This was cited by seventy-one percent. Disaggregated by province, this response was most prevalent in Northern Cape (91%), Gauteng (91%), Free State (79%), Mpumalanga (75%), KwaZulu-Natal and Western Cape (71%) as the following table indicates.

**Table 45: Percentage of households per province mentioning each of the benefits (multiple response)**

| Province | Make life easy | Utilisation of electrical appliances | Save time | Save money | Opened small business | Other | Base N |
|---|---|---|---|---|---|---|---|
| Eastern Cape | 68 | 47 | 42 | 34 | 6 | 0 | 254 |
| Free State | 79 | 67 | 82 | 37 | 2 | 0 | 273 |
| Gauteng | 91 | 60 | 78 | 7 | 18 | 0 | 262 |
| KwaZulu-Natal | 71 | 52 | 66 | 6 | 14 | 0 | 220 |
| Limpopo | 70 | 75 | 56 | 15 | 10 | 2 | 291 |
| Mpumalanga | 75 | 40 | 49 | 37 | 3 | 0 | 278 |
| North West | 46 | 50 | 35 | 19 | 8 | 0 | 208 |
| Northern Cape | 91 | 40 | 63 | 12 | 6 | 0 | 325 |
| Western Cape | 71 | 36 | 53 | 20 | 8 | 1 | 267 |

The second most frequently mentioned benefit, even though significantly lower than 'makes life easier', was the opportunity to 'use electrical appliances'. This was mentioned by over half (55%) of the households which said that electrification had brought benefits to them. The percentages citing the opportunity to use electrical appliances was highest in Limpopo (75%), Free State (67%) and Gauteng (60%).

This was closely followed by the view (54%) that having access to electricity helps one to 'save time'. This was most frequently mentioned in households in Free State (82%), Gauteng (78%) KwaZulu-Natal (66%).

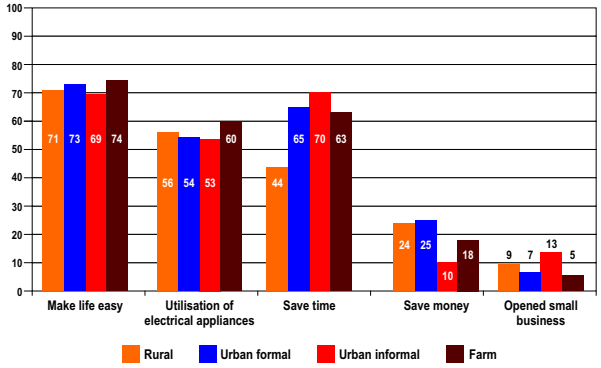
'Saving money' as a benefit was the next most mentioned benefit (22% of households). Disaggregated by province, this benefit was referred to particularly in Free State and Mpumalanga (both 37%) and Eastern Cape (34%).

Just under one-tenth (9%) of households cited being able to operate small businesses as another benefit. This was particularly in Gauteng (18%) and KwaZulu-Natal (14%). Some households in Limpopo (2%) and Western Cape (1%) cited 'other benefits'. These included 'being able to use it for lighting houses', 'household members not having to fetch firewood anymore', ' the ability to store food in the fridge', and 'having access to street lights'.

Disaggregating by geographic type, households in three types mentioned in particular the benefit of electricity's ability to 'make life easier'.

The exception was households in urban informal areas where 'saving time' was the most cited. Fifty-five percent of respondents across all geographic locations identified the ability to 'use electrical appliances' as the second most important benefit. The percentage feeling that having electricity 'saves time' was highest (70%) in urban informal areas. This benefit was least mentioned (44%) in rural areas. Those who mentioned 'opening of small businesses' were mainly in urban informal areas, with less than ten percent in other geographic areas.

**Figure 32: Household benefits by geographic location (percentage)**




Households who stated that the electrification programme had not delivered any benefits to their households (15%) were asked to explain why they thought this. The three most frequently mentioned reasons were “We have no electricity” and therefore also “No street lights”, “No community involvement” and “No training programmes”.

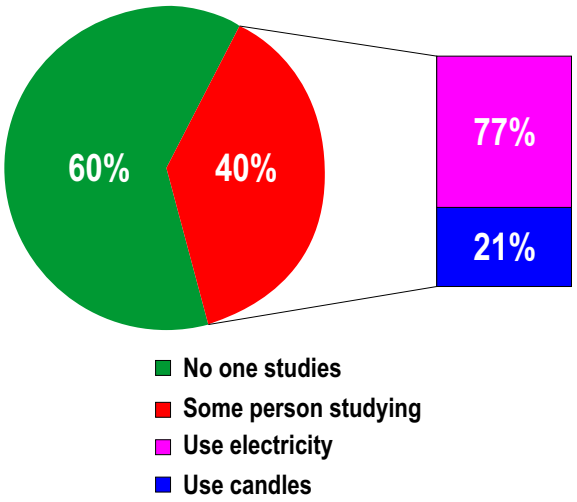
Other reasons included:

“Electricity is too expensive;
Still no jobs;
No free electricity;
Use electricity for cooking and lighting only;
Installed, but do not work;
No money to pay for electricity;
Eskom/farmer switched off electricity;
Meter box problems;
No one employed during the electrification programme;
Still using wood;
We want electricity and houses;
Squatting;
Just started living here;
Illegal connection”

### 9.1.1 Educational Benefits

All households (3952) were asked if there was any educational benefits to being electrified. Two fifths of the households, which equates to 1244 households, said they have a household member who studies at night. Most of these (67%) used electricity for lighting for night study, with a smaller proportion using candles (27%).

**Figure 33: Studying at night by electrification status (percentage)**

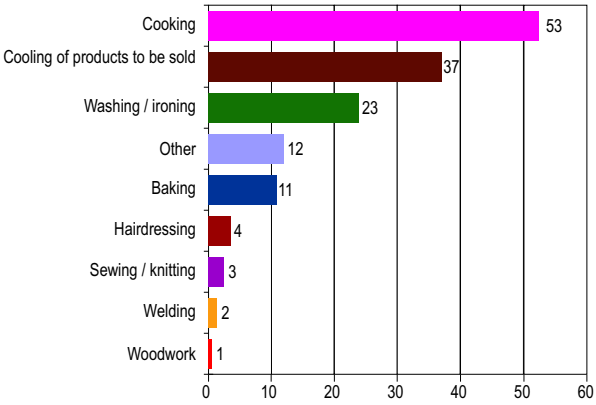



Only four households indicated that they have household members who study for 7 hours or more per night (didn't count as a percent, 0.4%). Three of those households used electricity for lighting, with the other using candles. Twenty one households said that family members spend between five and six hours studying per night and twenty of them uses electricity for lighting during night study, whilst the other uses candles. About 234 households indicated that family members spend between three and fours hours studying at night.

### 9.1.2 Contribution to household income

Representatives of households with electricity (n=3952) were asked to indicate how it has contributed to their household incomes. Only 10% (554) indicated that it has contributed to income generation whilst about 90% (3398) thought otherwise. Amongst the 10% that responded positively, most (53%) are using electricity to cook in order to raise money.

**Figure 34: Manner in which electricity contributes to household income multiple response (percentage)**




Cooking food for sale was the most popular activity for generating income. Closely linked to this was cooling of products for sale, cited by nearly two-fifths (37%) of households. About a quarter (23%) of households washed and ironed clothes for payment. Baking, hairdressing, sewing, welding and woodwork were also mentioned as ways in which electricity contributed to the household income. The 'other' category included running small businesses such as tuck shops, and photocopying shops, selling cold drinks, operating public phones, running crèches, renting out rooms and harvesting.

**Table 46: Percentage of households per province mentioning each of the benefits pertaining to household income (multiple response)**

| Province | Cooking | Cooling of products to be sold | Washing/ ironing | Other | Baking | Hair-dressing | Sewing/ knitting | Welding | Wood-work | Base N |
|---|---|---|---|---|---|---|---|---|---|---|
| Eastern Cape | 34 | 54 | 4 | 5 | 7 | 4 | 1 | 4 | 0 | 16 |
| Free State | 81 | 12 | 23 | 8 | 16 | 7 | 4 | 2 | 0 | 56 |
| Gauteng | 32 | 20 | 2 | 36 | 7 | 6 | 4 | 4 | 1 | 43 |
| KwaZulu-Natal | 66 | 16 | 23 | 13 | 18 | 3 | 2 | 0 | 0 | 32 |
| Limpopo | 19 | 55 | 0 | 15 | 11 | 1 | 10 | 5 | 4 | 53 |
| Mpumalanga | 51 | 77 | 39 | 9 | 1 | 7 | 0 | 1 | 0 | 58 |
| North West | 84 | 16 | 48 | 9 | 13 | 0 | 0 | 1 | 0 | 83 |
| Northern Cape | 84 | 64 | 65 | 0 | 26 | 18 | 4 | 7 | 4 | 127 |
| Western Cape | 89 | 8 | 34 | 0 | 17 | 18 | 6 | 0 | 0 | 86 |

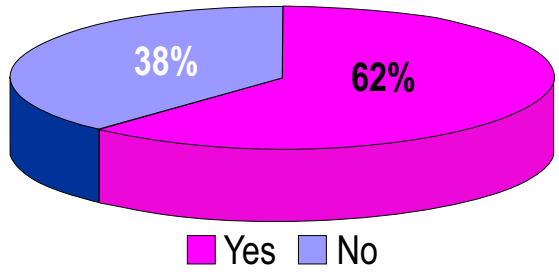
More than eight in ten households in the Western Cape (89%), Northern Cape and North West (both 84%), and Free State (81%) reported that they use electricity for cooking as an income generation activity. A majority of households in Mpumalanga (77%), Northern Cape (64%), Limpopo (55%) and Eastern Cape (54%) reported using electricity to cool products in order to sell.

Washing and ironing was mentioned by significant percentages in Northern Cape (65%), North West (48%), Mpumalanga (39%) and Western Cape (34%). Baking was most mentioned in Northern Cape (26%). Across provinces, hairdressing, welding, sewing and woodwork were least mentioned. Households in Gauteng were the most likely (36%) to mention other ways in which electricity has helped them to generate income.

## 9.2 Community benefits

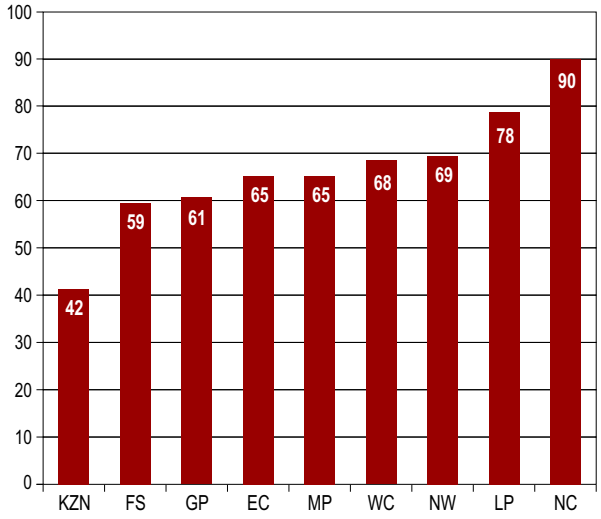
Of all households (3955), about six in every ten (62%: 2662)) households said that electrification had benefited their communities, with nearly two-fifths (38%: 1293)) arguing otherwise.

**Figure 35: Perceived community benefits (percentage)**



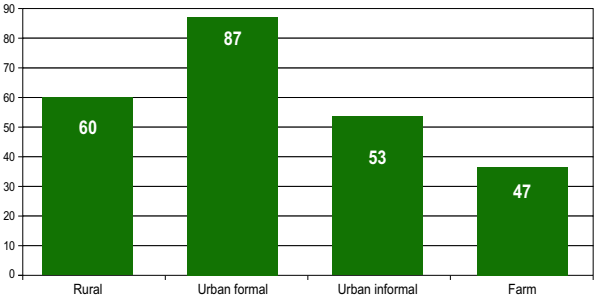

The views of those who responded positively to this question were analysed by province to check for any significant differences.

**Figure 36: Perceive community benefits by province (percentage)**



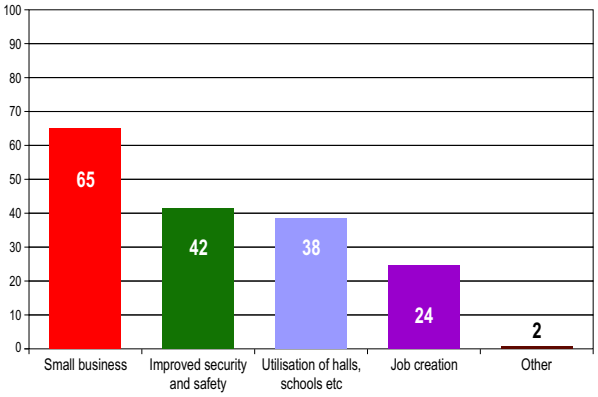

Positive community benefits were most noted in Northern Cape (90%), followed by Limpopo (78%). Over six in ten households in North West (69%), Western Cape (68%), Mpumalanga (65%, Eastern Cape (65%), Gauteng (61%) and Free State (59%) also perceived the electrification programme to have delivered some benefits. KwaZulu-Natal had the lowest proportion (42%) of households sharing this sentiment. These responses were further analysed by geographic location.

**Figure 37: Community benefits by geographic location (percentage)**




A large majority (87%) of households in urban formal areas indicated that the electrification programme had delivered benefits to their communities. Six in ten households (60%) in rural areas, just over half (53%) in urban informal areas and just under half (47%) in farm areas also perceived this. Residents on farms were thus least likely to indicate that their communities had benefited from the electrification programme. Those who responded positively were asked to provide examples of community benefits.

**Figure 38: Self-reported community benefits of the electrification programme (percentage)**



When asked for examples of community benefits, almost two-thirds (65%) mentioned being able to start small businesses, with just over two-fifths (42%) mentioning improved security and safety in their communities. More than one household in every three (38%) mentioned the ability to use halls, schools and similar spaces as benefits to their communities of the electrification programme. Nearly a quarter (24%) cited employment creation. Two percent mentioned 'other' benefits.

**Table 47: Percentage of households mentioning specific community benefits of the electrification programme, by province (multiple response)**

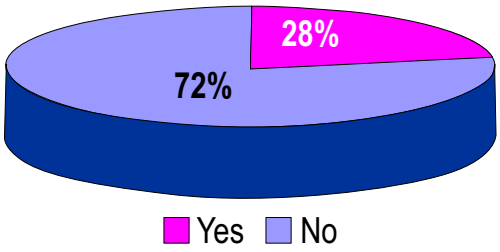
| Province | Small business | Improved security and safety | Utilisation of halls, schools etc | Jobs created | Other | Base N |
|---|---|---|---|---|---|---|
| Eastern Cape | 62 | 27 | 32 | 28 | 3 | 307 |
| Free State | 29 | 56 | 63 | 32 | 0 | 309 |
| Gauteng | 69 | 40 | 52 | 6 | 0 | 260 |
| KwaZulu-Natal | 60 | 33 | 61 | 26 | 0 | 260 |
| Limpopo | 82 | 66 | 30 | 28 | 2 | 343 |
| Mpumalanga | 71 | 36 | 22 | 23 | 0 | 288 |
| North West | 49 | 45 | 26 | 13 | 0 | 268 |
| Northern Cape | 41 | 70 | 34 | 26 | 0 | 334 |
| Western Cape | 33 | 71 | 39 | 18 | 0 | 291 |

Enabling of small businesses was most frequently identified as a community benefit in Limpopo (82%) and Mpumalanga (71%). This benefit was least mentioned in Free State (29%). The improvement of security and safety was most mentioned in Northern Cape (70%) and Western Cape (71%). The utilisation of halls, schools and other facilities was the most mentioned in Free State (63%) and KwaZulu-Natal (61%). Job creation was mentioned by fewer than a third in all provinces, ranging from thirty-two percent in the Free State to six percent in Gauteng. 'Other' benefits were mentioned only in Limpopo (2%) and Eastern Cape (3%). These include lights in the house, adult education, making life easier, not having to fetch wood, street lights, schools, 'Apollo' lights not working, and use of electrical appliances.

### 9.2.1 Contribution to employment creation

All households (3953) were asked if the electrification programme has created jobs for people from their households or communities. Twenty-eight percent (976) said that it had, and seventy-two percent (2977) said that it had not.

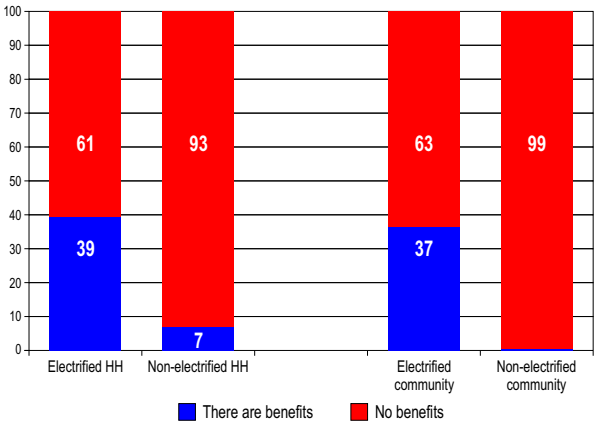
**Figure 39: Job creation (percentage)**




These responses were then disaggregated by household and community electrification status.
Of electrified households (2666) just under two fifths (39%) stated that the electrification programme has benefited their households and communities through job creation.

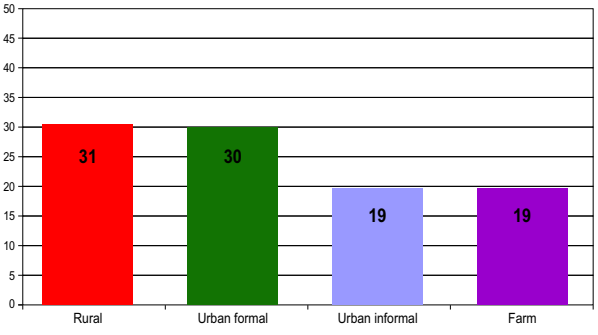
Almost all (93%) of non-electrified households (1287) stated that there were no benefits, with only seven percent citing benefits. As might be expected, this applies whether or not their communities are electrified.

**Figure 40: Job creation by electrification status (percentage)**




Among those who gave positive responses to this question (28%), the highest percentages were from rural (31%) and urban formal (30%) households. In urban informal areas and on farms, the figure was 19 percent.

**Figure 41: Perceived job creation by geographic location (percentage)**



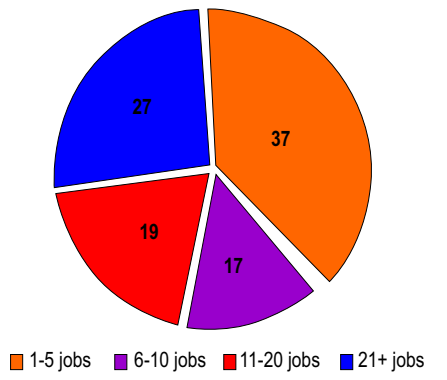
When the responses were disaggregated by province (Table 48), the highest percentage of electrified household representatives stating that electrification had led to job creation was in Limpopo (58%) and the lowest (9%) in Gauteng. Amongst non-electrified households, Western Cape had the largest proportion (17%) saying that electrification has led to job creation, followed by Limpopo (15%). In the other provinces, fewer non-electrified households indicated that job creation had resulted from electrification.

**Table 48: Perceived job creation by electrification status and province (row percentage)**

| | Electrified | | | | Non-electrified | | | |
|---|---|---|---|---|---|---|---|---|
| Province | Yes | No | Total | Base N | Yes | No | Total | Base N |
| Eastern Cape | 56 | 44 | 100 | 272 | 10 | 90 | 100 | 161 |
| Free State | 43 | 57 | 100 | 279 | 10 | 90 | 100 | 171 |
| Gauteng | 9 | 91 | 100 | 309 | 0 | 100 | 100 | 124 |
| KwaZulu-Natal | 30 | 70 | 100 | 251 | 4 | 96 | 100 | 181 |
| Limpopo | 58 | 42 | 100 | 317 | 15 | 85 | 100 | 130 |
| Mpumalanga | 24 | 76 | 100 | 306 | 4 | 96 | 100 | 140 |
| North West | 15 | 85 | 100 | 268 | 8 | 92 | 100 | 157 |
| Northern Cape | 35 | 65 | 100 | 338 | 10 | 90 | 100 | 108 |
| Western Cape | 25 | 75 | 100 | 326 | 17 | 83 | 100 | 115 |
| TOTAL | 39 | 61 | 100 | 2666 | 7 | 93 | 100 | 1287 |

From the 976 (28%) responses received, the mean score was computed in order to determine the average of number of jobs created. The average of jobs created was 146, with the most frequently mentioned total number of jobs created being '2' (102). About one-third (37%) said from one to five jobs were created. Seventeen percent said between six and ten jobs were created. Just under a fifth (19%) said that between eleven and twenty jobs were created, and twenty-seven percent said 21 or more jobs were created (Figure 42).

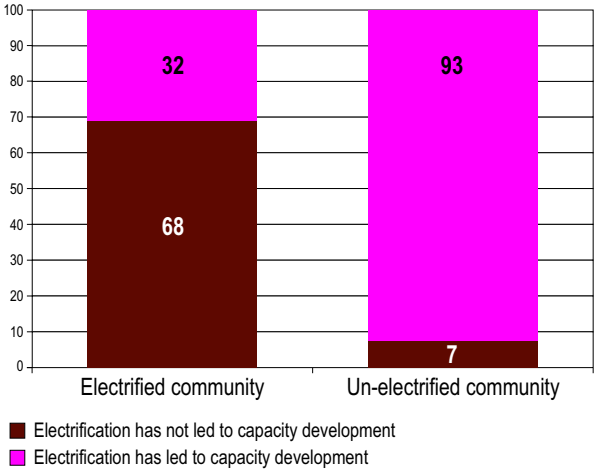
**Figure 42: Number of jobs created (percentage)**




### 9.2.2 Capacity development

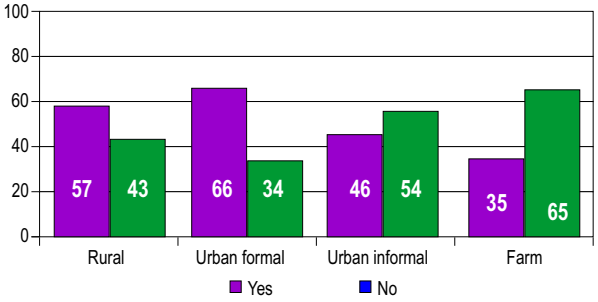
All households (3952) were asked whether they thought that the electrification programme had led to capacity development among community members. Just over half (53:2160%) thought that it had, and the remainder (47%:1792) thought that it had not. Responses to this question were then disaggregated by the electrification status of the community.

**Figure 43: Capacity development by electrification status (percentage)**



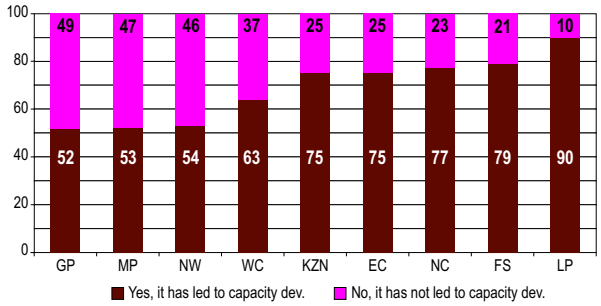

Over two thirds (68%) of households in electrified communities, and just under one-tenth of households in non-electrified communities, mentioned that the electrification programme had led to capacity development in their communities.

**Figure 44: Capacity development among community members by geographic location (percentage)**



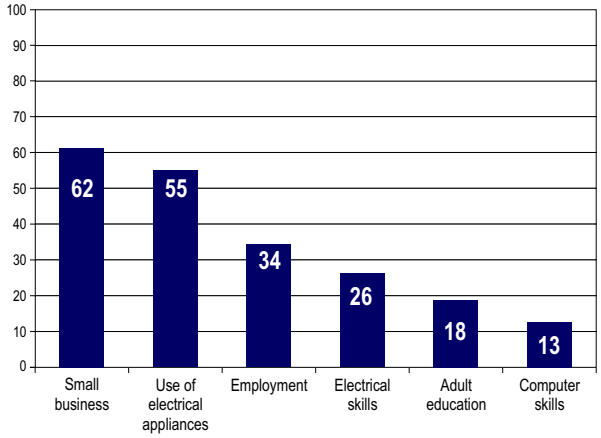

By geographic location, sixty-six percent of households in urban formal areas and fifty-seven percent in rural areas perceived the electrification programme to have brought capacity development, in urban informal areas forty six percent and on farms thirty-five percent.

**Figure 45: Capacity development among community members by province (percentage)**




Gauteng (49%), Mpumalanga (47%), and North West (46%) had largest percentages who indicated that electrification had not led to capacity development. Lower percentages were in KwaZulu Natal and Eastern Cape (both 25%), Northern Cape (23%), Free State (21%) and Limpopo (10%), where between 75% and 90% of households indicated that capacity development has taken place.

**Figure 46: Examples of capacity development among community members (percentage)**




As an example of capacity development brought about by electrification, the ability to start or operate small businesses (62%) was the most frequently mentioned. This was followed by the ability to use electrical appliances (55%), job creation (34%), electrical skills (26%), adult education (18%) and computer skills (13%). Also mentioned were opportunities in factories and schools (technical or fashion design), libraries, old age homes and clinics.

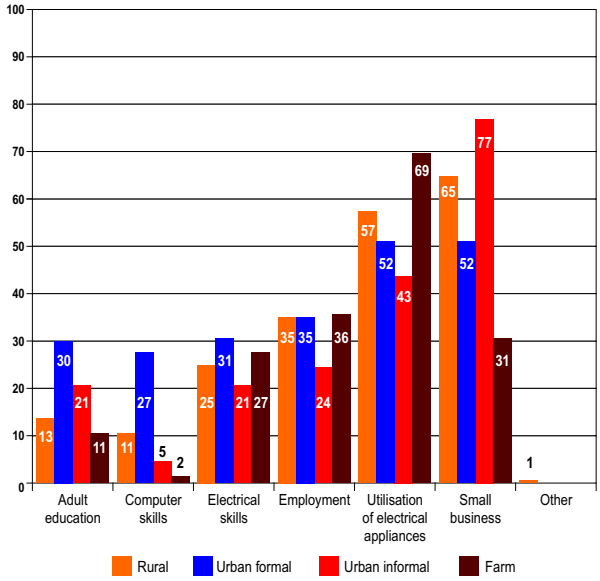
Adult education was the most frequently mentioned capacity development benefit in Free State (41%) and the least mentioned in Eastern Cape (6%). Computer skills were cited in Eastern Cape and Gauteng (21%).

**Table 49: Percentage of households mentioning capacity development benefits, by province (multiple response)**

| Province | Small business | Use of electrical appliances | Employment | Electrical skills | Adult education | Computer skills | Other | Base N |
|---|---|---|---|---|---|---|---|---|
| Eastern Cape | 62 | 27 | 32 | 28 | 28 | 28 | 3 | 307 |
| Free State | 29 | 56 | 63 | 32 | 32 | 32 | 0 | 309 |
| Gauteng | 69 | 40 | 52 | 6 | 6 | 6 | 0 | 260 |
| KwaZulu-Natal | 60 | 33 | 61 | 26 | 26 | 26 | 0 | 260 |
| Limpopo | 82 | 66 | 30 | 28 | 28 | 28 | 2 | 343 |
| Mpumalanga | 71 | 36 | 22 | 23 | 23 | 23 | 0 | 288 |
| North West | 49 | 45 | 26 | 13 | 13 | 13 | 0 | 268 |
| Northern Cape | 41 | 70 | 34 | 26 | 26 | 26 | 0 | 334 |
| Western Cape | 33 | 71 | 39 | 18 | 18 | 18 | 0 | 291 |

Electrical skills were most mentioned in Northern Cape (57%). Job creation was most mentioned in Northern Cape and Free State (46%), and Eastern Cape (42%). Utilisation of electrical appliances was mentioned seventy-four percent in Limpopo, fifty-three percent in Free State, and fifty-two percent in Gauteng, KwaZulu-Natal and Northern Cape.

**Figure 47: Capacity development among community members by geographic location (percentage)**




Responses to the question about capacity development were disaggregated by geographic location. Adult education was most mentioned formal urban areas (30%), and to a lesser extent in urban informal areas (21%). Computer skills were most cited in urban formal areas (27%), and electrical skills in urban formal areas (31%) followed by farms (27%). Employment was least mentioned in urban informal areas. Almost seven in ten households in farm areas mentioned being able to use electrical appliances , whilst over three-quarters in urban informal areas mentioned being able to operate small businesses.

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Satisfaction with service

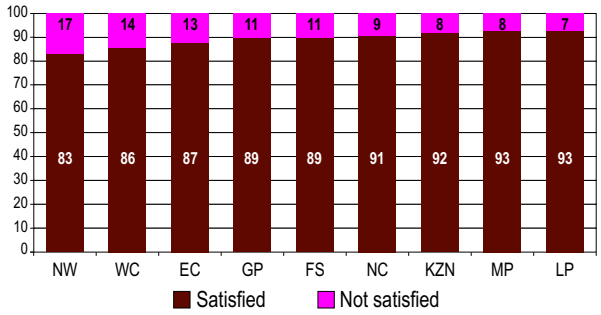
## 10. SATISFACTION WITH SERVICE PROVIDED

### 10.1 Installation processes

Levels of satisfaction with electricity installation in all provinces were generally high. Percentages stating that they were satisfied were as follows: Limpopo and Mpumalanga (93%). KwaZulu-Natal (92%), Northern Cape (91%), Free State and Gauteng (89%), Eastern Cape (87%), Western Cape (86%) and North West (83%). Only 341 households stated that they were not satisfied with the way electricity had been installed.

The highest percentage of households not satisfied with the installation of electricity was seventeen percent, in North West. The province with the lowest percentage of dissatisfied households was Limpopo (7% of households). Figure 48 shows the percentages of households satisfied and not satisfied with the installation of electricity in their homes.

**Figure 48: Level of satisfaction with electricity installation in all provinces (percentage)**




The data were further analysed to show levels of satisfaction in different locations.

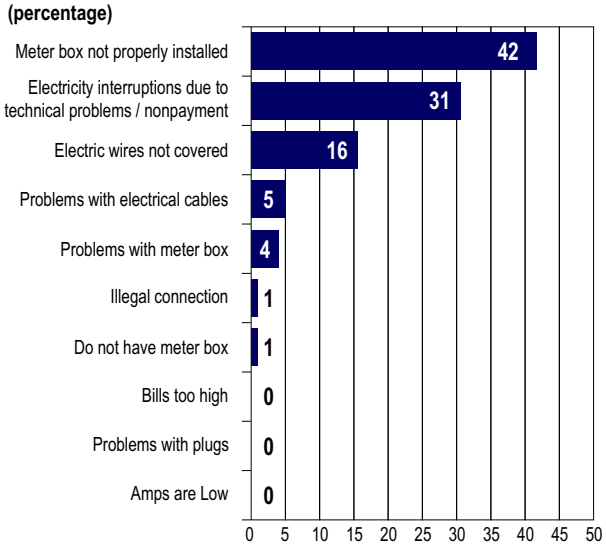
**Table 50: Percentage of households satisfied with electricity installation by location (row percentage)**

| Location | Yes | No | Total | Base N |
|---|---|---|---|---|
| Rural | 89 | 11 | 100 | 890 |
| Urban formal | 88 | 12 | 100 | 1236 |
| Urban informal | 85 | 15 | 100 | 313 |
| Farm | 85 | 15 | 100 | 329 |
| All households | 88 | 12 | 100 | 2768 |

Almost nine in ten rural households were satisfied with the way electricity was installed. Urban informal and farm households were slightly less satisfied than were households in other locations.

Households reporting dissatisfaction were asked for their reasons. They were given three options: “my meter box was not properly installed”, “electric wires are not covered” and “other“, which could include reasons not covered by the first two options.

**Figure 49: Reasons for dissatisfaction with electricity installation (percentage)**




Among the 341 households not satisfied with the installation of electricity in their homes, the most cited reason for dissatisfaction was “meter box not properly installed”. The second most cited reason was electricity interruptions due to technical problems or non-payment, given by just under a third of households. Electricity wires not being covered was mentioned by one-seventh of households (16%). One in a hundred households (1%) stated that they were dissatisfied because of illegal connections, with others not having a meter box. Other reasons constituting less than one percent were Amps too low, bills too high and problems with plugs.

**Table 51: Why households are not satisfied with installation, by province (column percentage)**

| Reason | Rural | Urban formal | Urban informal | Farm | Total |
|---|---|---|---|---|---|
| Meter box not properly installed | 35 | 77 | 8 | 18 | 42 |
| Electricity interruptions due to technical problems / nonpayment | 38 | 6 | 25 | 54 | 31 |
| Electric wires not covered | 14 | 6 | 63 | 15 | 16 |
| Problems with electrical cables | 8 | 1 | 2 | 3 | 5 |
| Problems with meter box | 3 | 6 | 0 | 5 | 4 |
| Illegal connection | 1 | 2 | 1 | 3 | 1 |
| Do not have meter box | - | 1 | 1 | 2 | 1 |
| Bills too high | - | 1 | - | - | 0 |
| Problems with plugs | - | 1 | - | - | 0 |
| Amps are Low | - | 0 | - | - | 0 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Base N | 99 | 147 | 47 | 48 | 341 |

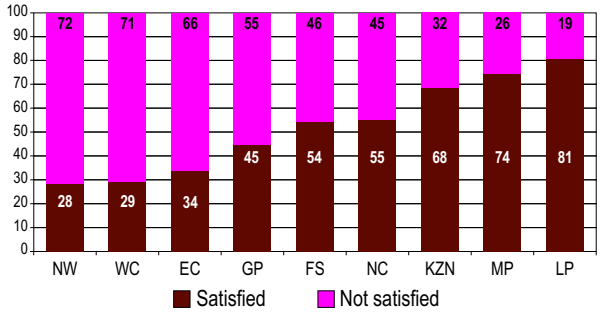
The table above illustrates the percentage of households not satisfied with electricity installation processes in the different locations. Households in urban formal areas were most likely to be dissatisfied by meter boxes not being properly installed. The main reason for dissatisfaction given by households on farms and to a lesser extent in rural areas was interruptions to the supply due to technical problems or non-payment. In urban informal areas, the most frequent reason for dissatisfaction was electrical wires not being covered properly.

## 10.2 Satisfaction with involvement of community members in electricity Installation

Households were asked if they were satisfied with the involvement of community members in the electrification programme. The aim was to find out if communities had been consulted about or involved in decision-making, and to provide guidance for the DoE in planning future electricity installation.

The figure below shows the levels of satisfaction with community involvement in the electrification programme. Just over half (54%) of households said that they were satisfied with the level of involvement and the rest were dissatisfied.

**Figure 50: Households satisfied with community involvement by province (percentage)**




In contrast to the generally high levels of satisfaction with the installation of electricity, satisfaction levels with community involvement were lower. In only five provinces were more than 50% of households satisfied with the level of involvement: Northern Cape (81%), Limpopo (74%), Western Cape (68%), Eastern Cape (55%) and Free State (54%). In Mpumalanga, Gauteng, KwaZulu-Natal and North West more than half of households were unhappy with community involvement.

There was also considerable variation by geographic location.

**Table 52: Percentage of households satisfied with community involvement by location (row percentage)**

| Location | Yes | No | Total | Base N |
|---|---|---|---|---|
| Rural | 46 | 54 | 100 | 1222 |
| Urban formal | 67 | 33 | 100 | 1447 |
| Urban informal | 41 | 59 | 100 | 621 |
| Farm | 33 | 67 | 100 | 664 |
| All households | 48 | 52 | 100 | 3954 |

More than two thirds (67%) of households in urban formal areas were satisfied with the involvement of community members in the electrification programme. This was twice the percentage who were satisfied in farm areas, and in urban informal and rural areas, fewer than half of the households were satisfied.

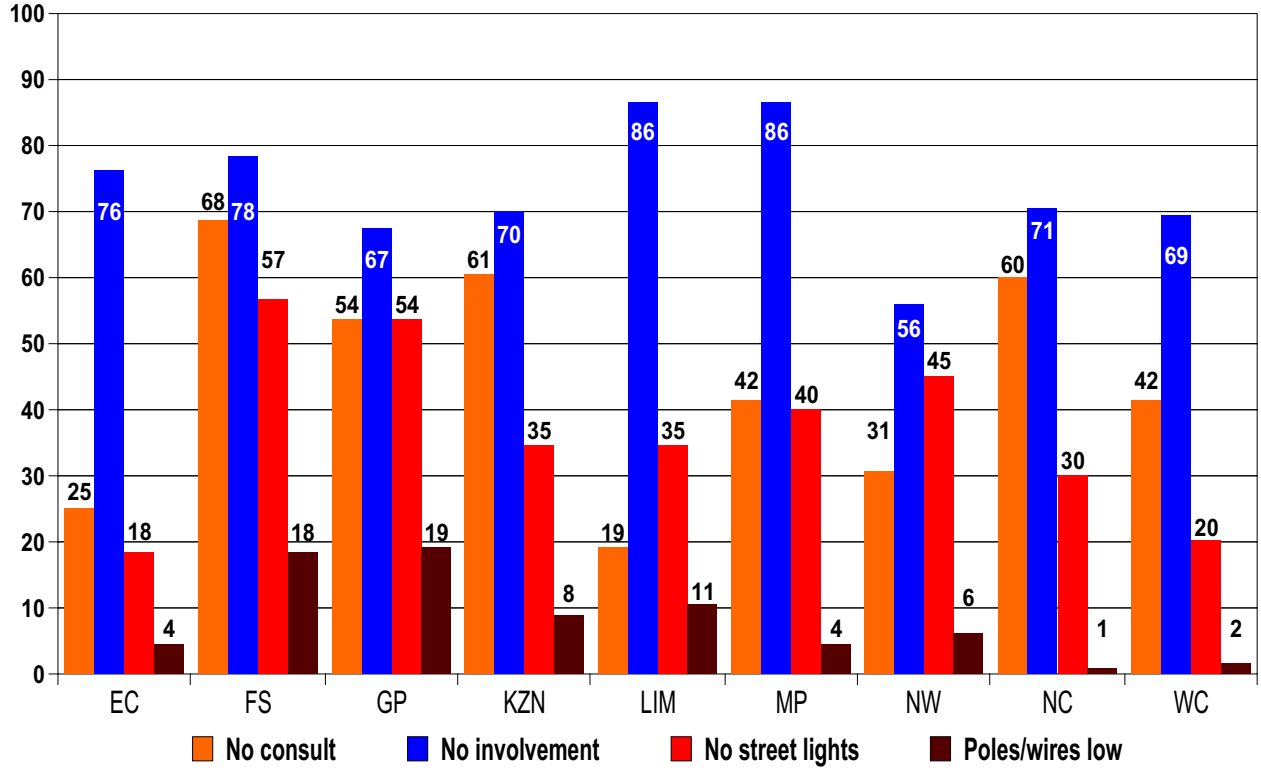
**Table 53: Percentage of households satisfied with community involvement by quintiles of per capita monthly income (row percentage)**

| Location | Yes | No | Total | Base N |
|---|---|---|---|---|
| Poorest quintile | 46 | 54 | 100 | 613 |
| Quintile 2 | 67 | 33 | 100 | 507 |
| Quintile 3 | 41 | 59 | 100 | 642 |
| Quintile 4 | 33 | 67 | 100 | 1088 |
| Least poor quintile | 48 | 52 | 100 | 1096 |
| All households | 48 | 52 | 100 | 3946 |

To determine if income correlated with satisfaction with community involvement in the electrification programme, the data were disaggregated by monthly income per capita quintiles. High dissatisfaction was bimodal, with households in the most poor and the least poor quintiles being the most dissatisfied.

The leading reason for dissatisfaction with community involvement in the electrification process was lack of involvement by households (Figure 51). This was particularly the case in Limpopo and Mpumalanga, where 86% of households gave this reason. Percentages of households in other provinces giving the same reason were Free State (78%), Eastern Cape (76%), Northern Cape (71%), KwaZulu-Natal (70%), Western Cape (69%) and Gauteng (67%).

Figure 51: Reasons for dissatisfaction with community involvement in Electrification Programme (percentage)




Another reason for dissatisfaction was lack of consultation. By province, this was reported as follows: Free State (68%), KwaZulu-Natal (61%), Northern Cape (60%), Gauteng (54%), Mpumalanga and Western Cape (42%), North West (31%), Eastern Cape (25%) and Limpopo (19%).

The above figure also shows that households in all provinces were dissatisfied with not having street lights in their communities. This issue is raised further in the next section which reports respondents' views on how to improve the electrification programme so that it benefits their communities. The provinces where there highest percentage complained about not having sufficient street lights in their communities were the Free State (57%) and Gauteng with (54%).

Another reason for dissatisfaction was that poles and wires were too low, although only 81 households expressed this view. The largest numbers of these were in Gauteng (23 households), North West (16 households) and Free State (13 households).

Three hundred and eighty nine households gave "other" reasons for being dissatisfied with the electrification programme. Because these numbers are so small in relation to the study sample as a whole, the figure below shows the numbers of households that responded to this question and not the percentages as in previous tables. In the Eastern Cape, 104 households reported dissatisfaction with programme because they did not have electricity at all times and were tired of false promises from Eskom and government regarding the electrification programme.

This view was also expressed by smaller numbers of households in the other eight provinces.

Other reasons for dissatisfaction with the electrification programme were that there is no or very little community involvement in the programme (nine households in all the provinces combined), there is theft and vandalism of electricity (five households in all the provinces), there is a need for more street lights and better electricity services (five households in all the provinces) and that the whole community should be electrified (two households in all the provinces).

**Table 54: Other reasons for dissatisfaction with involvement of community leaders (N)**

| Province | No electricity / false promises by Eskom, Government | No / little community involvement | Theft / vandalism of electricity | Need more streetlights/ better electricity service | Whole community should be electrified |
|---|---|---|---|---|---|
| Eastern Cape | 104 | 2 | 0 | 0 | 1 |
| Free State | 24 | 0 | 1 | 1 | 0 |
| Gauteng | 35 | 2 | 0 | 3 | 1 |
| KwaZulu-Natal | 52 | 2 | 4 | 0 | 0 |
| Limpopo | 49 | 0 | 0 | 0 | 0 |
| Mpumalanga | 30 | 1 | 0 | 0 | 0 |
| North West | 28 | 2 | 0 | 0 | 0 |
| Northern Cape | 13 | 0 | 0 | 0 | 0 |
| Western Cape | 33 | 0 | 0 | 1 | 0 |
| Base N | **368** | **9** | **5** | **5** | **2** |

The last question in the questionnaire gave households the opportunity to give comments and suggestions on how the electrification programme can be improved in their communities. These comments will help the DoE with future implementation of the programme.

Out of the 3960 households interviewed for the study, 3544 responded to this question. A wide range of suggestions were made and these were consolidated for analytical purposes into ten main categories.

Up to 1405 respondents had no comments or suggestions about the electrification programme, which according to the data is spread amongst all the provinces. Only one province had less than 100 "no comment/suggestion" responses to this question i.e. North West province with 60 (16%) responses. The next most frequent comment was that people needed electricity connections. The comments were made both by households without electricity at present and by those that do but wish that the rest of their communities could be supplied with it. The highest percentages of people wanting electricity connections were in the Free State (45%) and KZN (30%).

Another comment related to technical problems, including meter boxes not working or malfunctioning, tripping electricity supply, power cuts not related to load shedding, and wires not properly connected. These comments were made particularly in the Northern Cape (20%) and Gauteng (19%).

**Table 55: Respondent comments on how to improve the electrification programme (percentage)**

| Comments | EC | FS | GP | KZN | LIM | MP | NW | NC | WC |
|---|---|---|---|---|---|---|---|---|---|
| No comments/suggestion | 51 | 21 | 34 | 37 | 48 | 44 | 16 | 51 | 68 |
| Need electricity connections | 28 | 45 | 24 | 30 | 15 | 22 | 14 | 7 | 11 |
| Have technical problems | 9 | 9 | 19 | 10 | 12 | 14 | 13 | 20 | 4 |
| Want free electricity | 3 | 8 | 11 | 10 | 6 | 3 | 9 | 7 | 10 |
| Satisfied with service | 4 | 5 | 4 | 1 | 9 | 7 | 5 | 2 | 1 |
| Electricity too expensive | 1 | 2 | 2 | 1 | 6 | 6 | 14 | 2 | 3 |
| Must involve community | - | - | 1 | 9 | - | 2 | 11 | 6 | 2 |
| Need street lights | 3 | 9 | 3 | 1 | 1 | 1 | 3 | 1 | 1 |
| Need vendors nearby | 1 | 1 | 1 | 1 | - | 2 | 11 | 3 | 1 |
| Need other basic services | - | - | 1 | - | 2 | 1 | 2 | 1 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Base N | 219 | 449 | 392 | 424 | 446 | 403 | 404 | 411 | 396 |

One hundred and forty five respondents said that they would like to have street lights in their communities with the highest percentage (9%) in the Free State. This, they felt, would help to address crime at night.

Eleven percent of respondents in Gauteng and ten percent in KwaZulu Natal and Western Cape stated that they would like to receive free electricity or Free Basic Electricity. The highest percentages of households stating that electricity was too expensive for them were in North West (14%), and Limpopo and Mpumalanga (6%).

Across all the provinces, only 27 households (less than 1 %) said that they would like to have vendors nearby.

Only 91 households (2%) said that they were happy with the service they were receiving from Eskom and government and were pleased with the electrification programme.

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Conclusion

## 11. CONCLUSION

The sample frame used for this study implies that this report recounts for households earning less than R1600 per month. As stated in the section relating to sampling, eighty-eight percent of the households in the study fall into the poorest forty percent of national income distribution. The information in the study thus refers to poor households and not to a nationally representative study of all households.

To contextualise the findings, it is important to understand the characteristics of households included in the study. Just over half of the households have a male as the household head and most household heads have little formal education. The mean age of household heads is just over 50 years, and households range between five and six members. Per capita income is approximately R330 per month. On average, these households have fewer than one person in full-time or part-time employment. Apart from the earned income of some members, households rely for income on child support and old age grants. In terms of household characteristics, there was little difference between electrified and non-electrified households.

The vast majority (95%) of households in the study use pre-paid meters, and the largest percentage of households receives a 20 Amps supply. These households have typically been electrified for a period of 7 to 12 years, with the Western Cape being the longest established in terms of electrification. The largest percentages of households experiencing power cuts in the last twelve months were in Gauteng, Free State, Northern Cape and KwaZulu-Natal, particularly in urban formal areas. Mpumalanga and Limpopo reported the highest number of power cuts, with more than half of the households in these provinces experiencing 13 or more in the last 12 months.

The longest power cuts were experienced in Eastern Cape, North West and Gauteng where a quarter of households experienced power cuts of 13 hours or more. Just over three-fifths of households did not report power cuts, with those that did (just over a third) reporting to Eskom (77%) and to municipalities (21%).

Although free basic electricity is aimed primarily at assisting poor households, only thirty-three percent of the households in the study indicated that they receive FBE. There were notable provincial differences, with seventy-eight percent of households in the Western Cape indicating that they receive FBE, but sixteen percent in the North West. The percentage of households in urban informal areas receiving FBE is almost twice as high as in rural areas.

The survey results provide information about multiple energy use. Energy sources principally used are candles, electricity, firewood, paraffin and, to a lesser extent, batteries.

In ninety-six percent of low-income electrified households, electricity is the main energy source for lighting homes, although for fifty-one percent of households candles are an important secondary source in times of service interruption. Electricity is the main energy source for cooking in slightly under two thirds (63%) of electrified households, with only 42 percent using electricity exclusively. Firewood is used exclusively for cooking in one-fifth of households, while multiple sources are used by one-third of households, usually in the form of a combination of electricity, firewood and paraffin. Thirty-one percent use exclusively electricity for space heating, and five percent use electricity in combination with other energy sources. Firewood continues to be the preferred energy choice, being used exclusively by 34 percent of households and in combination with other energy sources by a further six percent. Fifteen percent of electrified households stated that they used no specific energy source for heating, either doing without heat or using warm clothing.

For operating domestic appliances such as televisions and radios, seventy-four percent of electrified households make exclusive use of electricity, with only small percentages using other single energy sources or multiple energy combinations. The remaining one-fifth (22%) of electrified households say that they do not use appliances.

Nearly seventy percent of low-income non-electrified households use exclusively candles for lighting, with the remainder using paraffin or a combination of candles and paraffin. For cooking, seventy-three percent of households use a single energy source, principally firewood (39%) and paraffin (30%). Those using multiple energy sources mainly use a combination of wood and paraffin. Other energy sources and combinations (gas, coal, dung, etc.) hardly feature. Non-electrified households rely extensively on firewood for space heating; it is used exclusively by sixty percent of households. Paraffin is exclusively used for heating in a fifth of households (21%). The remaining 15 percent either use a range of energy sources or do without. Around a third of non-electrified households power their appliances with batteries alone, mainly batteries (27%) and to a small extent car batteries (6%). Multiple energy use is virtually non-existent for powering appliances, with sixty percent reporting that they do not use any energy source for appliances.

The results show that electricity and other energy sources are used in electrified households, with multiple energy sources being used particularly for lighting and cooking. For lighting and operating appliances, electricity has become fairly well entrenched as the energy of choice, though for thermal applications (cooking and heating), energy sources other than electricity continue to play a sizable role in meeting domestic energy needs. As a result of this partial energy switching from biomass and transitional energy sources, some of the benefits that would have been derived from a full energy switch are likely to be diminished or compromised. For instance, the health gains that would result from eliminating indoor air pollution emanating from the use of firewood would not be fully realised.

Furthermore, the potential time saving introduced by electrifying homes would at least be partially offset by the continued need for women and children to collect firewood for cooking and other purposes. Nonetheless, these constraints to the full realisation of the benefits of electricity need to be contextualised in relation to the situation of non-electrified households.

The data appear to suggest that such households are faced with fewer choices relating to energy use, such as those residing in informal urban settlements that are largely dependent on paraffin for many uses, especially thermal applications. These constrained choices exposes people living in such conditions to a variety of risks and vulnerabilities, ranging from health risks (respiratory illnesses, potential for domestic fires, etc.) to the disproportionately high economic burden of rising energy price.

The section on household consumption patterns includes a definition of energy poverty. In accordance with international norms, a household was classified as energy poor if it needs to spend more than 10 percent of its income on energy. Households spending more than this percentage are likely to need to make difficult trade-offs between meeting their energy requirements and other priorities. The survey shows that fifty-nine percent of electrified and sixty percent of non-electrified households spend more than 10 percent of their net income on energy. On average, electrified and non-electrified households spend around one-fifth of their incomes on energy. High energy burdens are found particularly among electrified households in the Eastern Cape, in rural areas, and in the poorest quintile of income distribution. Among non-electrified households, the energy burden is highest in Gauteng and the Free State, in informal settlements, and in the poorest income quintile.

For electrified households, energy poverty is highest in the Eastern Cape and formal urban areas, while the Western Cape, Gauteng and the Eastern Cape, and informal settlements and formal urban areas, have the highest percentages of energy poverty among non-electrified households. Irrespective of electrification status, energy poverty rates were higher in families consisting of a single adult and one or more children, and in the poorest quintile of the income distribution. A large percentage of the energy poor are in the Eastern Cape, KwaZulu-Natal and rural areas, in households consisting of three adults with children, and in workerless households.

A substantial percentage of the energy poor are in non-electrified households in KwaZulu-Natal and in informal settlements.

The vast majority (87%) of electrified households felt that the electrification programme has benefited them, with over three-quarters in all provinces stating this. This opinion was particularly wide expressed in Northern Cape (96%) and Free State (94%), and expressed least in Gauteng and North West (75%). By location, there was little variation in these views although they were held by a slightly higher percentage of households in urban informal areas (92%) than in other geographic areas.

The most frequently mentioned benefit of electrification was that electricity 'makes life easier'. This was mentioned by more than seven out of ten (71%) households, the highest percentages being in Northern Cape and Gauteng (91%), Free State (79%) and Mpumalanga (74%). The second most frequently mentioned benefit was the opportunity to 'use electrical appliances', mentioned by over half (55%) of respondents who felt that electrification brought benefits to their households. Next most mentioned benefit was that electricity helps to 'save time' (54%), followed by 'saving money' (22%). Just under one-tenth (9%) cited being able to operate 'small businesses' as a benefit.

Regarding educational benefits, two fifths (1244) of households indicated that they had a family member who studies at night. The source of energy for lighting most used for study purposes is electricity (67%), with a smaller proportion using candles (27%). The rest (6%) either use paraffin, solar systems, generators or batteries.

A tenth (10%:554) of the households stated that electrification has contributed to income generation of the household. Among these, 'cooking' was the principal activity for generating income followed by 'cooling of products to be sold'.

Over six in ten households (62%:2662) stated that electrification had benefited their communities. These views were held particularly in Northern Cape and Limpopo, and in urban formal areas.

As examples of these benefits, almost two-thirds mentioned being able to start a business, forty-two percent cited improved security and safety in their areas, thirty-eight percent cited being able to use halls, schools and similar public spaces, nearly a quarter (25%) mentioned employment creation (24%) and two percent gave other examples.

Twenty-eight percent (976) of respondents stated that electrification had led to job creation. The highest percentages holding this view were in rural areas (31%) and in urban formal areas (30%). Limpopo was the province with the highest percentage perceiving electrification to have created jobs and Gauteng the lowest (7%). Thirty-seven percent stated that between one and ten jobs were created.

Just over half (53%:2160) stated that electrification had led to capacity development, with forty-seven percentage disagreeing. Sixty-six percent of households in urban formal areas, fifty-seven percent in rural areas and nine in ten households in Limpopo felt that electrification had led to capacity development. The ability to start a business was the most frequently mentioned example of this result of electrification.

Satisfaction with the installation of electricity was high in all provinces with between eight and nine households in every ten indicating that they were satisfied. Reasons for dissatisfaction related mainly to meter boxes not properly installed or uncovered wires. Some households were also dissatisfied because electrical wires were not covered.

Just under half of households were dissatisfied with the level of involvement of community members in the electrification installation process. This varied significantly by province with the majority of households in the Northern Cape (81%), Limpopo (74%), and Western Cape (68%) expressing satisfaction in comparison with KwaZulu-Natal (29%) and North West (28%). The percentage of households in urban formal areas satisfied with community involvement was twice that in farm areas.

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Provincial highlights

## 12. PROVINCIAL HIGHLIGHTS

### 12.1 Eastern Cape

The Eastern Cape had the lowest percentage of households heads in full time employment, the fewest household members in full time employment and the lowest per capita income of all provinces. Households and communities in the province tend to have been electrified more recently in other provinces. The province did not stand out in terms of being either very knowledgeable or not about Free Basic Electricity. A large percentage of households in the province stated that power failures lasted for thirteen hours or more.

The main source of energy in the province is paraffin, followed by candles, firewood and electricity. More households use paraffin for lighting than in any other province. Cooking was mostly done using electricity but non-electrified households used manly firewood and paraffin. Firewood was the main energy source for heating, but compared to other provinces, the use of paraffin for heating was highest amongst electrified households. Non-electrified households tended to use firewood for heating.

Energy expenditure as a percentage of total monthly household income in the Eastern Cape is the highest of all provinces. Among electrified households, twenty-eight percent of net income is spent on energy, slightly higher than among non-electrified households (24%). Electrified households tend to spend their energy budget mostly on electricity, and non-electrified households on paraffin and firewood.

The proportion of households in the province in energy poverty[5] is high, with more than seven in every ten households spending more than ten percent of their income on energy.

### 12.2 Free State

Relative to the other provinces, the Free State had the largest percentage of household heads in full time employment. Just over half (55%) of households indicated that they receive Free Basic Electricity. Seventy-one percent of respondents in the province stated that they had experienced power failures in the last 12 months.

These occurred between one and 12 times during the period and lasted between 5 and 8 hours. A large majority of households in Free State cited technical problems as the main reason for power failures.

More than half of the households in the province rely on electricity, with firewood, candles and paraffin also important energy sources. For lighting, electrified households use mainly electricity, followed by candles. For cooking, a large majority of electrified households rely primarily on electricity, whilst a large percentage of non-electrified households use firewood and paraffin. In the Free State, paraffin and coal are more used for heating than in other provinces.

In electrified communities in the province, nineteen percent of monthly income is spent on energy, and thirty-three percent in non-electrified communities. Non-electrified households spend most of their domestic energy budgets on paraffin, the balance being allocated to candles and car batteries. More than half of electrified and non-electrified households are in energy poverty, in that they spend more than 10% of their incomes on energy.

The province has the second highest percentage of households stating that electrification has brought them benefits, prominent amongst these being the saving of time and money. Other benefits mentioned by a large percentage are cooking as a means of generating income, the utilisation of halls and schools, and job creation. Adult education and job creation were mentioned by forty-one percent of respondents in the province. Asked to make general comments, a substantial percentage said that they would like to have Free Basic Electricity.

### 12.3 Gauteng

Compared to other provinces, Gauteng recorded a low per capita income. Electrified communities and households are well established, being electrified on average for 11 years. More than a third of households, second only to Mpumalanga, indicated a 60 Amps power supply. Almost a fifth of the households in the province were uncertain about whether they receive FBE or not.

[5]Energy poverty - when a household spends more than 10 percent of its income on energy in order to ensure domestic energy needs.

Together with North West, Gauteng has the largest percentage of households indicating they had not received training on electricity saving or safety measures. The province has experienced the most power cuts in the last 12 months, with more than a quarter of households indicating that these lasted 13 hours or more.

Gauteng households tended to use electricity most, followed by candles and paraffin. There is a clear distinction between electrified and non-electrified households in the province in terms of energy use. In electrified households, electricity is very dominant whilst in non-electrified households the use of paraffin is most common (proportionally the highest of all provinces).

In electrified households, twenty percent of the budget is spent on energy. This is lower than the proportion spent on energy in non-electrified households (36%); this is the highest of all provinces. Non-electrified households in Gauteng have the highest energy cost burden with eight in ten non-electrified households spending more than 10% of the household budget on energy. Most of this budget is spent on electricity in electrified households and on paraffin and candles in non-electrified households.

Gauteng households regarded the electrification programme as less beneficial to households and communities than do those in other provinces. Those regarding it as beneficial said that it makes life easy, saves time and contributes to small businesses.

Regarding job creation and capacity development, respondents in Gauteng were the most skeptical of all the provinces, with 91% of electrified and 100% of non-electrified household respondents stating that no jobs have been created by electrification. Satisfaction levels with involvement of community members in the electrification programmes was among the lowest of the provinces.

### 12.4 KwaZulu-Natal

KwaZulu-Natal and the Eastern Cape are the only two provinces with more female than male heads of households. The majority of households in KwaZulu-Natal are supplied with 20 AMPS and the province also has the largest proportion of households supplied with 2.5 Amps (29%). A large percentage of the province's respondents indicated that they are not sure whether they receive Free Basic Electricity, with a low percentage indicating that they have received training on electrification. The province has one of the highest reported rates of power failures, 66% of households having experienced power cuts in the last 12 months. The majority of households experiencing power failures said that these had occurred between 1 and 12 times during that period. Perceived reasons for power failures were primarily technical problems.

KwaZulu-Natal has a relatively low electrification rate, and consequently a broader range of energy sources is used, with candles, firewood and paraffin used as secondary energy sources. More than ninety percent of electrified households use electricity for cooking, whilst non-electrified households use firewood and to a lesser extent paraffin. A large majority of electrified households in this province use electricity for heating, whilst non-electrified households use firewood. For cooking, the majority of the non-electrified households use firewood as the sole energy source. Over seventy percent of electrified households use electricity as their sole source of energy. Non-electrified households rely mainly on one energy source for heating purposes; in most cases this is wood.

Electrified households in the province spend eighteen percent of their income on energy, and non-electrified households seventeen percent. Electrified households spend more than 80% percent of their energy budget on electricity. Non-electrified households spend most of their budgets on paraffin, candles and wood.

Asked about the benefits of the electrification programme, in order of priority KwaZulu-Natal households said electricity makes life easier, saves time, and facilitates the utilisation of electrical appliances.

Cooking and washing/ironing were mentioned as activities that generate income.

The province had the lowest percentage of households stating that electrification has benefited their communities. The most frequently mentioned community benefits were being able to utilise halls and schools, and being able to open a small businesses.

Households in the province were generally unhappy about community involvement during the electrification programme, and the most frequent general comments were that they have no electricity or that they were concerned about false promises by Eskom or Government.

### 12.5 Limpopo

Limpopo is one of three provinces where per capita income was lower amongst electrified households than non-electrified households. Households in Limpopo have been electrified more recently (7 years) than provinces such as the Western Cape where a substantial proportion have been electrified for about 15 years. The majority of households in Limpopo have a 20 AMPS supply. Over 60% indicated that they received training on issues related to electrification, the highest percentage recorded in any province. More than half of Limpopo households experienced power failures more than 13 times in the last 12 months.. More than two thirds of the households were unaware of Free Basic Electricity.

Limpopo is one of the provinces where the use of electricity coexists with equally high usage of candles and firewood. Households in the province largely use electricity as the main source of energy for lighting. It is also one of the two provinces where a very low proportion of electrified households uses electricity for cooking, with wood being used by almost three-quarters of electrified households and more than eighty percent of non-electrified households.

Relative to other provinces, Limpopo also relies strongly on firewood for heating. About a quarter of energy expenditure is on firewood, with little spending on paraffin. The high use firewood probably explains the relatively low energy costs in Limpopo, compared to other provinces.

Electrified households spend 14 percent of their income on energy, and non-electrified households 18 percent.

Limpopo has the largest percentage of households that think the electrification programme has led to capacity development. The percentage citing the use of electrical appliances as a household benefit of electrification was highest in Limpopo, with the percentages perceiving the programme as enabling people to start small businesses or as leading to job creation amongst the highest of the provinces. Limpopo is one of two provinces where almost all households are satisfied with the installation of electricity. The percentage of households dissatisfied with community involvement in the electrification programme is lowest in Limpopo.

### 12.6 Mpumalanga

Relative to other provinces, where the norm is 20 Amps, a high proportion of Mpumalanga households receive 60 Amps power supply. This is also the province with the highest percentage of households stating that they do not receive Free Basic Electricity and have not received training on the use of electricity. Mpumalanga households experienced relatively few power cuts during the last 12 months, although those that did reported them to be frequent and lengthy.

Mpumalanga reported the highest use of candles as an energy source, followed by electricity and firewood; and it has the highest (20%) use of coal for energy of all the provinces. Electricity is mainly used for lighting, second to candles which are used by a quarter of households. Amongst electrified households, electricity and firewood were the most used energy sources, and firewood and paraffin in non-electrified households. Coal featured prominently as a source of energy for heating in this province.

Among electrified households, approximately 20% of monthly income is spent on energy, slightly lower than the 16% for non-electrified households.

In electrified households, energy spend is mostly on electricity, with firewood accounting for a quarter of energy expenditure and little spending on paraffin.

In non-electrified households in the province, spending on coal is equal to that on candles and paraffin, with these sources constituting two-thirds of the domestic energy budget.

A large proportion of households in Mpumalanga listed the cooling and selling of products as a benefit of electrification. They tended to be very satisfied with the installation process but less satisfied with the involvement of their communities in the electricity programmes.

### 12.7 North West

Electrified households in North West had a higher than average per capita income in this study. Households and communities in the province have been electrified for approximately 10 years. Relative to other provinces, they were the least likely (16%) to state that they receive Free Basic Electricity; almost seven in ten (69%) stated that they do not. North West households were also least likely to have received training on either saving on electricity costs or on safety measures. The province experienced the least number of power cuts in the past 12 months. However, when they did take place they were long-lasting, with twenty-five percent of households indicating that they had had power of longer than 13 hours.

About eight in 10 households rely on electricity for lighting purposes, followed by candles. In electrified households, the most used energy source for cooking is electricity and in non-electrified households it is paraffin followed by firewood. The province has the largest incidence of 'other' forms of heating than the options provided. These are mainly blankets or warm clothes.

Electrified households spend seventeen percent of their income on energy sources, significantly less than the twenty-seven percent spent by non-electrified households.

In electrified households, this expenditure is mainly on electricity, and in non-electrified households on paraffin and candles.

Households in this province were least likely to say that they had benefitted from the electrification programme and also least likely to state that electricity has made life easier.

Those who said that electricity had contributed to household income mentioned cooking, and washing and ironing, as income generating activities. A large proportion of people in the province felt that the electrification programme did not lead to job creation or to capacity development. North West households were least satisfied with the installation process and also with community involvement in the electrification process.

### 12.8 Northern Cape

Per capita income of non-electrified households in the Northern Cape was the highest of all provinces; and in electrified households, it was approximately R170 lower than that of non-electrified households. Households and communities in the Northern Cape have been electrified for 10 to 12 years and the majority have a 20 Amp supply. The province had the second highest proportion of people who were aware of Free Basic Electricity, second only to Western Cape. It also had the second highest proportion, after Limpopo, indicating that they have received training in the safe and efficient use of electricity. Seventy percent of households (70%) indicated they had experienced power cuts in the past 12 months, generally ascribing these to technical problems.

The Northern Cape had the highest proportion of households giving electricity as the main source of energy, followed by firewood and candles. Of all the provinces, they were least reliant on paraffin as an energy source. For lighting, a very high proportion of households relied on electricity as an energy source, followed by candles. A combination of electricity and firewood was used in electrified households for cooking. Firewood was the main source of energy in non-electrified households.

Electrified households mainly used electricity for heating and non-electrified households relied heavily on firewood.

Only 12% of total monthly income of Northern Cape households is spent on energy sources and the province has the lowest percentage of energy poor households. Electrified households in the Northern Cape spend the largest share (80%) of their energy budget on electricity.

For non-electrified households, paraffin and gas each accounted for about a third of spending whilst a quarter of the budget went to candles.

The Northern Cape had the highest proportion of households stating that the electrification programme had benefitted households, primarily in the sense that electricity had made life easier. This province also had the highest proportion of people stating that they had benefitted financially from cooling and selling products, washing and ironing clothes, and baking. They were also the most positive regarding community benefits, nine in ten households saying that the electrification programme had benefitted their communities by improving the safety and security of communities. Northern Cape households were also the most satisfied with the way communities were involved in the electrification programme.

### 12.9 Western Cape

The Western Cape had the largest percentage of respondents in full-time employment, and the highest per capita income. Western Cape electrified communities were the most established in terms of the number of years electrified: generally between 12 and 15 years. Households in the province were also the most satisfied with the vending hours for purchasing prepaid tokens. This province was least likely to report ever experiencing power failures, with a high proportion of those that did not sure of the cause of the failures. The largest proportion of households aware of Free Basic Electricity was found in this province.

In the Western Cape, three-quarters of households use electricity as the main energy source, followed by paraffin and candles (a quarter).

Although electricity is the preferred energy source for lighting, a sizeable proportion of households rely on paraffin. Amongst all electrified households in all provinces, the Western Cape relies most on electricity for cooking.

For non-electrified households, almost nine in ten rely on paraffin for cooking. Households in the Western Cape rely proportionately more on electricity and paraffin for heating, especially amongst non-electrified households, than do households in other provinces.

In electrified communities in the Western Cape, seventeen percent of total monthly household income is spent on energy; this is generally lower than in other provinces. Conversely, in non-electrified communities, the proportion (27%) is substantially higher.

Of all electrified households in energy poverty, only one percent are in the Western Cape. In contrast, the non-electrified households are extremely vulnerable, with eighty-four percent of these spending more than 10% of their net income on energy, thus rendering them energy poor.

In the Western Cape, approximately three-quarters of electrified households spend their energy budget exclusively on electricity. Non-electrified households spend almost their entire domestic energy budget on paraffin.

The Western Cape was the province with the highest proportion of households that used electricity to generate income from cooking. Improved security and safety as a community benefit was most cited in this province. Western Cape households were amongst those least satisfied with the installation process, but were most satisfied with community involvement therein.

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Participation chart

## PARTICIPATION CHART

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ELECTRICITY

# Household Questionnaire

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# An evaluation of the Electrification Programme 2008

## HOUSEHOLD QUESTIONNAIRE

This questionnaire is designed to collect information on the impact of the Electrification Programme in your community. The information you provide will be used only for this purpose and will be treated in strict confidence. Your cooperation will be highly appreciated. Should you require more information about this study, do not hesitate to contact us at Department of Minerals and Energy on …Tel. 012 317 8631 Fax: 012 317 8958

| IDENTIFICATION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Name of the Province** | EC | FS | GP | KZN | LP | MP | NW | NC | WC |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **District Name** | | | | | | | | | |
| **District Number** | Inserted by PDA | | | | | | | | |
| **Municipality Name** | | | | | | | | | |
| **Municipality Number** | Inserted by PDA | | | | | | | | |
| **Area/Village/Suburb name** | | | | | | | | | |
| **Type of area** | Rural | | | | | | | | 1 |
| | Urban Formal | | | | | | | | 2 |
| | Urban Informal | | | | | | | | 3 |
| | Farm | | | | | | | | 4 |
| **Interviewer's Name and Surname** | | | | | | | | | |
| **Date of Interview** | Inserted by PDA | | | | | | | | |
| **EA Number** | | | | | | | | | |
| **Household Number** | | | | | | | | | |
| **Indicate Geographic GPS Co-ordinates** | Inserted by PDA | | | | | | | | |

| No. | Demographic Profile | Answer | | | | | | | | | | | | | Skip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Number of persons living in this household (Please classify them by age and gender) | Total Number of people | | | | | | | | | | | | | |
| | | | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50+ | Total | |
| | | Male | | | | | | | | | | | | | |
| | | Female | | | | | | | | | | | | | |
| 2 | Is the household head male or female? | Male | | | | | | | | | | | | 1 | |
| | | Female | | | | | | | | | | | | 2 | |
| 3 | How old is the household head? | | | | | | | | | | | | | | |
| 4 | What is the marital status of household head? | Never married | | | | | | | | | | | | 1 | |
| | | Currently married | | | | | | | | | | | | 2 | |
| | | Widowed | | | | | | | | | | | | 3 | |
| | | Separated | | | | | | | | | | | | 4 | |
| | | Divorced | | | | | | | | | | | | 5 | |
| | | Living together but not married | | | | | | | | | | | | 6 | |
| 5 | What is the highest education level achieved by head of household? | No formal education | | | | | | | | | | | | 1 | |
| | | Primary education | | | | | | | | | | | | 2 | |
| | | Secondary education | | | | | | | | | | | | 3 | |
| | | Matric | | | | | | | | | | | | 4 | |
| | | POst matric | | | | | | | | | | | | 5 | |
| 6 | Is the head of the household currently in full-time employment? | Yes | | | | | | | | | | | | 1 | |
| | | No | | | | | | | | | | | | 2 | |
| 7 | How many people in this household are in full-time or part time employment? | Full-time employment | | | | | | | | | | | | | |
| | | Part time employent | | | | | | | | | | | | | |
| 8 | What is the total **monthly** income category for the head of the household? *(Please add all sources of income for the head of the household)* | No income | | | | | | | | | | | | 0 | |
| | | R 1 - 399 | | | | | | | | | | | | 1 | |
| | | R 400 - 1199 | | | | | | | | | | | | 2 | |
| | | R 1200 - 2499 | | | | | | | | | | | | 3 | |
| | | R 2500 - 4999 | | | | | | | | | | | | 4 | |
| | | R 5000 - 9999 | | | | | | | | | | | | 5 | |
| | | R 10000+ | | | | | | | | | | | | 6 | |

| No. | Demographic Profile | Answer | | Skip |
|---|---|---|---|---|
| 9 | What is the **main** source of income for the head of this household? | Child grant | 1 | |
| | | Self employed | 2 | |
| | | Pension | 3 | |
| | | Disabled grant | 4 | |
| | | Inheritance | 5 | |
| | | Old age grant | 6 | |
| | | Unemployment Insurance Fund | 7 | |
| | | Child Maintenance | 8 | |
| | | Trust Fund | 9 | |
| | | Part time employment | 10 | |
| | | Full time employment | 11 | |
| | | Other (Please specify) | 12 | |
| 10 | What is the total **monthly** income category for this household? *(Please add income for all members who are working, and all other sources of income for the household)* | No income | 0 | |
| | | R 1 - 399 | 1 | |
| | | R 400 - 1199 | 2 | |
| | | R 1200 - 2499 | 3 | |
| | | R 2500 - 4999 | 4 | |
| | | R 5000 - 9999 | 5 | |
| | | R 10000+ | 6 | |
| 11 | What is the source of income for this household? *(Please circle from the list provided for all members of the family who have a source of income)* | Child grant | 1 | |
| | | Self employed | 2 | |
| | | Pension | 3 | |
| | | Disabled grant | 4 | |
| | | Inheritance | 5 | |
| | | Old age grant | 6 | |
| | | Unemployment Insurance Fund | 7 | |
| | | Child Maintenance | 8 | |
| | | Trust Fund | 9 | |
| | | Part time employment | 10 | |
| | | Full time employment | 11 | |
| | | Other (Please specify) | 12 | |

| No. | Demographic Profile | Answer | | | | Skip |
|---|---|---|---|---|---|---|
| 12 | What is the **main** source of energy for cooking, heating and lighting in this household? | | Cook | Heat | Light | |
| | | Paraffin | 1 | 1 | 1 | |
| | | Gas | 2 | 2 | 2 | |
| | | Candle | 3 | 3 | 3 | |
| | | Coal | 4 | 4 | 4 | |
| | | Firewood | 5 | 5 | 5 | |
| | | Solar System | 6 | 6 | 6 | |
| | | Electricity | 7 | 7 | 7 | |
| | | Batteries | 8 | 8 | 8 | |
| | | Car batteries | 9 | 9 | 9 | |
| | | Generator (Petrol / diesel) | 10 | 10 | 10 | |
| | | Other (Please specify) | 11 | 11 | 11 | |
| 13 | Does your household have any of the following appliances? | | | Yes | No | If no to all go to 15 |
| | | Radio | | 1 | 2 | |
| | | Television | | 1 | 2 | |
| | | Electric kettle | | 1 | 2 | |
| | | Refrigerator | | 1 | 2 | |
| | | Personal Computer | | 1 | 2 | |
| | | Washing Machine | | 1 | 2 | |
| | | Microwave oven | | 1 | 2 | |
| | | Stove | | 1 | 2 | |
| | | Heater | | 1 | 2 | |
| 14 | Are the appliances in working condition? | | | Yes | No | |
| | | Radio | | 1 | 2 | |
| | | Television | | 1 | 2 | |
| | | Electric kettle | | 1 | 2 | |
| | | Refrigerator | | 1 | 2 | |
| | | Personal Computer | | 1 | 2 | |
| | | Washing Machine | | 1 | 2 | |
| | | Microwave oven | | 1 | 2 | |
| | | Stove | | 1 | 2 | |
| | | Heater | | 1 | 2 | |

| No. | Electricity Status and Utilization | Answer | | | |
|---|---|---|---|---|---|
| 15 | Is your community electrified? | Yes | | 1 | If No go to 17 |
| | | No | | 2 | |
| 16 | For how long has your community been electrified? | | | Years | |
| 17 | Is your household electrified? | Yes | | 1 | If No go to 32 |
| | | No | | 2 | |
| 18 | For how long has your household been electrified? | | | Years | |
| 19 | What type of electricity connection do you have? | Grid | | 1 | If non grid go to 32 |
| | | Non-Grid | | 2 | |
| 20 | Indicate type of supply | 2.5 Amps | | 1 | |
| | | 10 Amps | | 2 | |
| | | 20 Amps | | 3 | |
| | | 60 Amps | | 4 | |
| | | 80 Amps and more | | 5 | |
| 21 | What type of metering system do you use? | Prepaid metering system | | 1 | If conventional go to 24 |
| | | Conventional metering system | | 2 | |
| 22 | If prepaid system is used are vending hours adequate? | Yes | | 1 | |
| | | No | | 2 | |
| 23 | If 'No' to question 22 what hours do you suggest? | | From | To | |
| | | Weekdays | | | |
| | | Saturdays | | | |
| | | Sundays | | | |
| | | Month-end Weekend | | | |
| | | Public Holidays | | | |
| 24 | Do you receive Free basic Electricity? | Yes | | 1 | |
| | | No | | 2 | |
| | | Don't know | | 9 | |
| 25 | Do you ever experience power failure in your household? | Yes | | 1 | If no go to 32 |
| | | No | | 2 | |

| No. | Electricity Status and Utilization | Answer | | |
|---|---|---|---|---|
| 26 | Within the last 12 months how many times did you experience power failures *(not due to expired account)*? | 1 - 12 times | 1 | |
| | | 13 - 24 times | 2 | |
| | | 25 - 36 times | 3 | |
| | | 37 - 48 times | 4 | |
| | | 50+ times | 5 | |
| 27 | How long does the power failure last? | 1 - 4 hours | 1 | |
| | | 5 - 8 hours | 2 | |
| | | 9 - 12 hours | 3 | |
| | | 13+ hours | 4 | |
| 28 | What were the reasons for power failure? | Heavy Rain / Thunderstorm | 1 | |
| | | Strong Wind | 2 | |
| | | Technical Problems | 3 | |
| | | Do not know | 4 | |
| | | Other (Please specify) | 5 | |
| 29 | Do you report power failure? | Yes | 1 | If no go to 32 |
| | | No | 2 | |
| 30 | Where do you report power failure? | Eskom | 1 | |
| | | Municipality | 2 | |
| | | Other (Please specify) | 3 | |
| 31 | How do you report power failure? | Telephonically | 1 | |
| | | Personally / in person | 2 | |
| | | Other (Please specify) | 3 | |

| 32 | What energy sources does your household utilize?<br><br>Please rank the response<br>0 = Not at all<br>1 = Less<br>2 = Average<br>3 = Most of the time<br>4 = All the time | | Cook | Light | Heat | Appliances | |
|---|---|---|---|---|---|---|---|
| | | Paraffin | | | | | |
| | | Gas | | | | | |
| | | Candle | | | | | |
| | | Coal | | | | | |
| | | Firewood | | | | | |
| | | Solar system | | | | | |
| | | Electricity | | | | | |
| | | Batteries | | | | | |
| | | Car batteries | | | | | |
| | | Generator (Petrol / Diesel) | | | | | |
| | | Other | | | | | |

| No. | Electricity Status and Utilization | Answer | | | | | |
|---|---|---|---|---|---|---|---|
| 33 | How much does your household spend **per month** on the following energy sources?<br><br>(Please indicate the cost of that particular source of energy, where you bought it, distance travelled to and from home, as well as transport cost **per month**)<br><br>**Place**<br>0 = None<br>1 = Vending Station<br>2 = Shop<br>3 = Spaza Shop<br>4 = Town<br>5 = Other Specify<br>6 = Conventional<br>(Used for electricity only) | | Cost (Rands) | Place | Distance to & fro (km) | Transport cost (Rand) | |
| | | Paraffin | | | | | |
| | | Gas | | | | | |
| | | Candle | | | | | |
| | | Coal | | | | | |
| | | Firewood | | | | | |
| | | Solar system | | | | | |
| | | Electricity | | | | | |
| | | Batteries | | | | | |
| | | Car batteries | | | | | |
| | | Generator (Petrol / Diesel) | | | | | |
| | | Other | | | | | |
| | | Total cost | | | | | |
| 34 | Does the household collect firewood? | Yes | | | | 1 | If no go to 36 |
| | | No | | | | 2 | |
| 35 | Who in the household is responsible for collecting firewood, how far and how often?<br><br>(Please indicate the cost of that particular source of energy, where you bought it, distance travelled to and from home, as well as transport cost **per month**) | | 1 = YES<br>2 = NO | Distance in (km) | 1 = Every day<br>2 = Every weekend<br>3 = Fortnight<br>4 = Monthly<br>5 = Once a year<br>6 = Other (specify) | | |
| | | Female (16 years & older) | | | | | |
| | | Male (16years & older) | | | | | |
| | | Female (15 years & younger) | | | | | |
| | | Male (15 years & younger) | | | | | |
| 36 | How much in total does it cost your household per month to have all your energy sources? | R 1 - 50 | | | | 1 | |
| | | R 51 - 100 | | | | 2 | |
| | | R 101 - 150 | | | | 3 | |
| | | R 151 - 200 | | | | 4 | |
| | | R 201 - 250 | | | | 5 | |
| | | R 251+ | | | | 6 | |

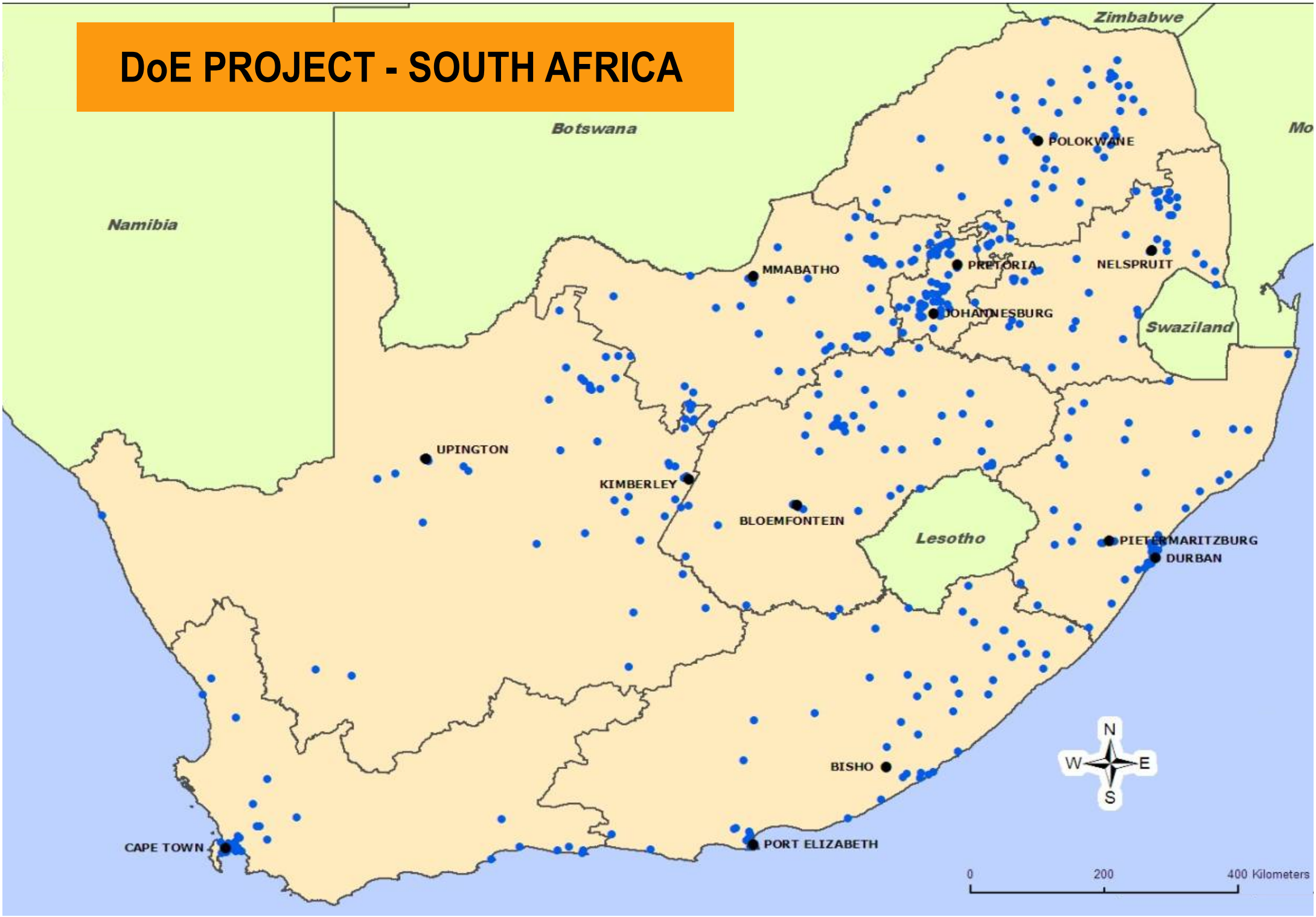
| No. | Electricity Status and Utilization | Answer | | |
|---|---|---|---|---|
| 37 | How much do you think your household should pay? | None | 0 | |
| | | R 1 - 50 | 1 | |
| | | R 51 - 100 | 2 | |
| | | R 101 - 150 | 3 | |
| | | R 151 - 200 | 4 | |
| | | R 201 - 250 | 5 | |
| | | R 251+ | 6 | |
| 38 | Did you receive any training on how to use electricity (e.g how to save on your electricity bill)? | Yes | 1 | |
| | | No | 2 | |
| 39 | Did you receive any training in safety measures when using electricity? | Yes | 1 | |
| | | No | 2 | |
| **No.** | **Electricity impact** | **Answer** | | **Skip** |
| 40 | Do you think that the Electrification programme has benefitted your household? | Yes | 1 | If no go to 42 |
| | | No | 2 | |
| 41 | If yes, please give specific benefits? | Save money | 1 | |
| | | Save time | 2 | |
| | | Utilisation of electrical appliances | 3 | |
| | | Make life easy | 4 | |
| | | Opened small business | 5 | |
| | | Other specify | 6 | |
| 42 | If 'No' to question 40 above, please give explanation why there are no benefits? | | | |
| | | | | |
| | | | | |
| 43 | Do you think that the Electrification programme has benefitted your community? | | | If no go to 45 |
| | | | | |
| 44 | If yes, please give examples of specific benefits? | Utilisation of halls, schools etc | 1 | |
| | | Improved security and safety | 2 | |
| | | Small business | 3 | |
| | | Jobs created | 4 | |
| | | Other (Specify) | 5 | |

| No. | Electricity impact | Answer | | Skip |
|---|---|---|---|---|
| 45 | Do you think that the Electrification programme has created jobs for people in this household or community? | Yes | 1 | If no go to 47 |
| | | No | 2 | |
| 46 | If yes, please above how many jobs? *(Please put a number)* | | | |
| 47 | Do you think that the Electrification programme has led to the capacity development among community members? | Yes | 1 | If no go to 49 |
| | | No | 2 | |
| 48 | If yes, please give examples of the types of capacity development | Adult education | 1 | |
| | | Computer skills | 2 | |
| | | Electrical skills | 3 | |
| | | Employment | 4 | |
| | | Utilisation of electrical appliances | 5 | |
| | | Small business | 6 | |
| | | Other please specify | 6 | |
| 49 | Do you have household members who study at night? | Yes | | If no go to 52 |
| | | No | | |
| 50 | If yes please indicate the main source of energy used for lighting during night study | Paraffin | 1 | |
| | | Gas | 2 | |
| | | Candle | 3 | |
| | | Solar system | 4 | |
| | | Electricity | 5 | |
| | | Batteries | 6 | |
| | | Car batteries | 7 | |
| | | Generator (petrol / diesel) | 8 | |
| 51 | How many hours do they utilize studying per night? | 1 to 2 hours | 1 | |
| | | 3 to 4 hours | 2 | |
| | | 5 to 6 hours | 3 | |
| | | 7+ hours | 4 | |
| 52 | Does electricity contribute to your household income? | Yes | 1 | If no go to 54 |
| | | No | 2 | |

| No. | Electricity impact | Answer | | Skip |
|---|---|---|---|---|
| 53 | In what manner? | Cooking | 1 | |
| | | Baking | 2 | |
| | | Sewing / knitting | 3 | |
| | | Cooling of products to be sold | 4 | |
| | | Woodwork | 5 | |
| | | Welding | 6 | |
| | | Hairdressing | 7 | |
| | | Washing / ironing | 8 | |
| | | Other (Specify) | | |
| **No.** | **Electricity impact** | **Answer** | | **Skip** |
| 54 | Are you satisfied with the way the electricity is being installed in this household? | Yes | 1 | If yes go to 56 |
| | | No | 2 | |
| 55 | If 'No' please elaborate on your dissatisfaction | My meter box is not properly installed | 1 | |
| | | Electric wires are not covered | 2 | |
| | | Other (specify) | 3 | |
| 56 | Are you satisfied with the level of involvement of community members in the electrification programme? | Yes | 1 | If yes go to 58 |
| | | No | 2 | |
| 57 | If no, could you please provide reasons for your dissatisfaction? | No consultation | 1 | |
| | | No involvement | 2 | |
| | | No street lights | 3 | |
| | | Poles and wires too low | 4 | |
| | | Other (please specify) | 5 | |
| 58 | Do you have any other comments or suggestions to make on how the Electrification programme can be improved in your community? | | | |
| | | | | |

| *Comments* | |
|---|---|
| Respondent's comments | |
| | |
| | |
| | |
| Fieldworker's comments | |
| | |
| | |
| Fieldworker's signature | |
| Supervisor's comments | |
| | |
| | |
| Supervisor's date | |
| Supervisor's signature | |

**THANK YOU**


DoE PROJECT - SOUTH AFRICA
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