



AFRICAN UNION ENERGY

African Energy Commission

Commission Africaine de l'Energie

HOUSEHOLD ENERGY USE IN AFRICA

A Special Policy Report on Energy
July 2023

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AFREC is a specialised energy agency of the African Union, mandated to develop the African energy sector by coordinating, harmonising, protecting, conserving, developing and promoting rational exploitation, commercialization and integration of energy resources in Africa. Working with AU member states with a broad network of experts and partners in all the 55 African Union member states, we ensure all energy initiatives responds to the future development of the African energy sector, in our pursuit to build 'the Africa We Want'.

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Executive Director's Statement

Africa differs from the other part of world on energy production platform and trend in several ways, but perhaps the most striking, is that in Africa the household sector is the main energy consuming sector. Globally households sit third after industry and transport. In Africa, over half of all final energy consumption happens within the household sector. AFREC is working with all members of the African Union to assist them in developing their energy data (as set out in the introduction) and it is vital that all countries look specifically at improving their data on energy use in households for the reasons stated above. This report highlights our current understanding about energy use in the Africa's households, and also identified challenges with our current data – for example the static position on the share of the consumption of charcoal. It shows how data from wider household surveys can aid energy statisticians and provides some practical and cost effectively ideas for enhancing energy data.

The report also provides insights for policy makers on the reality of the fuels being used, and what that means for achieving our joint sustainable goals. In doing so, it shows how developments in energy, such as wider use of small solar plants is making a difference to the lives of Africans, for example by providing a source of lighting.

Policy makers are essential in the African drive for more and better transparency which will lead at the end of the day to better policies for better life in the country. It is our sincere hope that this report will help policy makers to understand the need for allocating more resources to energy statistics in their countries, starting with the urgent need for a comprehensive survey on the energy consumption in their residential sector.

The global commitment on climate change and energy transition is urgently needed but of course deciding of action will be challenging, but cannot be achieved without timely, detailed, comprehensive and up-to-date data for understanding local and regional situations and differences. This report, like AFREC's the other policy briefs, aims to help that process by shedding light on the situation and challenges for Africa.

Mr Rashid Ali Abdallah

Executive Director
African Energy Commission (AFREC)

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Executive Summary

Energy use in Africa differs in many ways from the global trends and it is energy that is used in the homes that perhaps differs the most. This report, which is drawn from data collected by AFREC or produced by African countries, shows the current situation of energy use in homes across the continent, how it has changed, the limitations of current data and shares ideas on how household energy data collection can be improved.

In Africa, over half of all final energy consumed is in the household sector. Around 85% of all energy used in African homes, is biomass. This figure reaches 95% in the Central, East and Western regions of Africa, a disturbing reality that has remained largely static over the past 20 years. There is however evidence of some changes, albeit small. Electricity and natural gas are being used more, although natural gas is only really prominent in North Africa, with electricity consumption up by nearly 40% and gas by just over 80% since 2010. But the growth in the use of these fuels has not resulted in a significant shift in the use of biomass and has mainly been a substitute for the use of petroleum products.

Understanding and reporting the use of biomass is challenging. Often countries have to model its use based on population growth and more often than not, it is only wood and charcoal that are reported. However, as this report sets out in Section 3, there is a range of data collected via household surveys that can help improve countries better understand their energy use.

Household surveys, already run by National Statistical Institutes (NSI) can show how use of fuels is evolving, with higher use of charcoal. This can be used to help improve the relevance of energy data. They also give insight into the range of biomass fuels used, thus helping to make energy data more comprehensive. Household surveys can also help us understand more about changes, the growth of off-grid power, the use of generators and variations in the use of appliances and other assets owned and used, all of which can directly and indirectly, help countries improve their energy data.

The type of analysis presented in this report is only possible through the work of energy statisticians in AU member states and the support given to them to produce comprehensive energy statistics. Robust and comprehensive data is essential to understanding the situation and helping develop the best policies. AFREC is supporting countries in a number of ways to enhance their energy data, as set out below, but cooperation at a national level between those responsible for energy statistics and the NSI, will also help many countries better understand household energy use.

Introduction

This report is one of series reports that AFREC have been producing to shed light on the energy situation in Africa, using data collected by AFREC from AU member states. The reports aim to enhance understanding on specific fuels, their production processes, trade and use, while serving as a framework instrument to policy makers across all African countries.

The report contained here focuses on household energy use - the largest consuming sector across Africa, and is written in the context of understanding more on energy use in the build-up to COP 27, which took place in Africa in 2022. It starts with an overview of household energy use in Africa, before exploring in Section 2 how that use of fuels has changed this century. Section 3 then looks at other sources of data on household energy use, focusing on national and international household surveys and the information that can be drawn from such surveys. The final section sets out some ideas for enhancing household energy statistics, based on evidence set out in Sections 2 and 3.

The report is largely based on AFREC's data provided by AU member countries, and is made available to all for free in the African Energy Information System (AEIS), which currently covers the period from 2000-2018, along with data for 13 countries for 2019. Additional data in Section 3 is drawn from NSIs of various countries as well as UNICEF, via its household surveys. Though there are some inconsistencies and gaps in the data, Africa's energy data is still developing, and with the support of AFREC, improvement in quality and reliability can be observed. Therefore, it is only through positive, productive use of data and support provided to statisticians, that energy statistics can be improved and assist in the formulation of effective policies.

AFREC's Energy Statistics

In line with its mandate, AFREC has established and maintained the African Energy Information System (AEIS) since 2012, which facilitates the collection and validation of African country energy statistics through the use of questionnaires. AFREC disseminates these statistics through publications and datasets, which are available on the AFREC website & data visualization dashboard at www.au-afrec.org. In 2019, AFREC assessed the current AEIS and came up with a holistic improvement plan which attempted to address all the identified challenges. These included: the information technology infrastructure requirements, procedural mechanisms, information flow processing, human capacity, technology architecture, programming and equipment, required funding, enhancement and expansion of the energy data collection into more sectors and indicators, thus making the AEIS a more integrated and comprehensive system.

In 2020 with support from the African Development Bank (AfDB), the AEIS was revamped to be fully aligned with international standards and best practices in order to guide the African energy sector transformation, investment and decision-making. The work included:

- Improving existing questionnaires and developing new ones with a focus on energy efficiency for all sectors, energy prices and taxes, CO2 emission, SDG7 tracking, installed capacity of power plants, amongst others;
- Improving data collection submission mechanisms by implementing an online data collection system;
- Developing a data visualization tool for data dissemination and reporting system;
- Capacity building for AU member states through regional and national workshops, including training of 40 selected NFPs as trainers of other NFPs in countries and regions.

In 2021, the new AEIS came into operation, enabling data submission through an online data collection system and implementation and deployment of the data visualization tool. The new AEIS will enhance the quality of energy data collected by AFREC and increase the coverage scope of AEIS to include more energy indicators (CO2 emission, SDG tracking, data visualisation tools etc.), ensuring AFREC becomes the main source and central hub for quality, credible and reliable energy statistics for Africa.

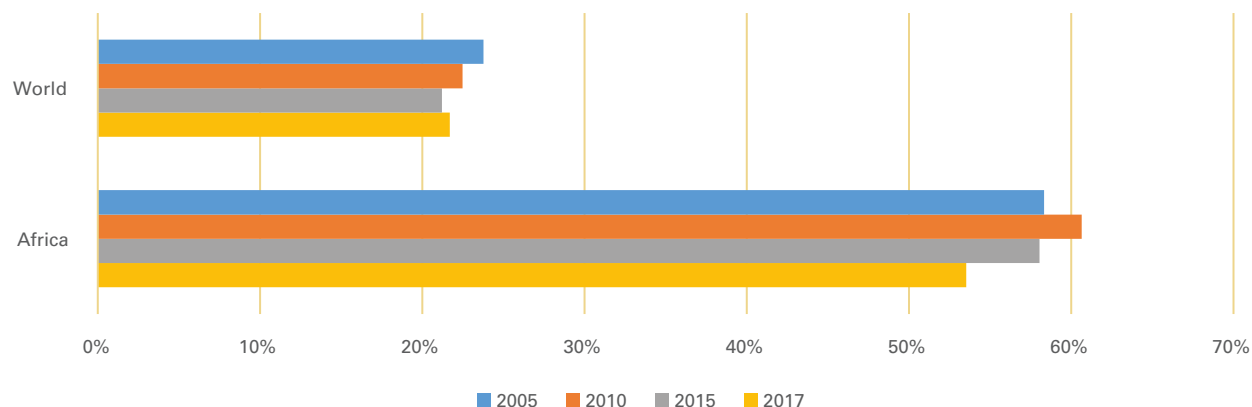
These developments however will take time to result in comprehensive data being available within all African countries. As such and also as a result of challenges presented by the impact of COVID-19, to process data collection, validation and dissemination at National level, in 2021 AFREC validated Energy Balance from only 13 African countries. Therefore, the data used in this report, whilst providing a very comprehensive overview of household energy use in Africa often only goes up to 2017 or 2018. As and when all countries are able to provide complete and timely data, the information available to inform policy and understanding of energy use in Africa, will increase.

SECTION 1

HOUSEHOLD ENERGY USE IN AFRICA

As stated previously, the household sector in Africa is the largest energy consuming sector in the continent. Together, African household use over half of all final energy supplied. Although the household sector's share of final consumption has fallen slightly over the past decade from 60% in 2010 to 54% in 2017, that is more than double the global figure of 22%.

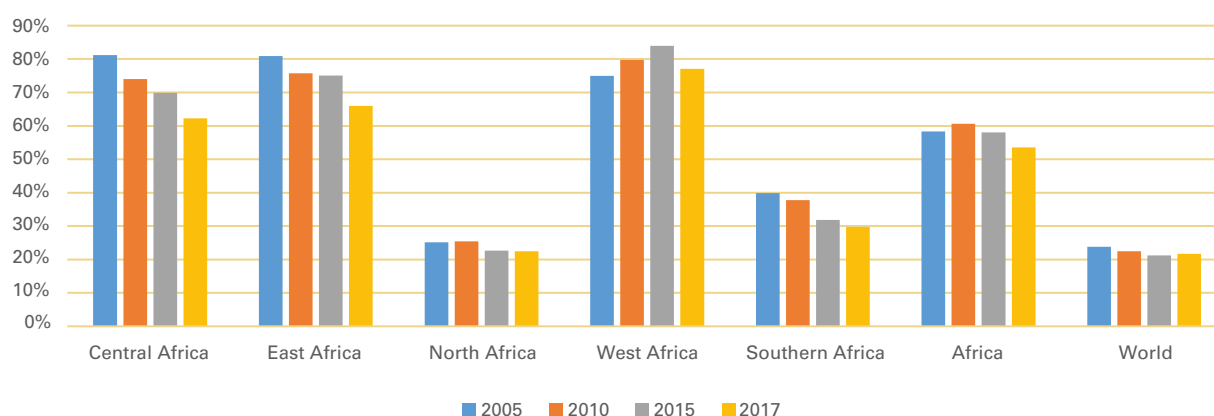
Chart 1.1 Household's share of Total Final Consumption



Source: AFREC, IEA World energy balances and

The share of final energy consumed by households varies by region (chart 1.2). North Africa has the lowest share and at just over 20%, is similar to the global average. In contrast regions with a high use of biomass see much higher shares. In West Africa households use over three-quarters (77%) of all final energy, whilst in Central and East Africa, households use over 60%. Southern Africa is between the two, with a share of just under 30%.

Chart 1.2 Households Share of Total Final Consumption, African Regions and World

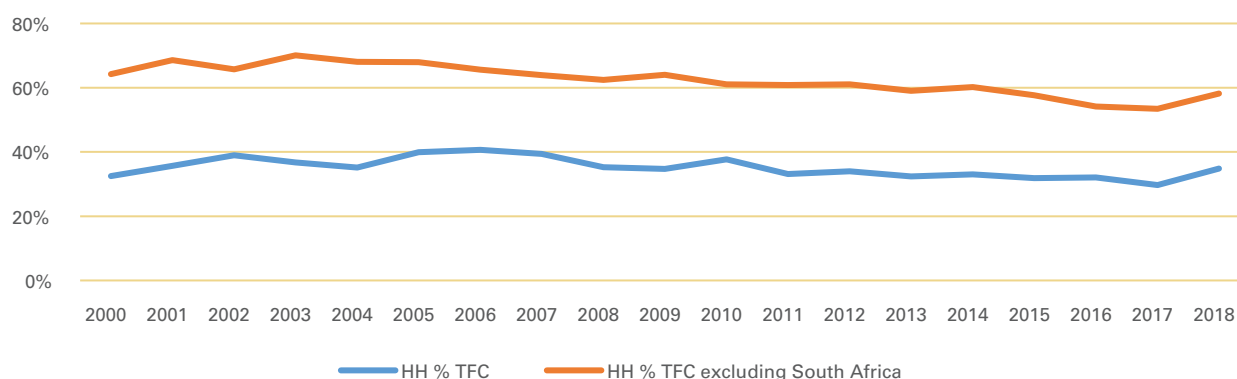


Source: AFREC, IEA World energy balances and

Across the regions there has generally been a decline in the share of final energy used by households. For example, the share in East Africa has fallen from 80% in 2005 to 65% in 2017, and this decline mirrors that seen globally (though on a much smaller scale). The fall in Africa is mainly due to an increase in use of energy in the transport sector, which grew by over 70% during this period. However, this change has not occurred throughout the continent. West Africa for example, saw increases in the share of household energy consumption up to 2015 to a share of 84%, before the household sector's share started to decline.

When looking at data at a regional level, it is important to reflect on the impact that larger countries in the region can have, as has been noted in other policy briefs. This can be especially the case when looking at Southern Africa. The chart below shows the share of final energy consumption used by households for the whole Southern Africa region and the region without South Africa. Across the whole of Southern Africa, households have been consuming just over 30% of all final energy in recent years, but excluding South Africa (with its large industrial sector) the share of the other Southern African countries rises to just over 50%, a figure that has been on a general decline from levels of close to 70% at the start of the century.

Chart 1.3 Household's (HH) Share of Total Final Consumption (TFC), Southern Africa



Source: AFREC

There are many reasons why African households use a far greater share of all energy than seen elsewhere in the world. Use is lower in other sectors including the structure of the economies across Africa, with lower industrial concentration, a higher share of businesses being run out of homes¹, lower access to and use of transport. But more generally there are issues with access to fuels which means households have no choice but to use biomass, which with its low efficiency, means more fuel is needed. This means that in studying energy use in Africa, the household sector is the most important, and is undoubtedly also one of the most challenging, specifically considering the high use of biofuels, which is explored in the next section.

¹The energy used in businesses run from homes should be separated out and shown in the industrial or commercial sector, but the reality is it is very difficult to do.

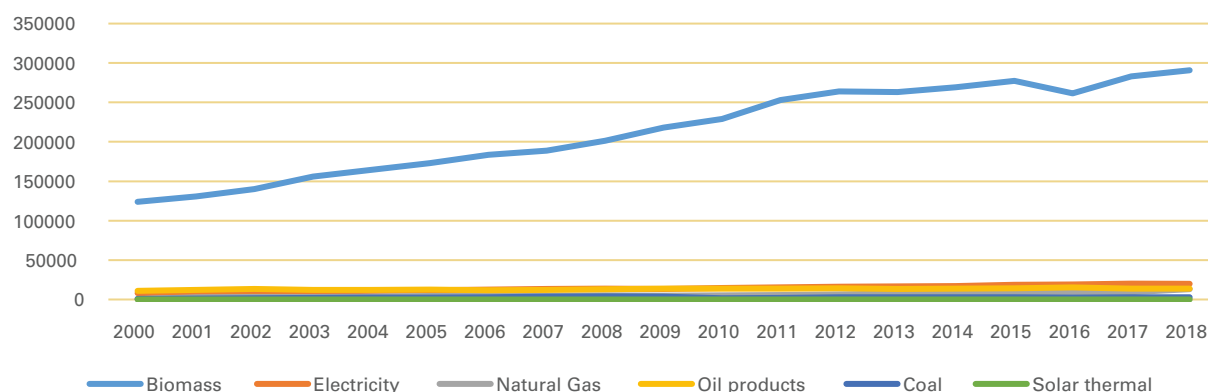


SECTION 2

FUEL USED IN AFRICAN HOUSEHOLDS

Across Africa biofuels are the main source of energy for homes, providing the energy needed for cooking, heating water and in some instances, lighting. In general, the biofuels used are forms of biomass, mainly wood and charcoal, but can include other solid fuels such as residues, straw and animal dung. Overall African homes consumed nearly 300 million toe (tonnes of oil equivalent) of biomass in 2018 (chart 2.1), which is nearly 6 times the total of all other fuels used in homes.

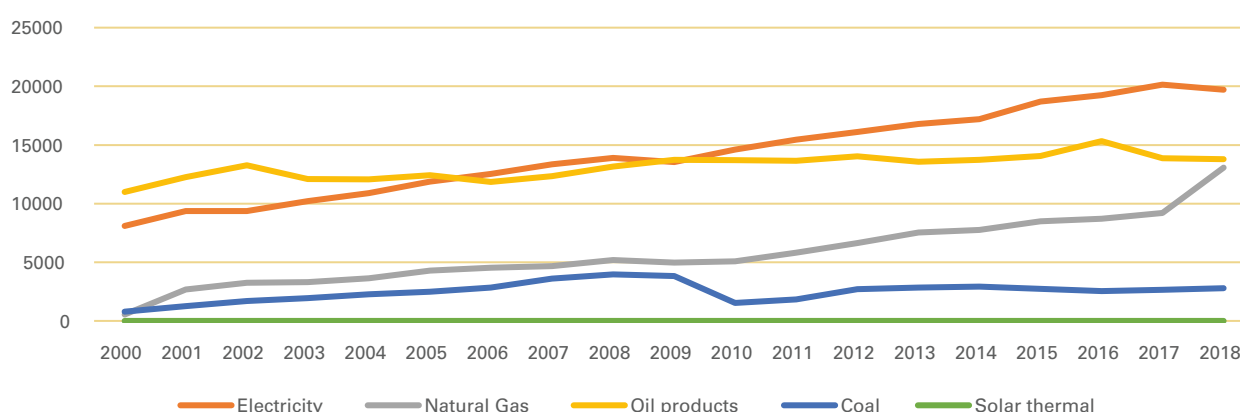
Chart 2.1 Energy used in African Homes, thousand toe



Source: AFREC

Biomass use in homes has grown fairly steadily this century, broadly mirroring the growth the African population². Of the other fuels, electricity became the second most used source of energy in 2005 and apart from a small decline in 2009, has been consistently growing since that time, to reach 20 million toe in 2018. The other fuel that has seen strong growth has been natural gas. Natural gas is only used in a small number of countries, mainly in North Africa, but its consumption in households has risen from 5 million toe in 2010 to 10 million toe in 2017 and 13 million toe in 2018. By contrast, oil products (diesel, kerosene, LPG, etc), once the second most used fuel after biomass, has been generally constant at around 13 million toe for the past 10 years and seems certain to be overtaken by gas to become the 4th most used fuel.

Chart 2.2 Energy Used in African Homes (Excluding Biomass), Thousand toe

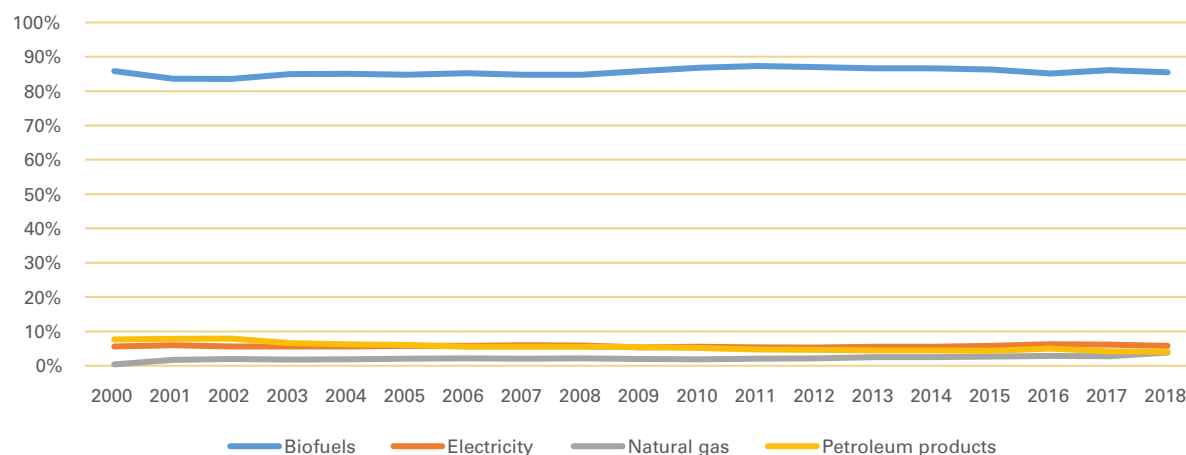


Source: AFREC

² In many countries biomass use is modelled using population growth given the costs and time required to run frequent household surveys.

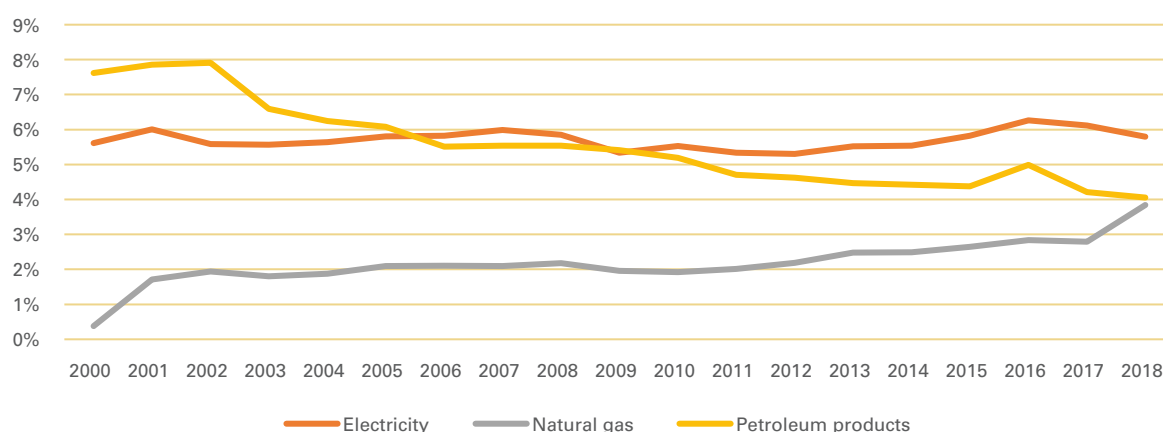
The changes in the use of fuels is also evident by looking at the share of fuels used. Biomass remains by far the most used fuel and at a fairly constant rate of around 85% of all energy used in African homes (chart 2.3). However, it is within the other fuels where the more significant changes have occurred (chart 2.4) with electricity and natural gas replacing mainly imported petroleum products.

Chart 2.3 Share of Energy Used in African Homes in Percentages



Source: AFREC

Chart 2.4 Share of Energy Used in African Homes (Excluding Biomass), in Percentages



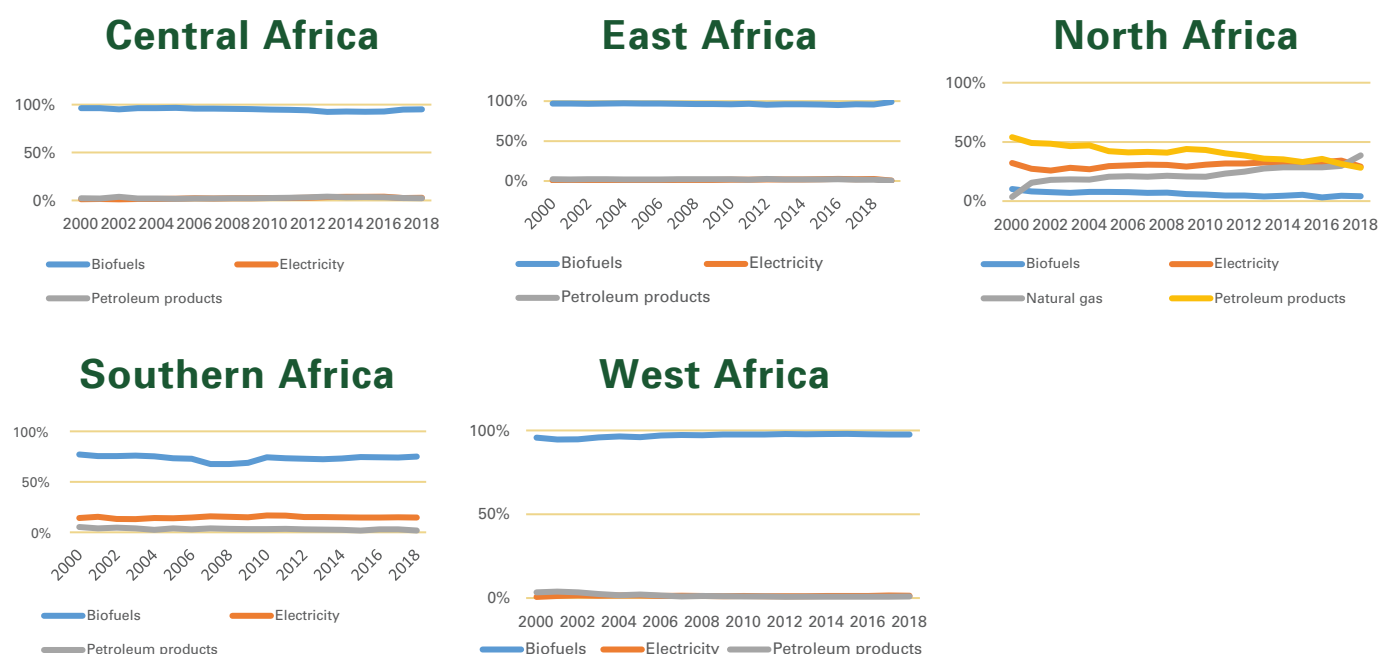
Source: AFREC

As expected, there are differences in the shares of fuels used by households across the regions (chart 2.5). In Central, East and West Africa, biomass accounts for around 95% of all household energy use, with electricity the second most consumed fuel at around 2%, having replaced oil products at the end of the first decade of this century.

North Africa is very different, with a low rate of biomass (less than 5% in recent years) and the steady rise of first electricity and then gas, as a household fuel. This has resulted in oil products falling from supplying just over 50% of North African household energy in 2000, to under 30% in 2018, overtaken by electricity in 2017 and natural gas in 2018.

Southern Africa differs again from the other regions, although similar to the East, Central and West, it does have a far higher share of electricity (15% in 2018) and a lower share of biomass (75%). In part this is due to higher rates of electricity use in South Africa, where electricity represents 35% of household energy use. But electricity also represents over 35% of home energy use in Botswana, Namibia, Mauritius and the Seychelles (where electricity provides 70% of household energy use).

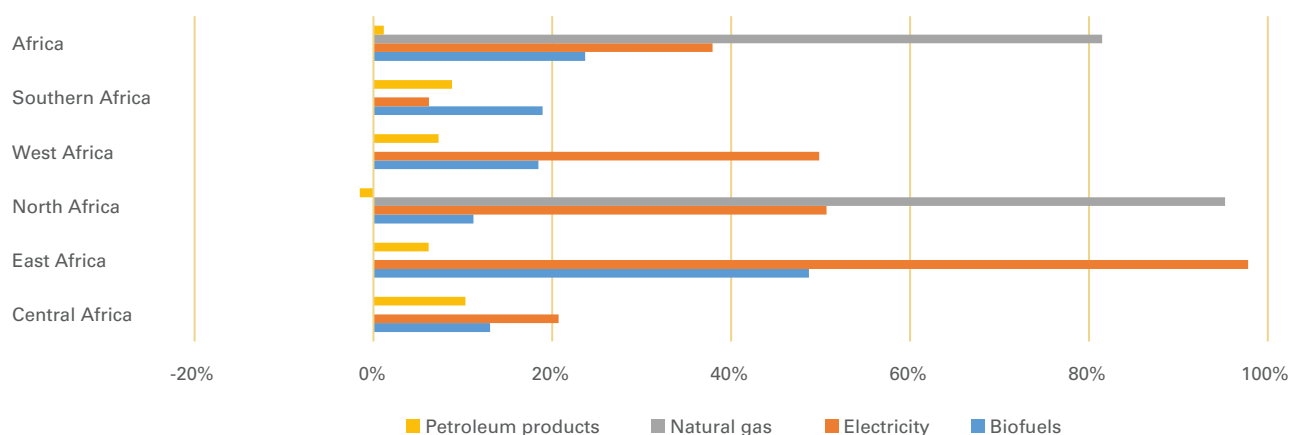
Chart 2.5 Share of Energy Used in African Homes, by Region, in Percentages



Source: AFREC

As indicated above, it has generally been natural gas and electricity that have seen the greatest increase in consumption by African households since 2010. This is further illustrated by chart 2.6 below. Electricity use has increased by 37% overall and by more than 50% in three regions, including nearly doubling in East Africa. Likewise, North Africa has witnessed a near doubling (95% increase) in the use of natural gas, thus creating an 80% increase across the whole continent. In contrast, use of all products has virtually been stable, a 1% increase overall, with growth elsewhere checked by a 1.5% decrease in North Africa.

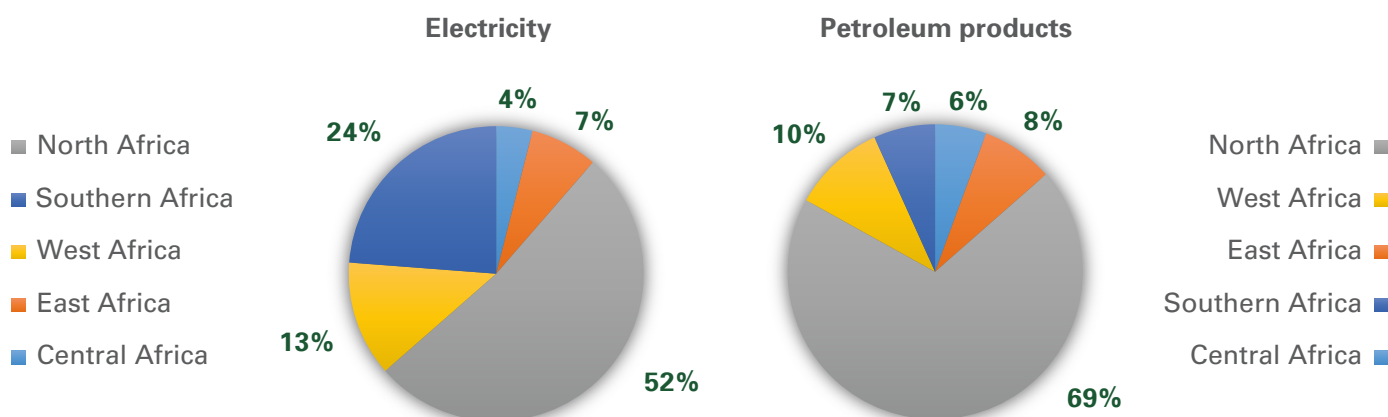
Chart 2.6 Percentage Change in Energy Used in African Homes, 2010 to 2017 by Region



Source: AFREC

North Africa dominates the picture of energy use in households for natural gas, but it is also the main regional consumer for electricity and petroleum products (chart 2.7) with North Africa consuming 10 million toe of the 20 million toe of electricity consumed and 9.6 million toe of the 14 million toe of petroleum products.

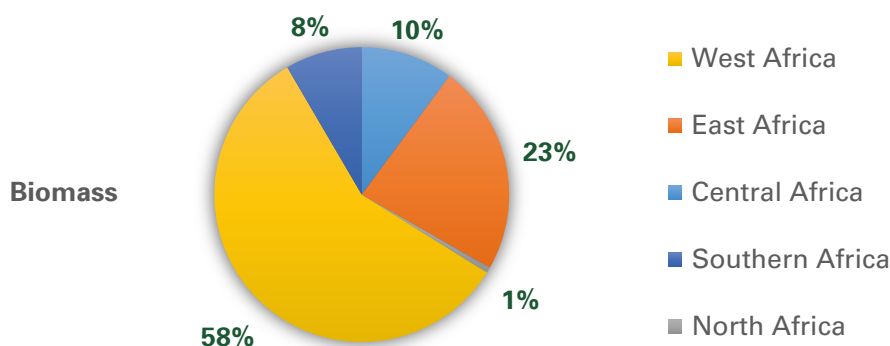
Chart 2.7 Percentage Share of Energy Used in African Homes by Region, 2017



Source: AFREC

The situation for biomass, however, is very different (chart 2.8) with West Africa and East Africa the largest consuming regions (164 and 66 million toe respectively, of the 284 million toe consumed across Africa), with just 1% consumed in North Africa.

Chart 2.8 Percentage Share of Biomass Used in African Homes by Region, 2017

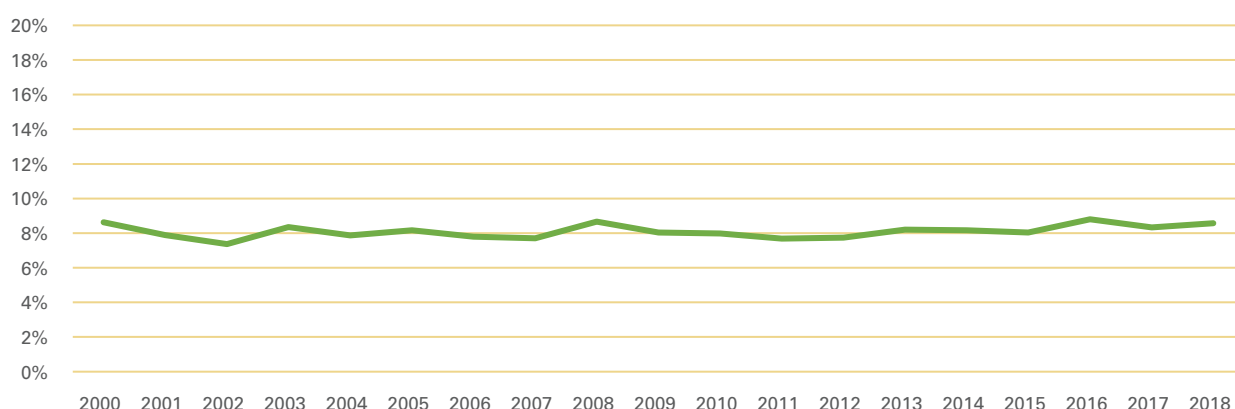


Source: AFREC

One of the challenges in producing energy data is to ensure the data keeps track of what is actually happening i.e. it reflects real life changes. This is especially difficult for biomass, which given the multiple supply routes, can only really be estimated from the demand side through the utilization of surveys. This is a unique challenge for African countries due to the high level of consumption of biomass and the fact that many countries are still developing their energy statistics systems. On the basis of currently available data, this is an area that many African countries need continued help in order to improve. Chart 2.9 below shows the percentage of biomass that is charcoal across all African countries and chart 2.10 shows the same data for the five regions.

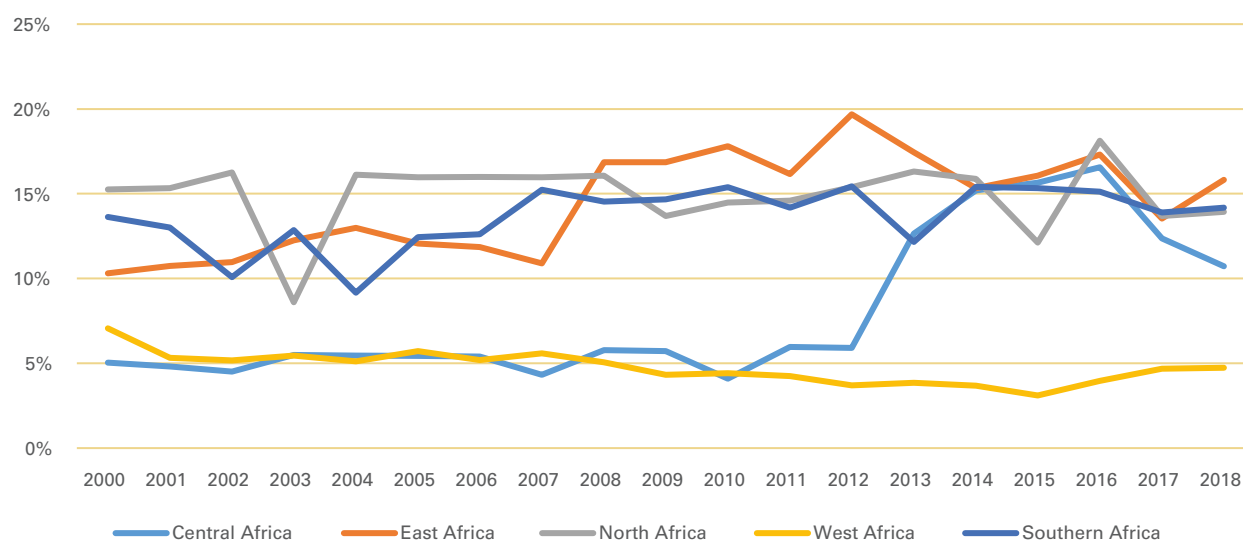
Evidence (some of which is highlighted in Section 3) points to an increased use of charcoal across Africa, however the data collected by AFREC does not indicate this. It shows a very stable position of charcoal representing around 8% of total biomass for the past nearly 20 years. The same relatively stable position is shown at the regional level, with only 3 countries making significant upward (and one off) adjustments to the charcoal data: Ethiopia in 2008, Uganda in 2012 and DRC in 2013 (other countries, especially smaller ones may have made more gradual changes and for some countries they may have been no actual change in charcoal use). However, what we face is a situation where most countries are not running regular surveys or using existing data to its fullest extent and so they generally provide the same (or similar) data on biomass each year. Some ideas on how countries may look to improving on this, are covered in Section 4.

Chart 2.9 Charcoal as a Percentage of Biomass used in African Homes - all of Africa



Source: AFREC

Chart 2.10 Charcoal as a Percentage of Biomass Used in African Homes by Region

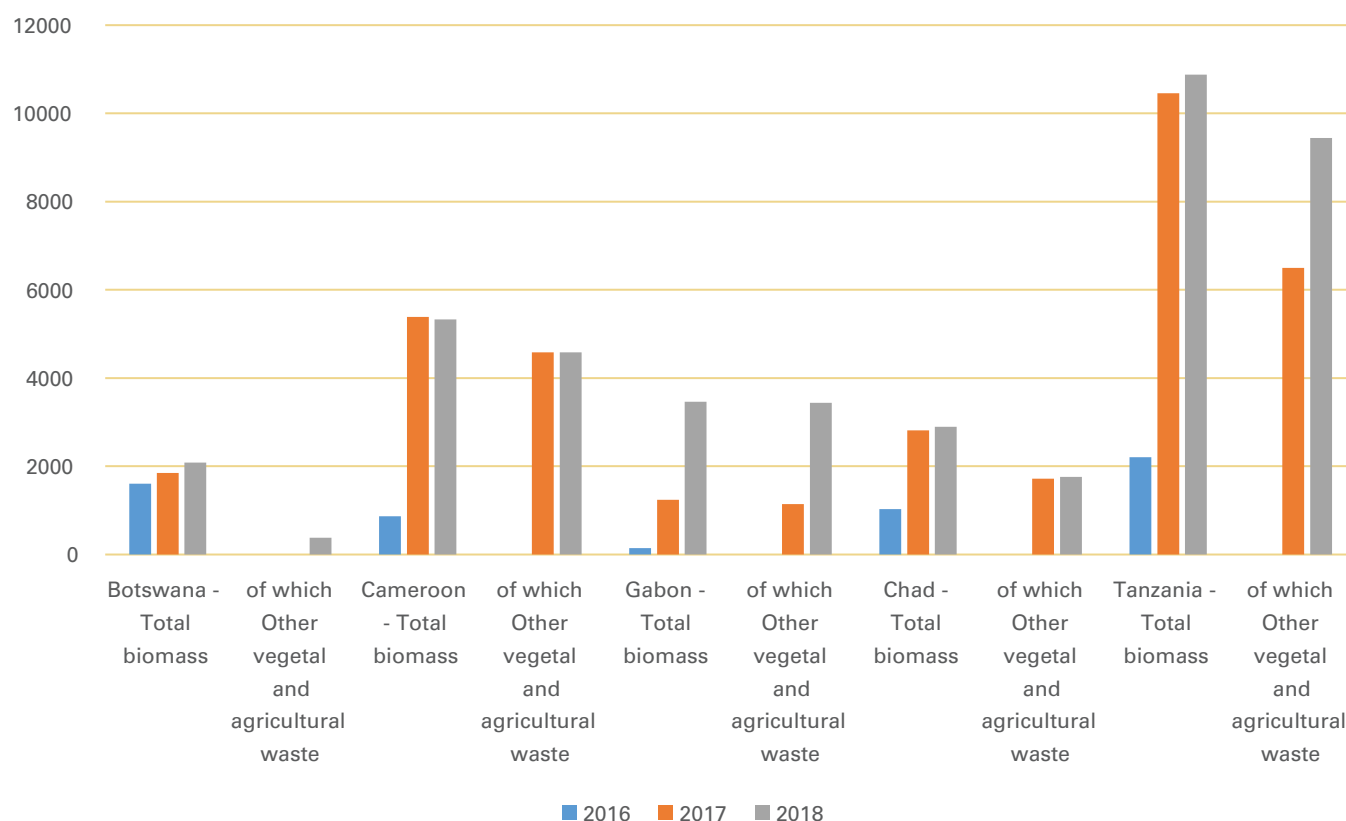


Source: AFREC

A stumbling block when looking to understand household energy use from energy balance data, is the lack of detail on the specific products being used. AFREC is working to address this and, as noted in the introduction to this report, has made revisions to its annual questionnaires, to enhance the data the Commission can collect from countries. One specific update, is an expansion in the number of biomass products countries can now report on. This is a very welcome development and hopefully, in time, it will allow for a fuller understanding of energy use by households.

However, care is needed in the interim stage we find ourselves in now. A number of countries have recently started to report additional biomass use, namely residues (or as recorded in the questionnaires “Other vegetal and agricultural waste”). However, in many cases the reporting started with the revised questionnaires and as such, there are gaps in the series. This is illustrated by 5 countries in the chart below. All should be congratulated for expanding their energy balance, however, by introducing data for other vegetal and agricultural waste the total amount of biomass use has increased, in some cases quite considerably. This is a consequence of data revisions and is understandable. However, where possible, these countries and others who have introduced new data, should explore how data can be backdated to produce a more consistent time series.

Chart 2.11 Examples of Impact of Adding New Biomass Categories to Data Reporting, Thousand toe



Source: AFREC

SECTION 3

HOUSEHOLD ENERGY USE BEYOND THE ENERGY BALANCE

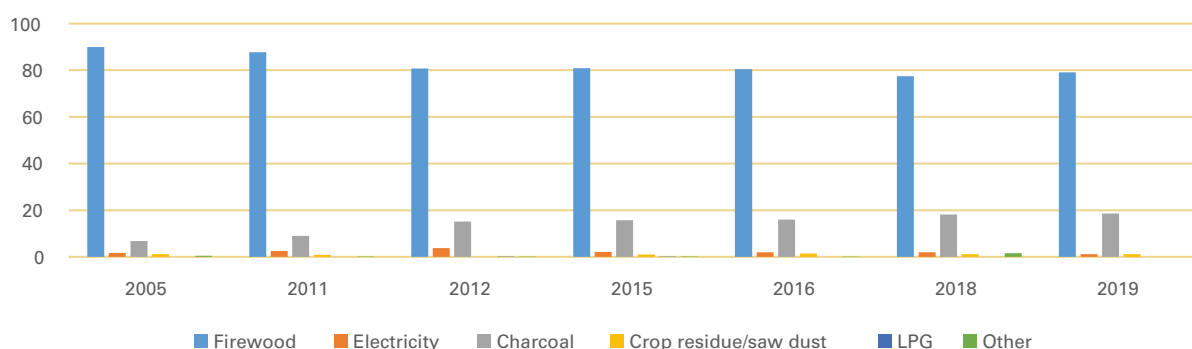
The importance of energy use in households, means it is important to draw on all country data and not just the energy balance. Household surveys are an excellent source of data and this is explored below.

3.1 National household surveys

Many African countries run household surveys. Often these take place every three to five years and are run by the National Statistical Institute (NSI), often supported by international donors. The surveys are normally representative of the whole country (though sometimes will focus on specific regions) and usually show results for different groups of the population, by age, region and rural/urban location. Typically, these surveys cover a wide range of questions on housing, employment, education, health and other topics. Given the importance of energy to health, education and indeed all aspects of life, these household surveys nearly always contain questions on fuels used for cooking and lighting.

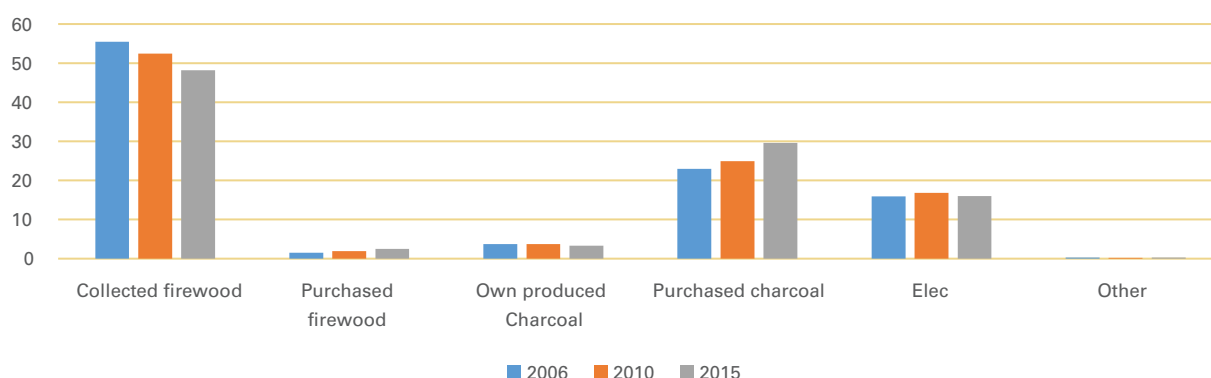
The frequency of the surveys makes it possible (where there haven't been substantial changes to the questions) to understand more about how home energy use is changing over time and in that sense can be more useful than questions contained in a population census, which typically happen every ten years³. To illustrate the use and importance of household surveys to understanding energy use some examples are shown below.

Chart 3.1 Percentage of Households by Fuel Used for Cooking: Malawi



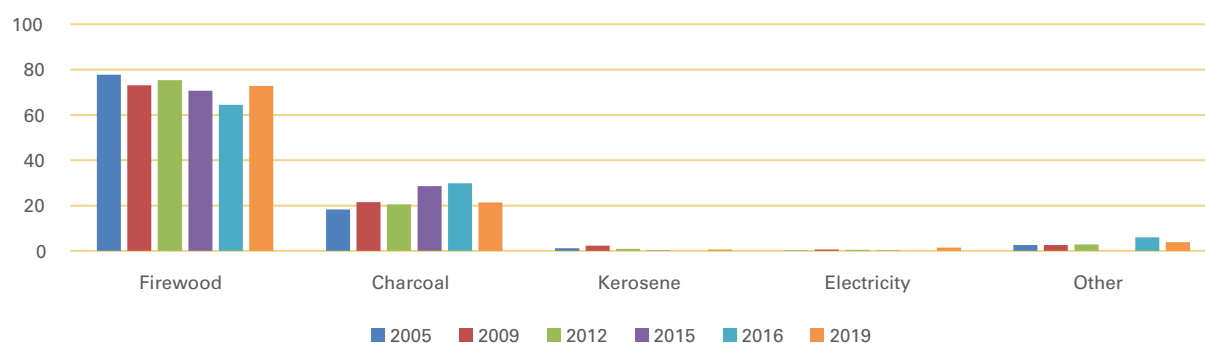
Source: NSO, Malawi

Chart 3.2 Percentage of Households by Main Type of Cooking Energy, All Households: Zambia



Source: ZSA, Zambia

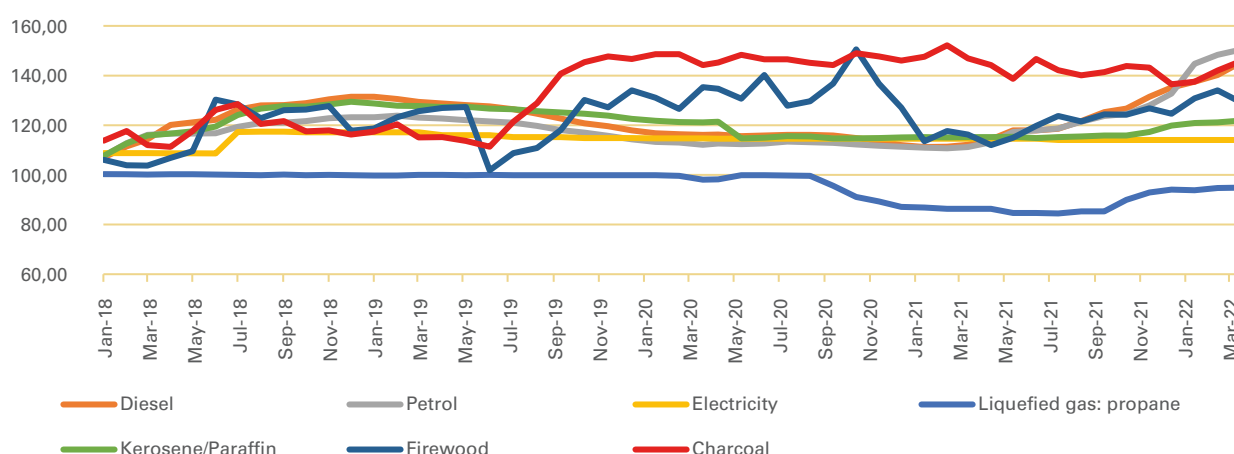
³ Where household surveys are running, repeating the questions in the population census can be a very effective way of periodic validation of survey results.

Chart 3.3 Percentage of Households by Fuel Used for Cooking: Uganda

Source: UBS, Uganda

The examples above are drawn from three African countries and as such should only be seen as examples of the information that can be drawn from household surveys. However, they do share some common themes. The first is that the energy used for cooking in households, generally changes with a switch from wood to charcoal. Secondly, there is a small increase in electricity use and third, the small use of other fuels. These changes are important and it's vital that they are picked up in energy data. Countries are very likely to have to use some estimation to derive estimates of energy consumption so they can be captured in each country's energy balance, but these values need to take full account of all available information and adjust for proportions of households using different fuels.

Another important point is that the changes can be reversed. For Uganda, the National Household Survey run by the Uganda Bureau of Statistics (UBoS), showed quite a change between in the 2019/20 survey and the 2015/16 survey with greater use of firewood and lower charcoal (chart 3.3). This seems very counter intuitive. But checking against the CPI produced by UBS (chart 3.4) shows that from the middle of 2019, there appeared to be a significant increase in the price of charcoal, which could well explain a temporary move by households back to using cheaper (free if collected) firewood. This largely reverses (possibly on a temporary basis) the switch from firewood to charcoal seen over the past 10- 15 years. So again, it is vital that energy statisticians look at wider factors - especially price, that might change energy use.

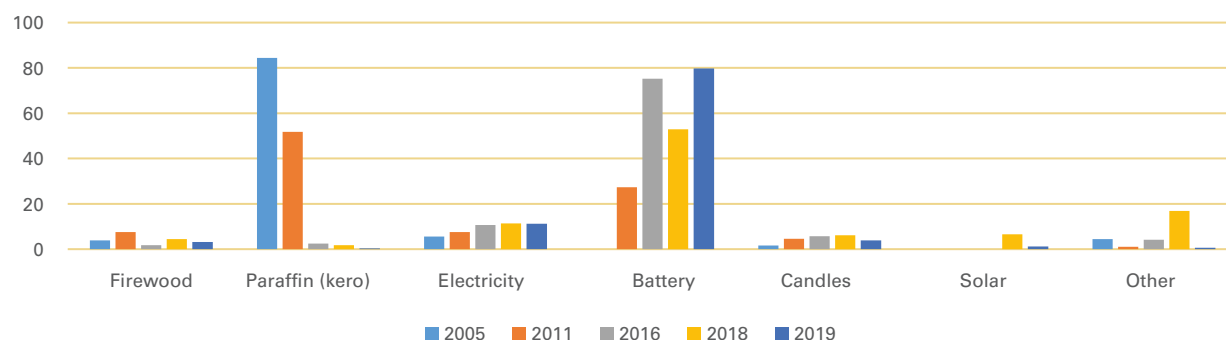
Chart 3.4 CPI⁴ Energy Items: Uganda

Source: UBOS, Uganda

⁴ Consumer price index

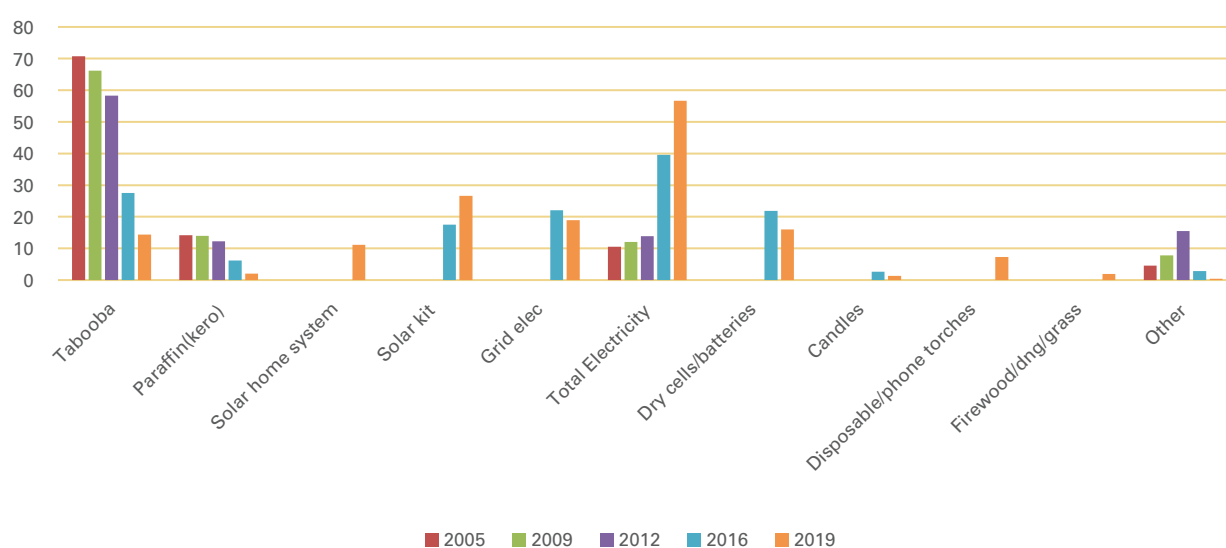
The same sort of trends appear when looking at fuels used for lighting as illustrated by charts 3.5 and 3.6 below. In these cases, we see a fall in the use of kerosene, reflecting the overall reduction in household use of petroleum products, a growth in use of electricity, including through off-grid sources such as solar, significant use of batteries (which will have environmental and cost related issues) and as for cooking the use of a number of fuels in small amounts. This is all valuable information that can be used to enhance energy data.

Chart 3.5 Percentage of Households by Fuel Used for Lighting: Malawi



Source: NSO, Malawi

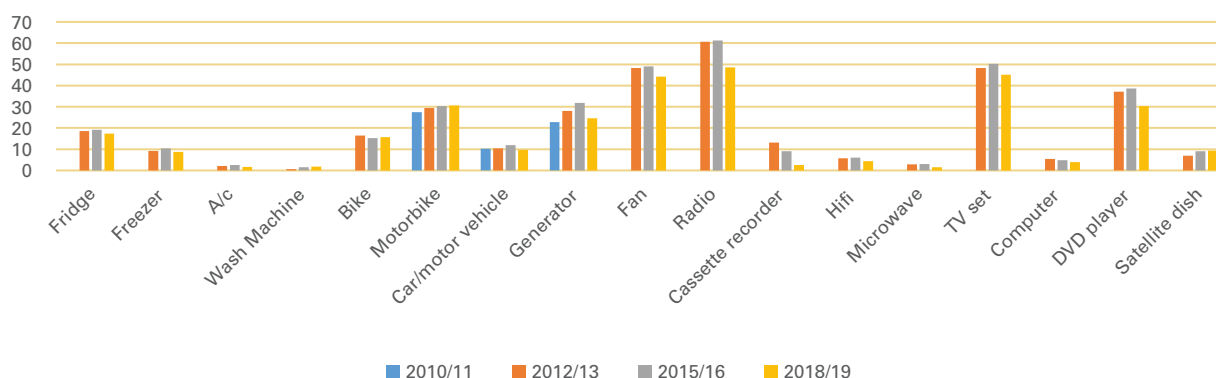
Chart 3.6 Percentage of Households by Fuel Used for Lighting: Uganda



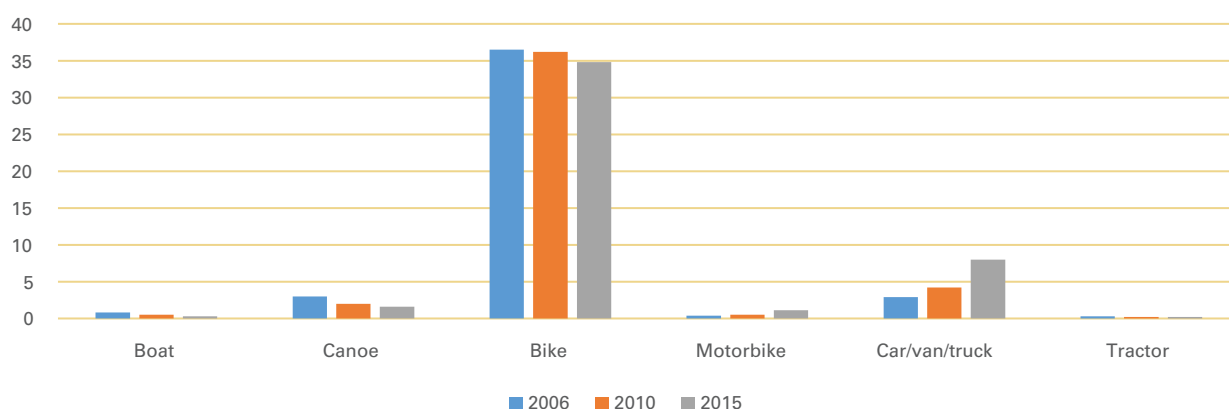
Source: UBoS, Uganda (Note: Tabooba is paraffin lamps)

Household surveys will often include questions on asset ownership, as the examples in charts 3.7 and 3.8 show. Again, this can be valuable additional information. For example, in the case of Nigeria (chart 3.7), one of the assets covered is home generators, so the growth in ownership of home generators is likely to mean more electricity being generated in homes (and as such more use of petrol/diesel for own generation – auto-generation).

Household surveys also often cover ownership, and likely use, of electrical appliances. If ownership is increasing it is likely that electricity being supplied to households should be on the rise, or that more homes are generating their own power, either at a home or community level. The same is true for vehicles, as the data for Zambia (chart 3.8) shows. The small fall in ownership of bikes and a rise in ownership of cars/trucks, would indicate that there should be growth in the road transport (as opposed to household) consumption of motor fuels.

Chart 3.7 Percentage of Households by Ownership of Assets: Nigeria

Source: NBS, Nigeria

Chart 3.8 Percentage of Households by Vehicle Ownership: Zambia

Source: ZSA, Zambia

In short, national household surveys can provide valuable information on the changes in energy being used in a country and as such, should be seen as a vital tool for energy statisticians and all those interested in household energy use in a country.

3.2 International household surveys

It is not possible for all countries to run national household surveys. However, due to the need for international organisations to properly understand the health and wider social situation across the developing world, two internationally funded wider surveys of households have been undertaken.

1. The Multiple Indicator Cluster Survey (MICS)⁵ (supported by the World Bank, United Nations Children's Fund [UNICEF], World Health Organization [WHO], and others).
2. The Demographic and Health Survey (DHS)⁶ (supported by the United States Agency for International Development [USAID], WHO, and others).

⁵ <https://mics.unicef.org/surveys>

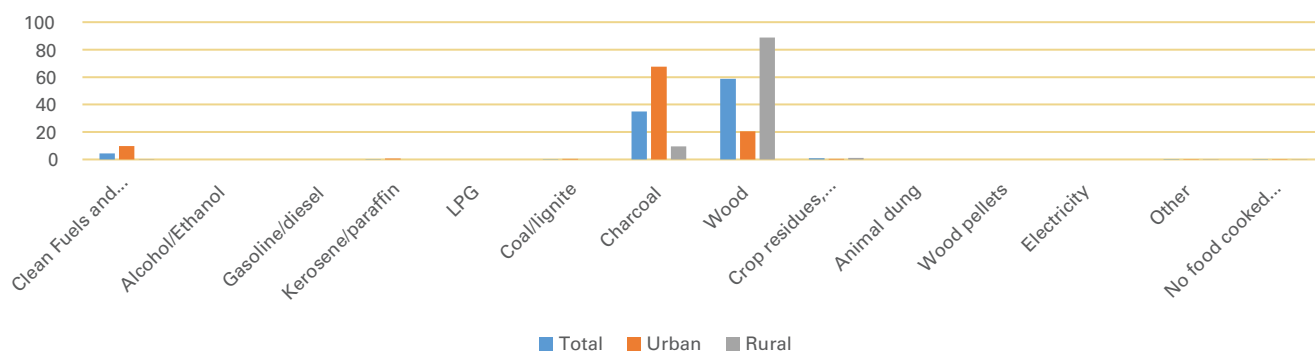
⁶ <https://dhsprogram.com/data/>

Both surveys ask questions about household use of different fuels for cooking and lighting and so can be used as a guide to household energy use. Unlike national surveys, these surveys tend to be one-off or run over an extensive time interval and so it is not always possible to understand changes over time. However, the surveys have the benefit of using the same questions in each country, so more direct comparisons between countries can be made. Since 2018 MICS have been run in 14 African countries and the findings of some of the most recent surveys fuels used for cooking and lighting, are shown in the charts below.

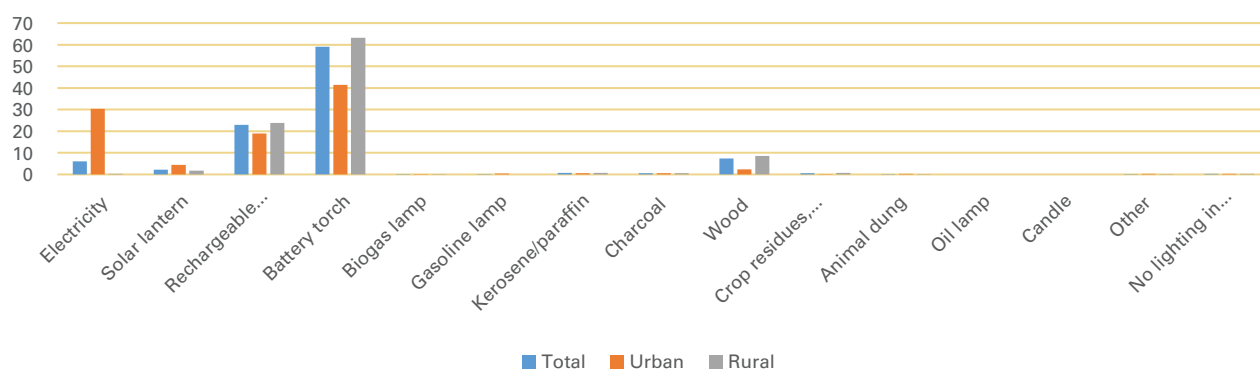
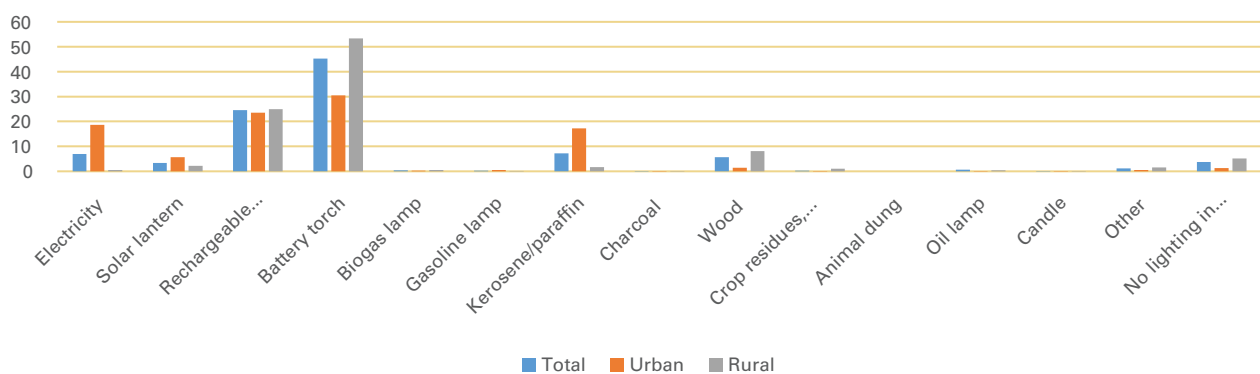
Chart 3.9 Percentage of Households by Fuel Used for Cooking⁷



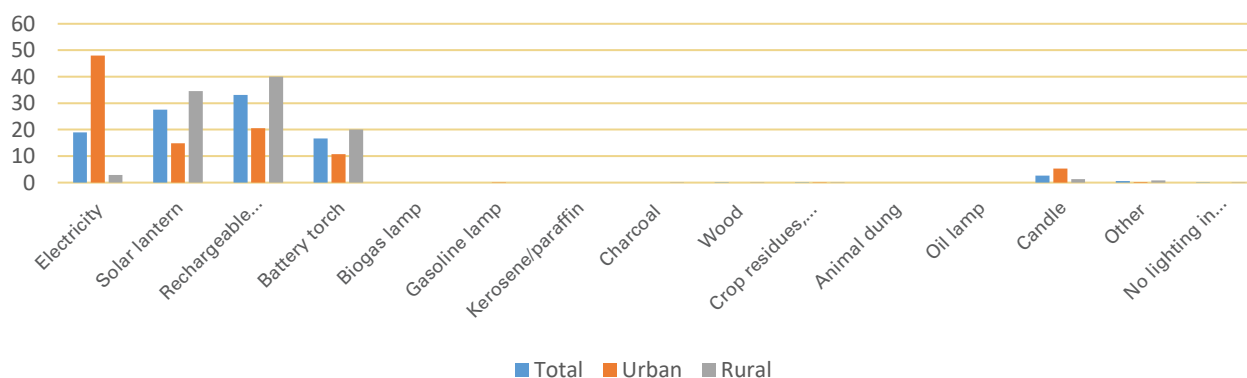
⁷Clean fuels and technologies for cooking are defined in MICS as those households mainly using electric stove, solar cooker, LPG (Liquefied Petroleum Gas)/cooking gas stove, biogas stove, or a liquid fuel stove burning ethanol/alcohol only.

DRC 2018

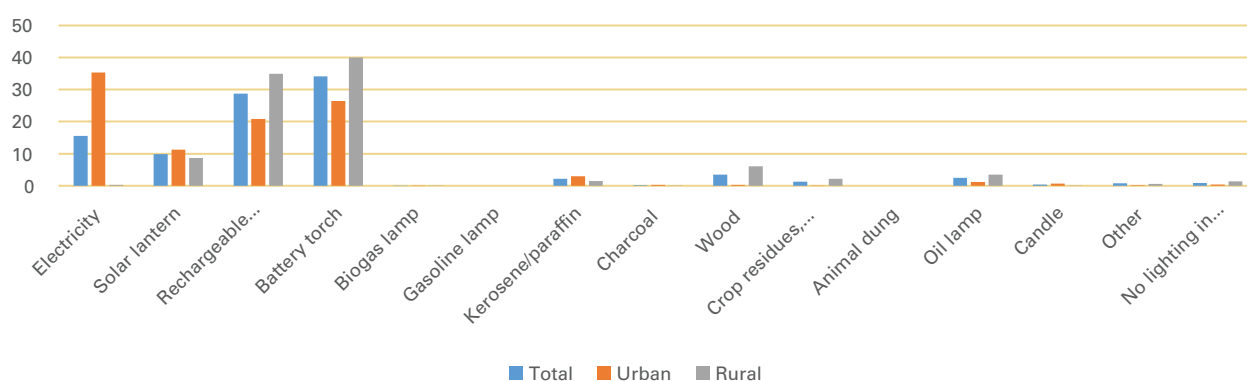
Source: MICS

Chart 3.10 Percentage of Households by Fuel Used for Lighting**Chad 2019****Central African Republic 2018/19**

Guinea Bissau 2018/19



DRC 2018

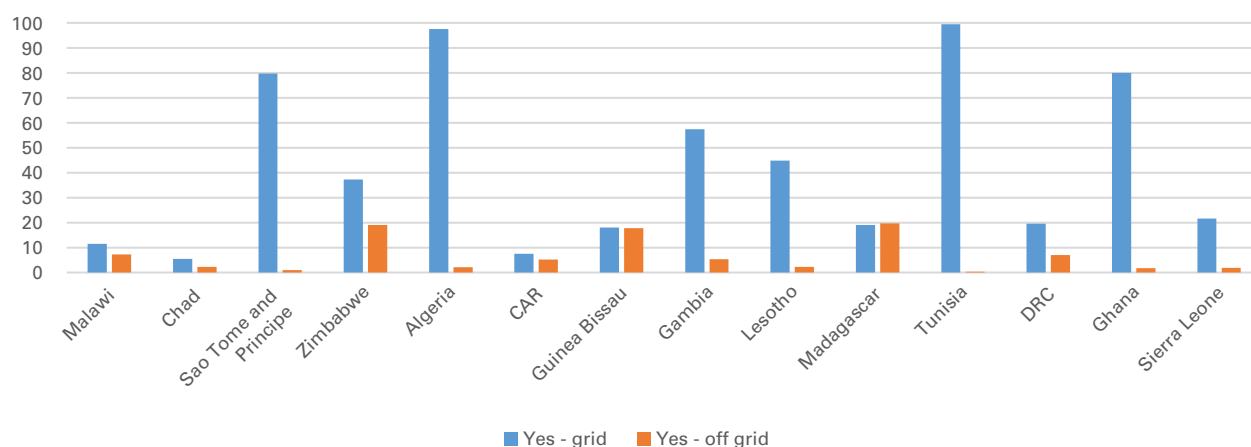


Source: MICS

Like the national household surveys, the MICS show a high use of wood and charcoal for cooking, but the detailed results (not visible in the charts) also show a range of other sources including crop residues, straw, grass, animal dung and wood pellets, all of which provide evidence of data that should be included in energy balances. For lighting, there is use of electricity, but as with national surveys, high use of batteries/torches, the start of greater use of solar lanterns, but very limited use of kerosene.

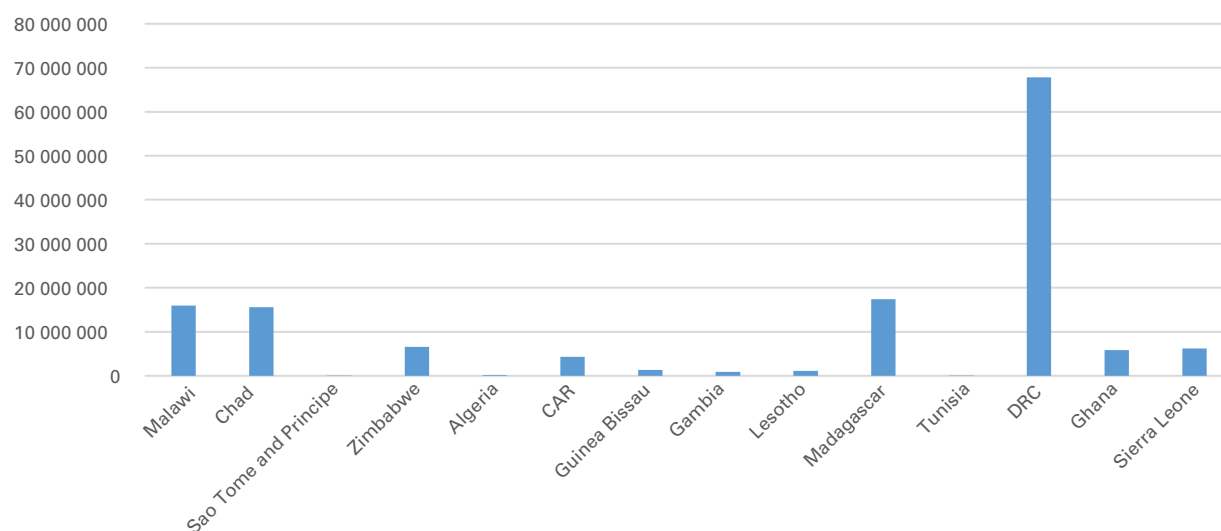
MICS surveys also provide more information on household access to electricity. Universal energy access is a key goal for many African countries and is one of the Sustainable Development Goals (SDGs). Like many SDGs it is measured at a very high level i.e. the proportion of the population with access to electricity⁸. MICS data provides a little more information by showing if electricity is supplied by grid supply or off-grid, often local solar cells or networks. As chart 3.11 shows, off-grid supplies are making a significant contribution to the energy access goal in a number of countries, including Zimbabwe, Guinea Bissau, Madagascar as well as making a contribution to countries facing the greatest challenges to meeting universal supply, such as Malawi, CAR, and the DRC.

⁸ <https://www.sdgdashboard.org/home>

Chart 3.11 Percentage of households with electricity, African countries with a recent MICS survey

Source: MICS

Discussions about energy access often focus on the proportion of homes with electricity, but it is important to reflect on what that means in terms of people. As an illustration, taking population data from the World Bank⁹ and applying that to the 14 African countries with the most recent MICS data, shows that of the 289 million people living in those countries, 151 million currently have no access to electricity via the grid or off grid. So, whilst the final section of the report explores how countries can enhance their energy data on households, it is always important to recall that many countries across Africa are having to do so, with 80% of the population or more, having no access to electricity.

Chart 3.12 Estimated Population with No Electricity: African Countries with a Recent MICS Survey

Source: calculation from MICS and World Bank data

⁹ <https://data.worldbank.org/indicator/SP.POP.TOTL>

SECTION 4

**ENHANCING
ENERGY
STATISTICS
ON THE
HOUSEHOLD
SECTOR**

As this report has highlighted, across the majority of African countries, the household sector is the one that consumes the most final energy, often more than half of final energy consumption. Therefore, as African energy statisticians look to enhance their energy data, the household sector should be seen as a major priority. Improving data on household energy use is not simply a task that will allow countries to have a more complete and accurate energy balance, it is vital for the economic and social development of countries. Improving information on household energy use includes not only qualitative data on energy but also qualitative information such as type of cooking stoves, reasons for why households are using biomass and data on several related items such as prices, health and the impact on life of women and children from the collection of firewood.

The previous section covered one of the SDGs on access to electricity, but another one of equal importance, is the proportion of the population with primary reliance on clean fuels and technology. Africa is home to some countries that have the lowest rates for this globally. If African governments, supported by the wider international community, are to address this problem and thus improve the life and well-being of Africans, they need to understand how much clean energy is required. In other words, understand the quantity and type of energy that households are currently using. Improving energy data in countries facing social and economic challenges is not easy. AFREC is working to provide a range of support, as noted in the introduction to the report. In addition, there are a number of steps set out below, that can be taken at a country level and which in time, can and will, improve data on energy use in households.

Grid connected fuels

As covered in Section 2, the fuels that are seeing the fastest growth across Africa are electricity and natural gas. A large proportion of these fuels will be provided via electricity and natural gas grids and provided on specific tariffs or prices for households. Therefore, where this data is not provided, it will be worth contacting the electricity and where applicable, natural gas supply companies to explore how data on supply to households could be provided.

Petroleum products

For many African nations all petroleum products are imported, so a first step is to ensure there is complete data on imports. In many cases the NSI (National Statistical Institute) is likely to have a role in compiling trade data, so reaching out to them to explore what data on imports they have and what fuels it covers, is an important first step. Household use of petroleum products has been steady or falling in many countries, and so is perhaps less important than it was 30 years ago. However, it needs to be captured, which is difficult. Petroleum suppliers may be able to help where fuels are provided to specific types of retailers, but often fuel is likely to be purchased from retail stations, i.e. garages. In this case it is likely that some estimation will be required using total sales and detailed import data and as much information on use of fuels as may be available from household surveys.

Biomass

As highlighted throughout this report, the most commonly used fuel in African households is biomass, most notably, wood and charcoal. Biomass differs from electricity and most fossil fuels because there are no large suppliers of it. Some may be purchased at local markets, but a lot is collected or made at home in local villages, as in the case of charcoal. This means that it is not possible to collect data on the supplies of these fuels directly and supply can only be estimated from demand or use of the fuel. Obtaining sound data on biomass use will require household surveys (as discussed below).

Household surveys

The most complete way to understand household energy use is to run surveys of household energy use, methodologies for which have been developed by AFREC and tested in several countries. One option might be regional surveys that could be run on a rolling basis, covering all regions, most likely over a number of years, and if linked to any existing household survey, these would provide additional robust data on biomass use.

Running household surveys requires planning. Thought needs to be given to the period of the survey (wet and dry seasons or both), who is most trusted to be enumerators, the design of the survey form and the training of enumerators and some of the vital planning decisions. Thought is also needed on the questions. The goal of the survey is to fully understand the types of fuels used and the quantities (that is the mass of the fuel).

The survey therefore not only needs to ask about fuels used for cooking, lighting and appliance use, but it needs to do so in the way they are described by people. It is vital that scales are used in the surveys to weigh the fuel and meaningful discussion held with the household (often the lady of household, who will know best) on how the fuel is used, what the cooking habits are, how long a “pile” of wood might last etc. It is also important to understand about primary and secondary fuels. The choice of fuel may depend on the economic cycle of the household, when there is more work they might choose fuels that need to be purchased, but rely on collected wood when money is tighter. To help understand all these local factors, prior discussions with a representative from local communities can be really valuable as it will help ensure that the survey is meaningful to the households and accurate data can be collected.

It is understood that new surveys cost money and that is a challenge, but not having this data to run optimised energy policies, often leads to even higher costs. Securing cross ministry/organization support to run the surveys will be a vital step in securing the finance to run the surveys. In reality establishing a full household energy survey may not be possible and even if it is, it will take time. So, as a starting point, it is vital that full use is made of all existing survey and census data.

Section 3 highlighted how national and international household surveys can shed light on the fuels that are being used. Knowing the fuels being used is a vital start. For example, understanding the proportions of homes using charcoal and wood fuel can be used to quality assure any existing estimates of charcoal and wood use provided in the energy balance. For example, are the volumes logical one against the other against real reported use – is charcoal too low? What do those volumes mean in energy terms, using standard international calorific values?

Household surveys can also be used to check completeness, they show what fuels are being used and how that changes. That allows for estimates of fuels to be checked, for example, is kerosene use falling as it is no longer used for lighting? It is also important to establish and build connections with the NSI and to discuss, if there is an existing household survey, how small changes to help enhance energy statistics could be made. Ideas include:

- 1 Add a question on generator use and the fuel used;
- 2 Add a question on the source of charcoal (own produced or purchased);
- 3 Add questions on the source of electricity used and its frequency of supply;
- 4 Pilot if a question on fuel use per day/week could be added.

The NSI is also likely to be running some form of survey on spending by households, which is needed to provide weights for the inflation measure, normally CPI (Consumers Price Index). This can be another valuable source of information on fuel use. Perhaps more money is being spent on batteries (for lighting) or small bags of charcoal (for cooking). Again, it is about using information that exists to add insights into fuels being used.

Other forms of biomass

Given the absence of other forms of energy, it is likely that a wider range of biofuels are being used, specifically residues. It may be possible to reach out to regional or local parts of government to explore what fuels are being used.

Off grid energy

As shown in chart 3.11, off-grid electricity supply is playing an increasing role in providing energy to homes. Its use can be picked up by any household surveys, but that would not provide any data on quantities of energy being produced and consumed. However, it is likely that in many countries the roll out of local electricity (and clean cooking stoves) is being supported by a number of NGOs – perhaps working more directly with the Environment Ministry. Many NGOs will be undertaking some monitoring of the performance of equipment (or reduction in fuel use for improved stoves) and thus reaching out to them may provide some additional information that can be used to start to make estimates.

Overall, improving data on household energy use is a complex task that really needs full energy use surveys. However, the more energy statisticians can reach out to others, especially their NSI and seek to find and then use all the information and insights that exist, they will make progress in enhancing household energy statistics.

Acknowledgements

The type of analysis presented in this report is only possible through the work of energy statisticians in AU member States and the support given to them to produce comprehensive energy statistics. Robust and comprehensive data is essential to understand any situation and help develop the best policies. Whilst supply data is generally widely available, all countries need to develop more comprehensive data on energy demand.

The report has been produced to help AU member states understand coal in the African energy landscape, which may assist them in taking relevant actions. It is a summary report and more detailed analysis will be needed at individual country level. The report uses freely available data and sources to assist country level analysis.

The report uses AFREC's Africa Energy Database as the main source of information for Africa. This reflects the work underway across African countries to enhance their energy data. This work needs to continue under AFREC's African Energy Information System (AEIS) programme and be supported by governments to ensure that all African countries have the data they need to plan and respond to national and international events.

Comments on the report are welcome and can be sent to: afrec@africa-union.org

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