

Zambia's

Modern Energy Cookbook

The future of Zambian cooking



The Zambia Modern Energy CookBook

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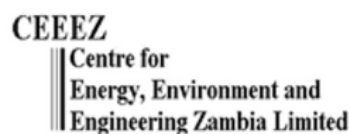
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The Zambia Modern Energy CookBook was developed by the Centre for Energy, Environment and Engineering Zambia (CEEZ) Ltd, the country partner for the Modern Energy Cooking Services (MECS) Programme in Zambia and food blogger Precious Phiri.

It is part of a series of MECS eCookBooks that seek to highlight the compatibility of modern energy-efficient appliances with local cuisines. This research was funded by UK Aid, via the Modern Energy Cooking Services (MECS) Programme.

This eCookbook is based on the findings of *MECS Kitchen Laboratory – Zambia*. For the full methodology, findings and detailed references, please consult this report, available on the MECS website.

www.MECS.org.uk | www.MECSplus.org

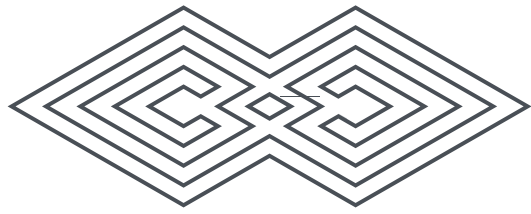


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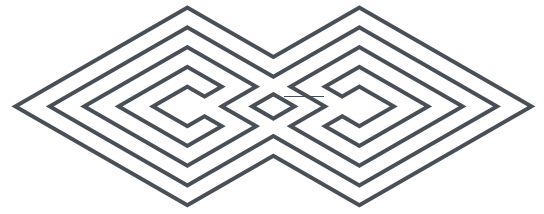


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01

Overview



Summary

The Zambia Modern Energy Cookbook provides a glimpse into Zambia's modern energy cooking future.

Electric cooking has a long history in Zambia, compared to many other sub-Saharan African countries. However, a combination of load shedding and tariff increases has turned many households away from modern energy and towards charcoal to meet their cooking fuel needs.

This is not a sustainable solution. Zambia has one of the highest deforestation rates in the world, and smoke from biomass cookstoves poses a significant risk to public health.

Rising charcoal prices pose a significant challenge for Zambian families. Therefore, a range of reliable and affordable modern energy cooking solutions will be required in Zambia, including more efficient electric cooking appliances, an expansion of the solar mini-grid and LPG sectors, and battery-supported electric cooking.

In this modern energy cookbook we show how:

- energy-efficient appliances such as the electric pressure cooker can make an important contribution towards reducing demand for electricity whilst simultaneously increasing convenience and affordability; and
- a clean fuel stack with LPG can mitigate the effects of load shedding and make modern energy cooking more reliable.

Forget what you think you know about modern energy cooking. Come with us on a culinary journey to explore how **modern energy cooking can be clean, safe, convenient, environmentally friendly, and surprisingly affordable!**



Watch the EPC Recipe's
via Youtube

Simply scan the QR code on your device

Overview of the Zambian Modern Energy Cookbook

The Zambia Modern Energy CookBook looks at the role energy-efficient cooking devices can play in Zambia's clean energy future. It builds on kitchen laboratory studies and other work by CEEZ that have been funded by UK Aid through the MECS programme. It does this through:

1

Showcasing energy, time and cost savings that are possible using energy-efficient cooking devices for typical Zambian dishes.

2

Talking to cooks who have integrated energy-efficient eCooking and LPG into their daily lives. Zambian food blogger, Precious Phiri, shows how she is able to cook traditional and authentic dishes using appliances such as the Electric Pressure Cooker!

3

Looking at five common Zambian dishes cooked by Precious Phiri and giving insight into potential energy and cost saving tips, as well as looking more broadly at typical Zambian food habits and culture.

4

Exploring the various fuels available in Zambia and the electricity access situation in the context of the Zambian government's urban cooking scenario, which would see a significant shift towards modern energy cooking.

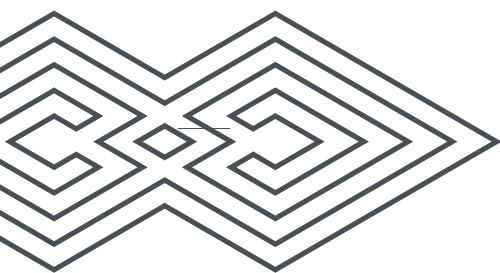




Clement



Precious



02

stories from the kitchen

Two cooks explain how energy-efficient cooking devices have made eCooking attractive, easy and exciting!



Meet Clement

Energy Researcher

I'm a Researcher at CEEZ. Despite my busy schedule during the day, I still manage to cook. Most of my cooking happens in the morning and evening and it revolves around cooking quick dishes such as tea for breakfast, nshima and relish dishes for supper. Roughly, I spend about 15 kwacha per month since I only cook in the morning and evening.

How did you learn to cook?

My first encounter with cooking dates back to about 30 years ago in the village. Before going to the farm, my mother would leave precooked foods in the kitchen and instruct me to reheat it on a three stone firewood stove prior to eating. This became a normal routine each time I knocked off from school during lunchtime. After observing my grandmother cook porridge mixed with groundnut powder, I asked her if I could give it a try someday which she agreed. From just warming the food, I gained more confidence and begun to prepare my own porridge and subsequently nshima and pumpkin leaves.

Who do you cook for?

I mainly cook for my son and myself. And at times for friends on the weekend.

What value has modern energy added to your daily cooking routine?

I smoothly integrated cooking with clean fuels because the house is connected to national electricity grid. Ecooking is clean and some appliances such as an EPC operate like smart gadgets which makes eCooking attractive, easy and exciting.

Previous monthly fuel expenditure

Hotplate + Charcoal = 20-25 Kwacha

Current monthly fuel expenditure

EPC + LPG = 15 kwacha



Meet Precious

Food Blogger

I'm a Zambian food blogger and I specialise in traditional and authentic Zambian dishes, so I enjoy cooking foods like dry beans, dry fish, village chicken, maize samp and offals (tripe).

How did you learn to cook?

I learnt how to cook from my mom and my grandma. I also learnt how to prepare other dishes from travelling around Zambia in rural areas at my previous job.

Who do you cook for?

Mainly for family and friends.

What value has modern energy added to your daily cooking routine?

Previously, I used a mbaula to prepare traditional dishes because they take long to cook and use a lot of electricity. With the EPC, I can cook these foods in a short period of time and consume very little power. Its cost effective when compared to charcoal. Whenever I cook dry fish or offals (tripe) in the EPC, the closed lid keeps the smell in (until the steam is released) so there are no flies in my kitchen. I can fry anything in the non-stick pan using the sautee function. I like the EPC because I can leave the pot cooking on its own while I do other things, as long as I set the time; it can cook various food and is cheaper to use.

Previous monthly fuel expenditure



Current monthly fuel expenditure





Precious'



Zambian Kitchen

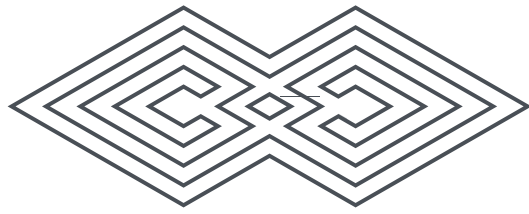


@zambiankitchen

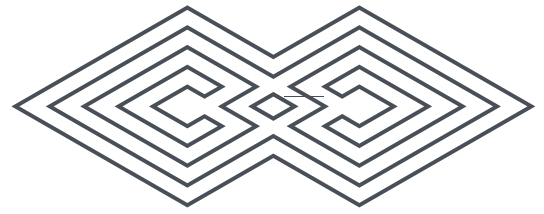


www.zambiankitchen.com





03



Fuels and Devices



Devices and Fuels

We compare a number of common cooking fuels and devices in the kitchen laboratory in the fuel comparison pages. The device specifications can be found on the *Cooking Device Details* page. Below, the efficiency of each device is shown to reflect the comparison results for each of the dishes. Efficiency is a very important factor for faster and cheaper cooking, and clean fuels are important from a health and convenience point of view.

Energy Efficient

Clean fuel



EPC
Electricity



Gas Cylinder
LPG

Not Energy Efficient



Hotplate
Electricity

Dirty fuel

Dirty fuels are not energy efficient



Mbaula
Charcoal

The time for modern energy cooking is now!

As of 2022, the Zambian government are committed to reducing the reliance on charcoal amongst urban households to 20% from its current level of 59%, and strengthening modern energy cooking. At the moment this includes promoting LPG, ethanol, biogas and electricity.

If these objectives are met, modern energy cooking will increase in Zambia over the next decade, and we believe that energy efficient electrical cooking can play a strong role in this.

The Cost of Electricity & Other Cooking Fuels

The price of electricity depends upon how much you buy and the tariff structures in place by ZESCO. They are periodically updated (and will likely change again in the near future).

In 2019, ZESCO applied to the Energy Regulation Board for a tariff increase which was later approved in January 2020. Below are the details of the residential tariff plan which was approved in 2020. Fixed monthly charges on customer tariffs have been removed.

Units	Residential 1 up to 100 Units	Residential 2 101-300 Units	Residential 3 above 300 units
Price	K0.56 per Unit	K1.01 per Unit	K2.31 per unit

Which band your cooking falls into will depend upon how much electricity you've already consumed that month. For example, if you've already used 100 units this month running your other appliances, your cooking will likely be charged at the 'Residential 2' tariff of K1.01 per unit.

Throughout the book, we've shown the cost of cooking with electricity as a range rather than a fixed value so that you can see what one would pay at each tariff level.

Although the prices of LPG and charcoal also vary based upon several factors, such as the quantity purchased and the location it is purchased from, fixed prices were used to simplify the analysis. The prices of LPG and charcoal used at the time of conducting the kitchen lab tests were ZMW17.8/kg (converted from ZMW9.09/l) for LPG and ZMW5/kg for charcoal.

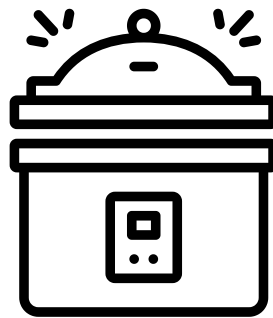
The Electric Pressure Cooker

How does it save energy?

Electric Pressure Cookers combine insulation, pressurisation and automation to deliver an extremely energy-efficient cooking service.

Insulation

reduces heat lost by convection up the sides of the pan & reduces radiation from the sides of the pan



Pressurised lid

reduces cooking time & reduces evaporation

Automation

turns off heating element as soon as operating pressure is reached



Why use it?

It is faster - pressure cookers raise the temperature in the pot above boiling point, which can cut boiling times in half.

It is cheaper - saving energy means saving money.

It is convenient - the automated cooking experience allows you to put your feet up whilst the EPC takes care of the cooking for you.

EPC Top Tips



boil, fry & pressure cook!!

The EPC can do a lot **more than just pressure cooking**. If you want to **boil or fry**, simply leave the lid off and it will be just like cooking with a normal sauce pan.

reduce time & water

Reduce the cooking time when pressure cooking otherwise you'll end up with mush! Use less water or you'll end up with soup! When the EPC is **pressurised**, no water escapes, unlike a conventional pot, where steam is evaporating throughout the cooking process.



use non-abrasive materials

The cooking utensils must either be **plastic or wooden** to protect the non-stick coating; and cleaning should be done with **non-abrasive** materials only



EPC Safety features

EPCs have **multiple safety mechanisms**, so even if one fails, there are several more there to protect you. This means that they are actually **one of the safest cooking appliances** on the market today. The most important safety mechanisms are:



pressure release valve & locking pin

The pressure release valve avoids pressure building up above safe levels. Pressure inside the pot pushes up the locking pin, which means the EPC cannot be opened when pressurised.

temperature sensor

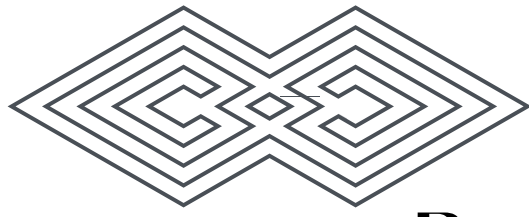
The temperature sensor at the bottom of the device avoids overheating. It automatically shuts off the power when the pot reaches its normal cooking temperature.



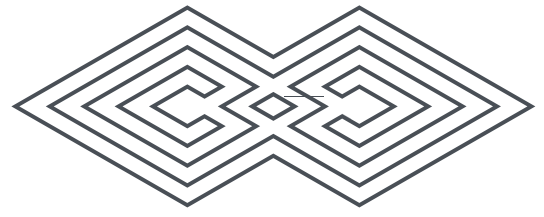
insulation & sealing

The lid and walls of EPCS are well insulated and the rubber sealing ring makes sure steam cannot escape. This prevents you from burning yourself if you touch the pot whilst its cooking.





04



eRecipes and energy comparison



Recipes

Five Zambian dishes were selected for the lab tests to represent the most popular types of dishes on the Zambian menu.



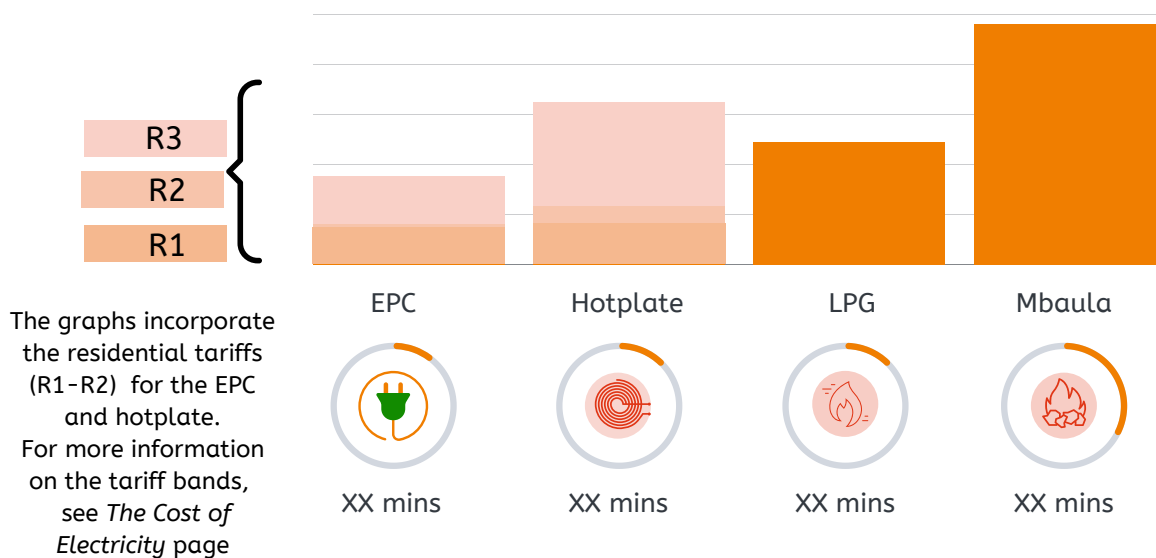
Nshima
Village Chicken
Bean Stew
Porridge with Groundnut Flour
Rape Vegetables



These dishes vary in cooking time and cooking process (boiling/simmering, frying, or combination) and therefore the selection allows us to test the performance of the cooking devices in relation to this diversity.

The eRecipes

For each of these five common dishes we compared the energy, time and cost readings using four types of cooking set-ups: an electric pressure cooker, a hot plate, LPG and mbaula. The readings were taken in a kitchen laboratory setting, using standardised recipes.



The Electric Pressure Cooker (EPC) Recipes



Precious optimised each of the kitchen laboratory recipes for an EPC. Each EPC recipe is accompanied by a video recipe, so look out for the hyperlinks and QR codes on each recipe page. Precious' recipes also offer energy saving tips so that you can start saving time and money every time you use an EPC!

Cooking Device Details

EPC



Fitted with an in-built heating element, a microprocessor, sensors, and a control panel to generate and retain heat energy, monitor and regulate pressure and temperature. This appliance has 15 in-built pre-programmed cooking menus.



1,795 ZMK BRAND: Midea 6.0L

Hotplate



A single hotplate with power rating at 230V/50Hz and wattage at 1000W. It is mostly sold in major retail chain stores.



150-180 ZMK BRAND: Essentials JB-3108

LPG Cylinder



A gas stove unit consists of a stove, a gas cylinder, a hose, and a gas flow regulator. The image represents a setup of a 2-burner stove powered by a 5kg gas cylinder. The payment includes a full cylinder, stove and ancillaries.



1,815 ZMK BRAND: Cadac

Mbaula



The mbaulas are made from scrap metal by local blacksmiths/artisan. The base and walls are perforated to facilitate air circulation. The mbaula vary in sizes. The one used can take up to approximately 400 grams of charcoal at any one time.



15-25 ZMK BRAND: N/A

Recipes and instructions



Ingredients

Maize meal

Water

This dish involves boiling and stirring. The amount of time taken depends on the fuel and appliance used.

NSHIMA

Basic Instructions

step 1

Warm the water and add maize meal to make a porridge-like consistency.

step 3

Once a thick paste has formed, briefly heat the nshima with a lid on for a few minutes, before stirring vigorously until the powder is mixed in and the paste is smooth.

step 2

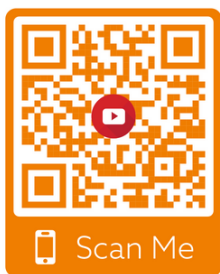
When the mixture starts to boil and the pot gives off a fresh corn aroma, add more maize meal in small quantities, stirring continuously.

step 4

Leave to simmer on a low temperature for a few minutes, and serve.

Precious' Nshima

EPC Recipe



[Watch video](#)



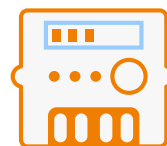
Time
25 Mins



Cost
0.1-0.5
ZMK



Serves
4



Energy
0.2kwh

About the Dish

Nshima is deeply embedded into Zambian culture and almost all cultural events (e.g., kitchen parties, traditional ceremonies and funerals) have a component of nshima cooking and eating. It is rich in carbohydrates hence mainly consumed for body energy needs and, as we show here, it can easily be cooked using an EPC.

Directions

Add Water

Add 3-4 cups of water in the EPC and close it. Close the valve and set it at 2 minutes on high pressure manually. After 2 minutes, release the steam valve and open.

Make Paste

Make a paste with 2 cups of mealie meal and 1 cup of cold water.

Add to boiling water

Add the paste to the boiling water in the EPC. Stir continuously and set the EPC to 5 minutes on high pressure manually. Close the lid.

Release steam valve

After 5 minutes, release the steam valve. Open the lid and set the EPC on the preset sautee function.

Add more mealie meal

Add more mealie meal slowly and stir vigorously until thick enough

Cover

Cover for a minute and then stir again. Power off the EPC and serve





Typical soaking time: N/A
can be cleaned immediately

The EPC pot is made from a non-stick material. When nshima is cooked in it and removed, the pot remains clean.



Typical soaking time: 3-4hours

A typical Zambian pot is made from aluminium and after cooking nshima, a crust is formed around the sides and at the bottom

EPC Nshima tips

use cold water

Make a paste of mealie meal and cold water, as the water will be boiling hot when adding the mealie meal. This is to ensure that no lumps are formed in the nshima.

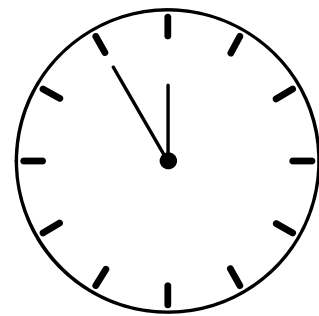


use saute option

You can also use the sautee option in the last stage when adding more mealie meal while stirring the nshima.

hold pot still

When stirring vigorously, hold the ends of the pot with a tea towel as the sides of the pot can get very hot.



keep warm

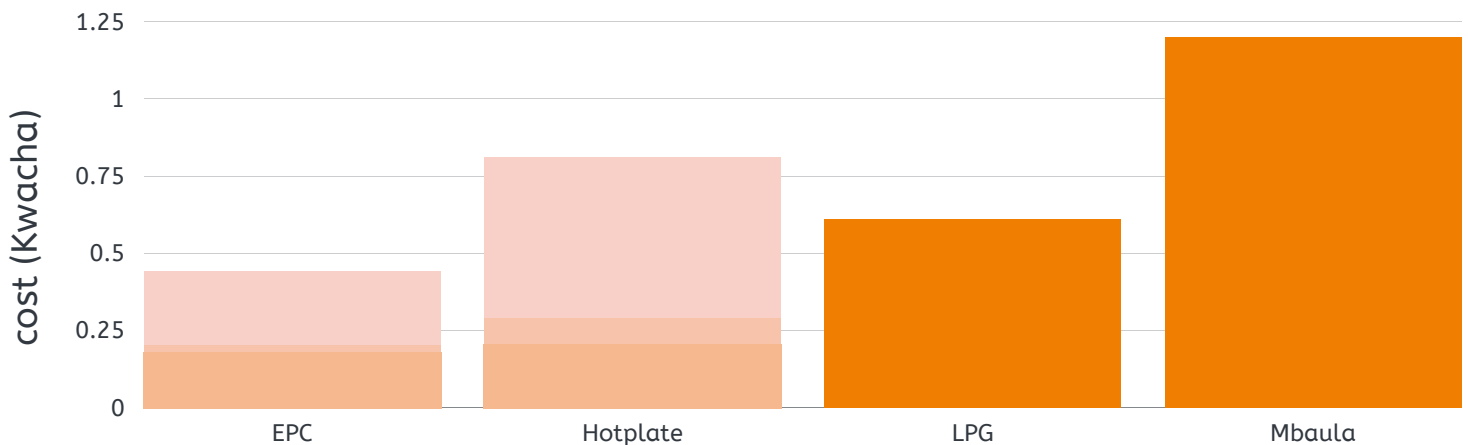
You can leave the nshima in the pot for some hours while the EPC is still connected to power and it will still be warm.

Kitchen Lab

Fuel consumption

Cost

Nshima is traditionally cooked using biomass, which proves to be more energy intensive, more laborious, and more expensive than modern energy equivalents. Even when cooking at the highest electricity tariff (R3), which requires the household to have used 300 units in the month, the EPC is still the cheapest way to cook nshima, costing 0.5 kwacha.



Time

Due to the increased efficiency and insulation of the EPC, Nshima (25mins) was prepared in less time than on the hotplate (34mins) and on the Mbaula (44mins).



25mins



34mins



21mins



44mins

OVERALL

"Preparing nshima in the EPC has been an exciting experience. The insulation from this pot creates a moist but firm textured nshima; it is very tasty with a nice aroma... and most of all the crust comes out as you remove the nshima, making it easy to clean the pot."





Ingredients

Village Chicken
2 diced medium Tomatoes
1 chopped medium Onion
Cooking Oil
Black Pepper
Curry
Salt

VILLAGE CHICKEN

Basic Instructions

step 1

Boil the chicken pieces in water on a high heat until cooked through.

step 2

Transfer the meat to a pan with cooking oil and fry until brown.

step 3

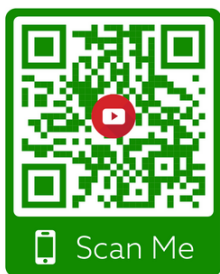
Remove the chicken and fry the onions and tomatoes in the oil that remains in the pan.

step 4

Add the chicken to the sauce, add salt to taste, and serve.

Precious' Village Chicken

EPC Recipe



[Watch video](#)



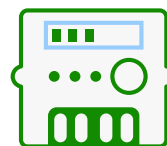
Time
25 Mins



Cost
0.1-0.5
ZMK



Serves
4



Energy
0.2kwh

About the Dish

Chicken carries a prestige status across different Zambian cultures, and chicken dishes like this one feature at special occasions such as marriage negotiations, kitchen parties, weddings and funerals.

Village chicken can be categorised in the long-boiling group of foods because the meat is dense. So preparing it on a hotplate just for the first part of boiling could take 40 to 50 minutes, while the EPC only takes 10 minutes to boil the chicken

Direction

Clean & cut chicken

Clean the chicken and cut into pieces

Add to EPC

Put the chicken in the EPC and add some salt, curry, black pepper and 1 tablespoon of cooking oil

High pressure

Set the EPC manually on high pressure for 10 minutes and close the valve

Release the steam

After 10 minutes, release the steam

Sautee

Set the EPC on the sautee function, add 2 tablespoons of cooking oil and fry until the chicken is brown

Make the gravy

Add tomatoes and onions and fry continuously. Stir well and make gravy

Ready to eat

Simmer and Serve

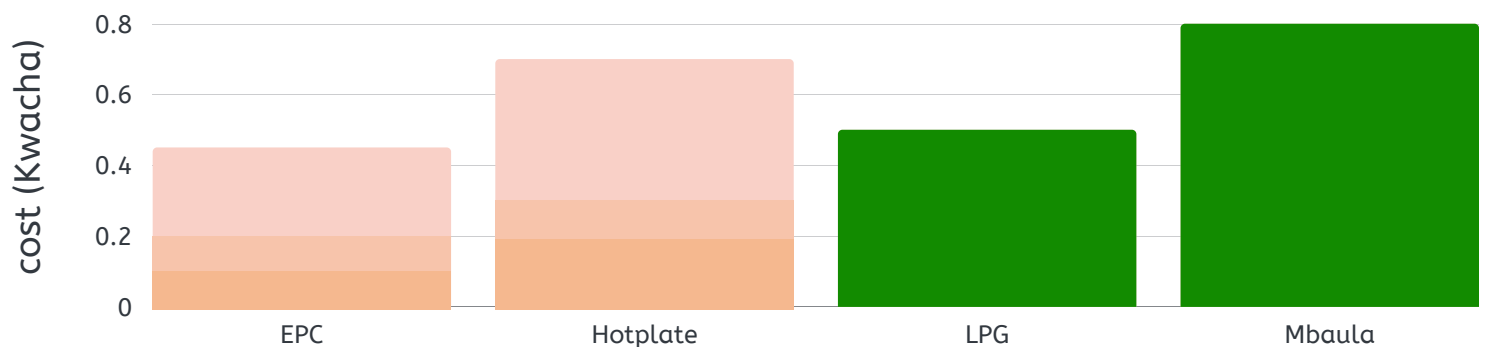


Kitchen Lab

Fuel comparison

Cost

Cooking village chicken stew on an EPC is far cheaper than charcoal, or LPG stoves. The mbaula requires by far the highest use of energy to cook chicken, which is reflected in its higher cost. At the lowest tariff band (R1), the EPC is at least 8 times cheaper than charcoal and even at the highest band (R3), it is still half the cost. The EPC is always cheaper than LPG, however at the highest band, the hotplate becomes more expensive. The mbaula is always the most expensive option.



Time

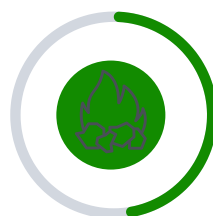
The dish takes between 25 and 35 minutes to cook, and the EPC and LPG stoves have shown to shorten the cooking time in comparison to the two less efficient stoves/devices



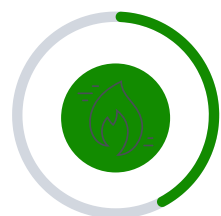
25mins



40mins



26mins



29mins



Ingredients

Dry Beans

2 medium diced Tomatoes

1 medium chopped Onion

Cooking Oil

Salt

Water

BEAN STEW

Basic Instructions

step 1

Clean beans to remove the dirt.

step 2

Add beans and water to the pot and boil with a little oil for 3-4 hours.

step 3

Prepare the gravy using the tomatoes, onions, and salt in a separate pot/pan. Pour into the pot containing the beans without stirring.

step 4

Let the gravy and beans simmer for 15 minutes and serve.

Precious' Bean Stew

EPC Recipe



[Watch video](#)



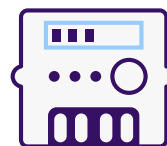
Time
90 Mins



Cost
0.2-1
ZMK



Serves
4



Energy
0.4kwh

About the Dish

Over 60% of beans come from northern Zambia but they are consumed in both urban and rural households across the country.

Just like the other selected foods, beans are equally accessible in all seasons on demand, and using an EPC to cook them has many advantages!

Direction

Clean the beans

Clean your beans and put them in the EPC

Add water

Add 3 full cups of water and a tablespoon of cooking oil

Pressurise the EPC

Set it manually on high pressure for 80 minutes and close the valve.

Cook the beans

After 80 minutes, remove the beans from the EPC

Make the gravy

Make some gravy by adding 2 tablespoons cooking oil, tomatoes, onions in the EPC and fry on the sautee function.

Add the beans to the gravy

Add the beans to the gravy and simmer for about 10 minutes on the sautee function

Enjoy!

Power off the EPC and serve



EPC Beans tips

check water level

Always make sure the water level is above the beans in the pot.

A large, solid purple circle is centered on a light beige background. Inside the circle, the word "Saute" is written in a white, serif font.

Saute

use saute function

When making gravy for the beans, use the sautee option as it will enable you to fry without the lid on.

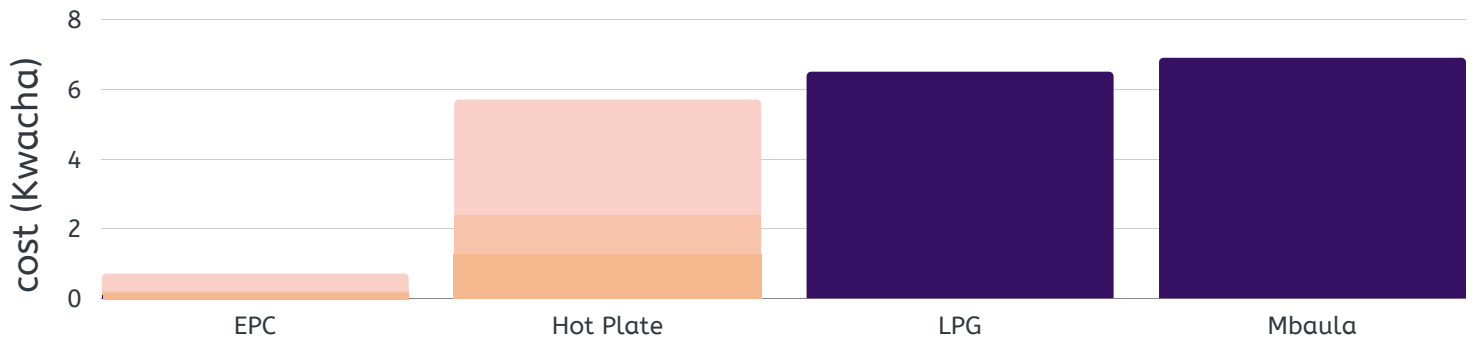
Kitchen Lab

Fuel comparison

Cost

The EPC was more energy efficient than all other appliances. It used 80% less energy than the hot plate. The EPC consumes very little energy once it gets to pressure as the pot is insulated. It also cooks much faster and as they say, 'time is money'! On the lowest band (R1), the hotplate is 7 times cheaper than LPG or the mbaula, however at the highest band (R3), it has a similar cost.

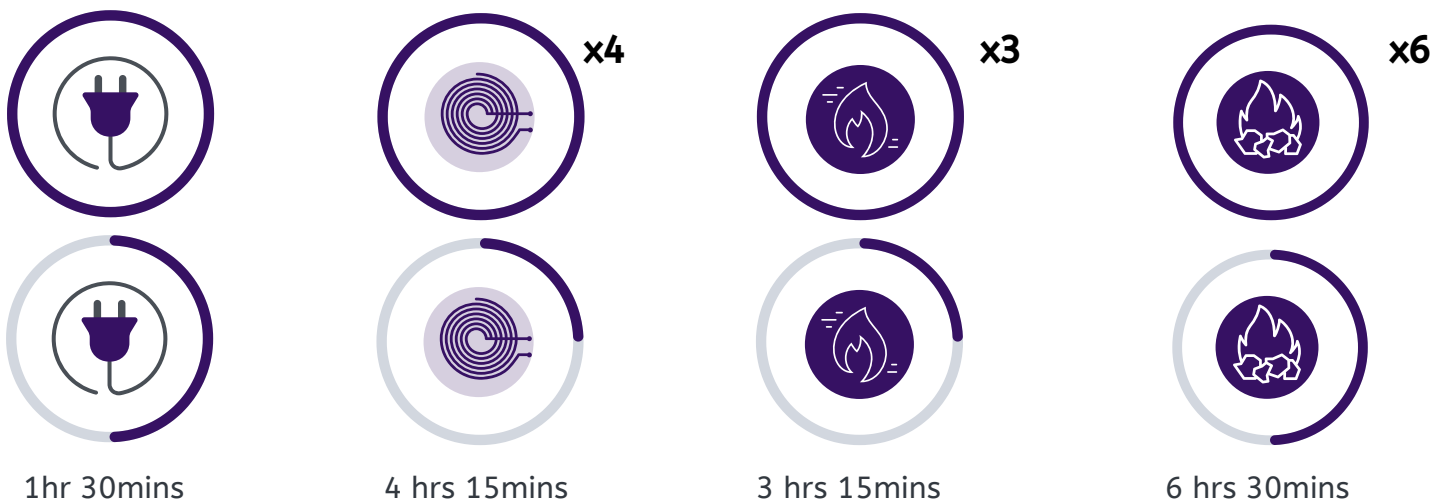
On the lowest tariff band (R1), cooking bean stew with an EPC is 35 times cheaper than the mbaula or LPG! Even on the highest band (R3), it is still 7 times cheaper!



Time

This dish requires a much longer cooking time than any other dish included in the tests.

The EPC out-performs the other devices considerably: it is twice as fast as LPG, three times faster than the hotplate and four times faster than the mbaula!





Ingredients

Water

Maize meal

Groundnut flour

Salt

Sugar (optional)

PORRIDGE WITH GROUNDNUT FLOUR

Basic Instructions

step 1

When the water is warm enough, maize meal is added in stages while stirring.

step 2

Continue adding maize meal until the required thickness is achieved. Add sugar and a pinch of salt for taste

step 3

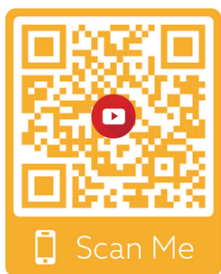
The porridge is left to boil and simmer. Add groundnut flour and keep stirring to avoid formation of lumps.

step 4

The porridge is left to boil until it is deemed ready to serve.

Precious' Porridge

EPC Recipe



[Watch video](#)



Time
28 Mins



Cost
0.2-0.6
ZMK



Serves
4



Energy
0.3kwh

About the Dish

Groundnuts are a source of cholesterol-free fats. Versatile products such as peanut butter are produced from groundnuts, but groundnut flour is typically used by Zambian households and for a variety of dishes.

Direction

Heat the water

Add 3-4 cups of water in the EPC and bring to the boil

TIP: if you want to multitask, close the valve and set the timer to 2 minutes - when the timer goes off, open the steam valve and release the pressure.

Make the paste

Make a paste with 2 cups of maize meal and 1 cup of water and add the paste to the boiling water in the EPC

Set high pressure

Stir continuously and then set the EPC on 5 minutes on high pressure manually

Sautee

After 5 minutes, release the steam valve and set the EPC on the preset sautee function

Add groundnut flour

Add the powdered groundnuts slowly and stir vigorously making sure no lumps form. Add ½ a teaspoon of salt

Almost ready

Stir continuously for about 5-7 minutes
Power off the EPC and serve.

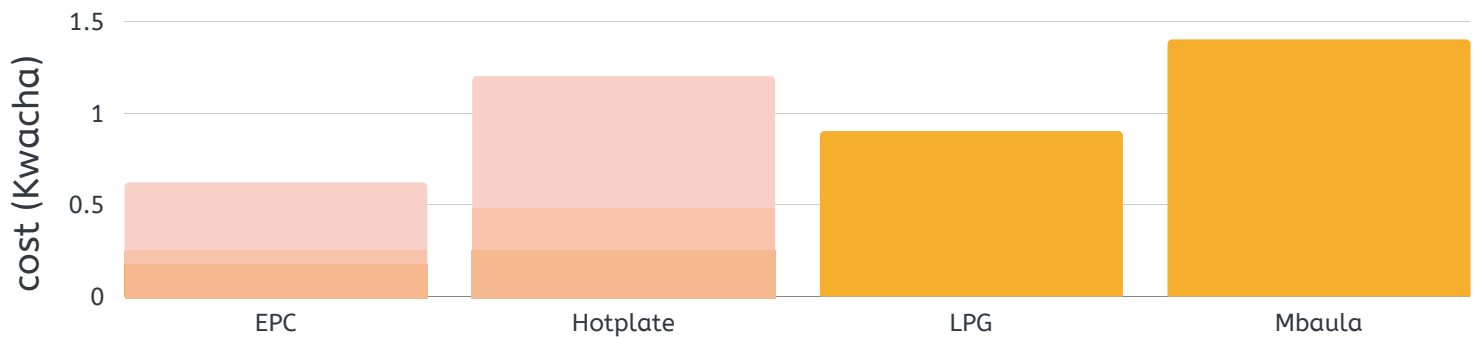


Kitchen Lab

Fuel comparison

Cost

The EPC used half the energy of the hotplate. On the lowest tariff band (R1), the hotplate was cheaper than LPG, but on the highest (R3), it was more expensive, but still cheaper than the mbaula. The EPC was always the cheapest option and on the lowest band (R1) it is 9 times cheaper than the mbaula and even on the highest band (R3), it is still half the cost of the mbaula.



Time

The LPG stove cooks the porridge in the shortest time when compared with the other devices. However, the difference in time between the LPG stove and the EPC is minimal. The hotplate and mbaula are slightly slower, but there is still relatively little difference between them.



28mins



35mins



26mins



38mins



Ingredients

Rape vegetables Dressed
Medium tomatoes 1(diced)
Medium Onion 1/2(chopped)
Cooking Oil 2 tbsp
Salt

RAPE VEGETABLES

Basic Instructions

step 1

Cut vegetables into small pieces.

step 2

Heat cooking oil and add onion, tomato and salt and fry.

step 3

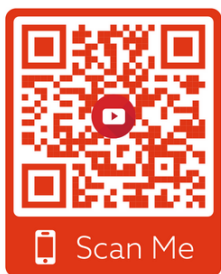
Add the vegetables to the pan and fry until the deserved texture is reach.

step 4

Traditionally, vegetables are cooked without a lid to retain the colour.

Precious' Rape Vegetable

EPC Recipe



[Watch video](#)



Time
7 Mins



Cost
0.05-0.3
ZMK



Serves
4



Energy
0.1kwh

About the Dish

Rape is grown both commercially and domestically throughout the year. Rich in vitamins and minerals and both affordable and readily available, rape is often served as an accompaniment to nshima, in both urban and rural areas.

Direction

Wash vegetables

Wash and cut the vegetables and pour some hot water on it to make it soft

Sautee

Set the EPC on the preset sautee function and add 2 tablespoons of cooking oil in the EPC

Add base ingredients

When its heated, add the tomatoes, onions and some salt. Stir to make gravy

Stir

Add the vegetables and stir for about 7-10 minutes

Serve

Power off the EPC and serve

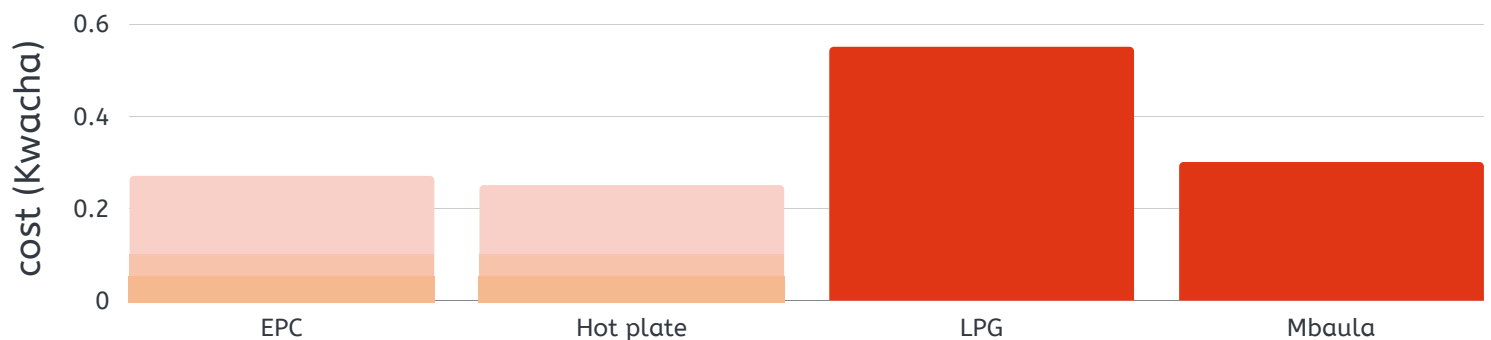


Kitchen Lab

Fuel comparison

Cost

Because rape leaves are so quick to cook, the EPC's insulation, pressurisation and automatic control offers little advantage over the hotplate, so the costs of cooking on both devices are comparable. At the lowest tariff band (R1), the electric appliances are 6 times cheaper than the mbaula and 10 times cheaper than LPG. At the highest tariff band (R3) they are cost comparable to the mbaula, but still less than half the cost of LPG.

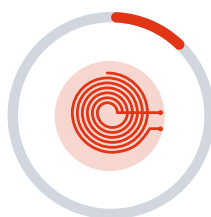


Time

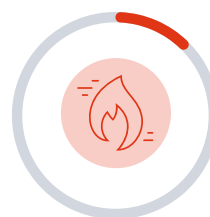
Of all the dishes selected for testing, the rape dish is the quickest and consists of a short frying process. The cooking time is similar across all devices, however the mbaula also has to be lit, making it the slowest total cooking time.



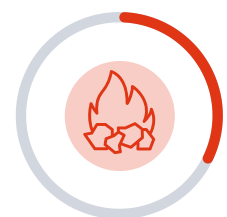
7mins



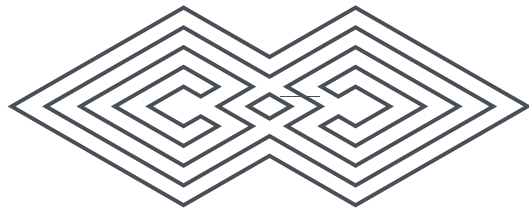
8mins



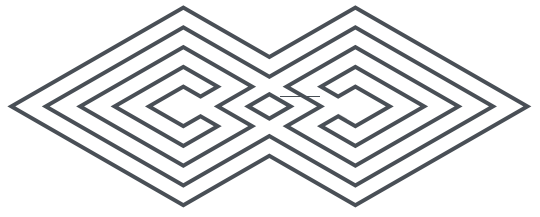
8mins



22mins



05

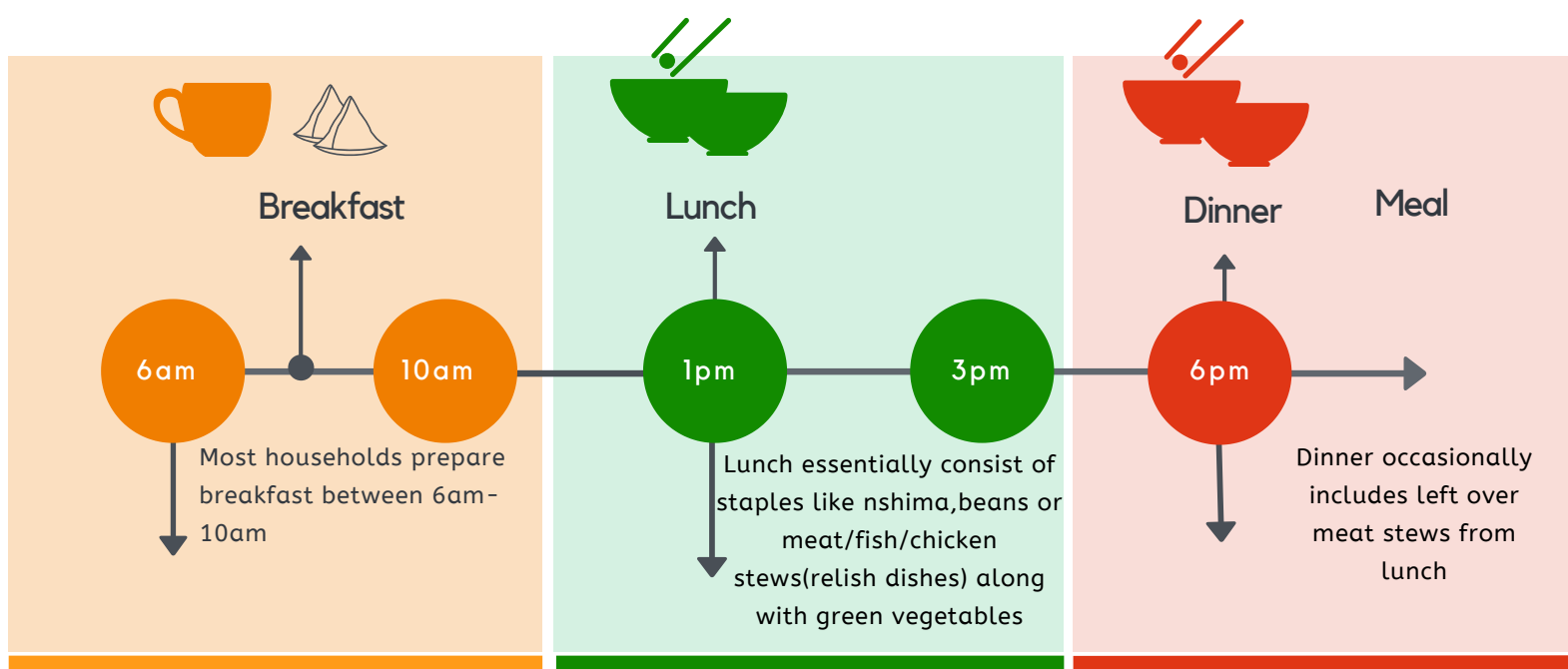


Zambian Cuisine



Typical Daily Cooking Timeline

Households with electric hotplates in urban populations sporadically use the appliance to cook meals. When used, fast to prepare dishes (such as tea, fried eggs and rice) are typically prepared on these appliances. Charcoal-powered stoves have dominated cooking practices in the majority of households and are often used to prepare medium- and long-cook dishes (such as nshima, bean stew, game meat).



Hot Drink <20mins

Porridge <20mins

Fried Eggs <20mins

Boiled Eggs <20mins

Bread store bought

Potato Chips <20mins

Pasta <20mins

Nshima 20-60mins

Chicken Stew 20-60mins

Rape (kale) <20mins

Beef Stew >60mins

Dry Fish Stew >60mins

Beans Stew >60mins

Mince Meat stew 20-60mins

Fried Kapenta 20-60mins

Pumpkin leaves <20mins

Boiled Okra <20mins

Nshima 20-60mins

Rape (kale) <20mins

Chicken stew 20-60mins

Beef Stew >60mins

Beans Stew >60mins

Dry Fish Stew >60mins

Pumpkin leaves <20mins

Boiled Okra <20mins

Pasta <20mins

Sausage Stew 20-60mins

Cooking times relate to typical cooking times when using an electric hotplate.

Types of popular Zambian foods

Boil & stir staples

Nshima
Porridge
Pasta



Stews

Chicken Stew
Mince meat stew
Beef stew



Shallow-Fried

Kapenta
Rape Leaves
Fried eggs



Long-Boil

Beans Stew
Beef Stew



Boiled Staples (vegetables)

Pumpkin leaves
Boiled Okra

Deep-fried

Potato Chips

Hot drinks

Tea

Energy Efficient Appliances

Cooking with energy efficient appliances can make a huge difference in cost-savings, compared to using inefficient appliances.



All-rounders

Induction stove

Frying specialists

Electric frying pan



Boiling and Long-cooking dishes

Electric pressure cooker

Boiling only

Kettle, rice cooker, slow cooker

Reheating

Microwave



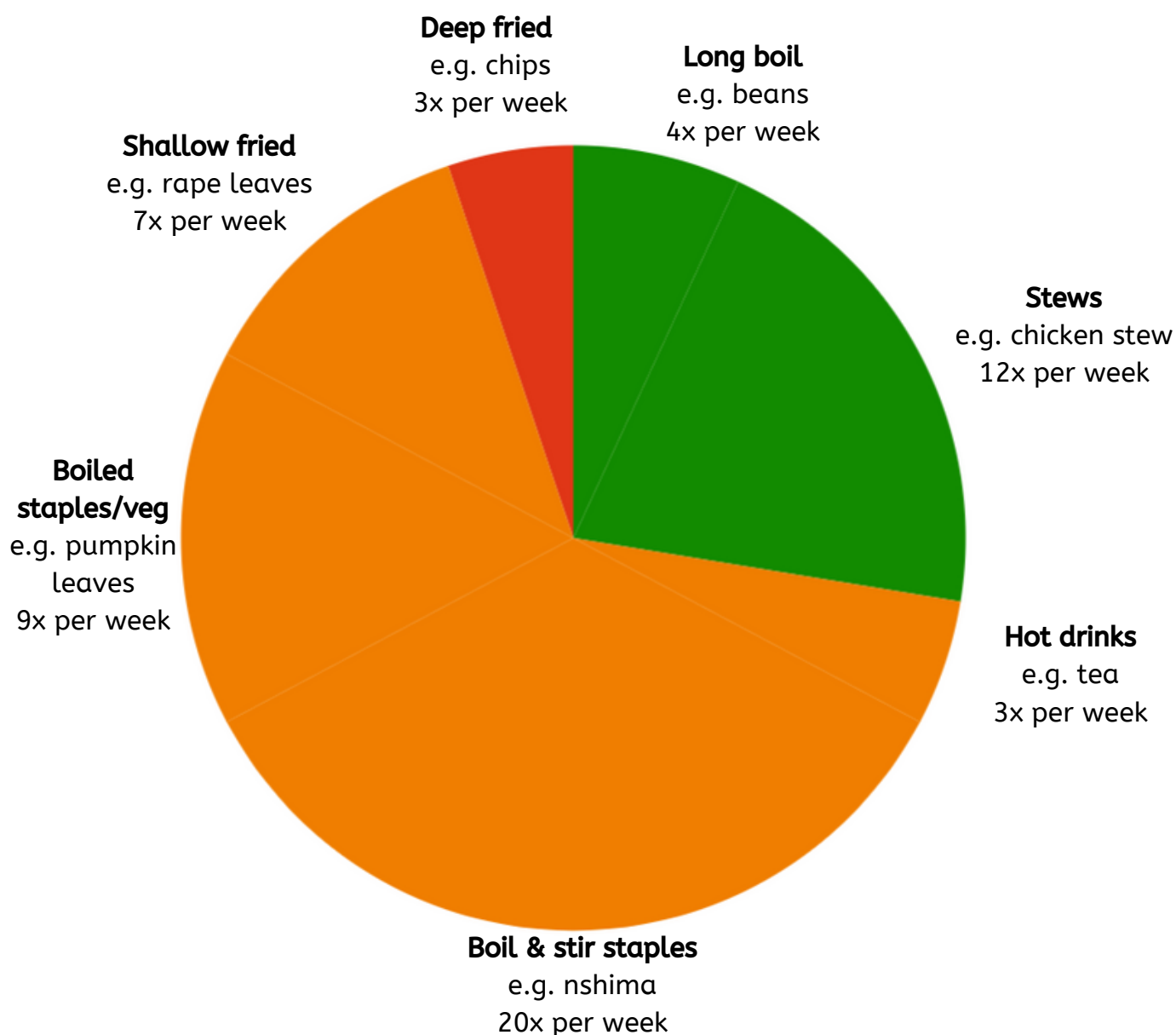
Roasting

Halogen oven



The proportion of a typical Zambian menu that can be cooked with an EPC

We mapped out a typical weekly menu for a middle-class urban Zambian household and categorised the foods to work out which were most important:



= EPC is best choice for these dishes



= EPC likely to be used sometimes for dishes in these categories



= not possible to cook with an EPC

The EPC is likely to be the first choice for



+



=

95%

of dishes on this menu
can be cooked
using an EPC

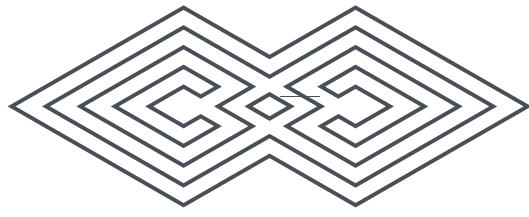


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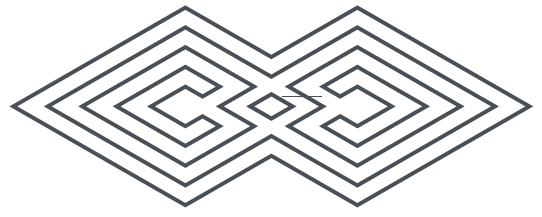
28%

of this menu





06



Where to Buy



APPLIANCE AVAILABILITY MAP












CEEEZ conducted an Appliance Availability survey¹ in the capital (Lusaka) and four other districts. Typically, these cities/towns are regional centers for trade and commerce in their respective localities. The map shows the range of retail stores surveyed for energy-efficient appliances



¹ Njobvu, C. and Yamba, F., 2022. Electric Appliance Availability Survey. [ebook] Modern Energy Cooking Services. Available at: <<https://mecs.org.uk/wp-content/uploads/2022/03/Electric-Appliance-Availability-Survey-Report.pdf>> [Accessed 11 March 2022].

Appliance availability by location

The same Availability Appliance survey observed the devices available in stores in each location over the five provinces.

Appliance	Lusaka	Solwezi	Kabwe	Chipata	Ndola
Hotplate (portable or intergrated with Oven) 					
Microwave 					
Electric kettle 					
Electric pressure cooker 					
Induction stoves 					
Rice cooker 					
Electric oven with gas hobs 					

Appliance Availability Online

Did you know?

Efficient energy appliances can be purchased from a range of retailers as seen on the *Energy Efficient Appliances* page. Some outlets now have an online presence so you can buy your appliances from the comfort of your own home.

Some retailers will deliver your appliance to you if you live close to Lusaka CBD. Alternatively collect from local stores.

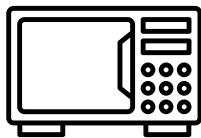
Electronics available



electric kettle

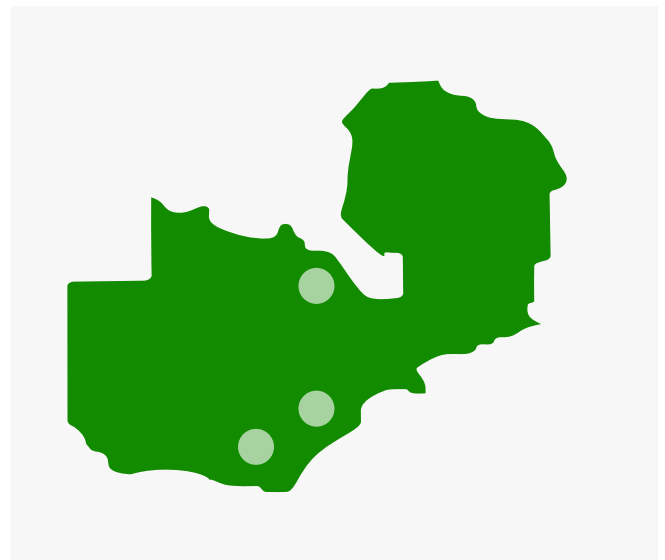


electric pressure
cooker



Microwave

and much more...



numerous stores

around the country



Home Delivery



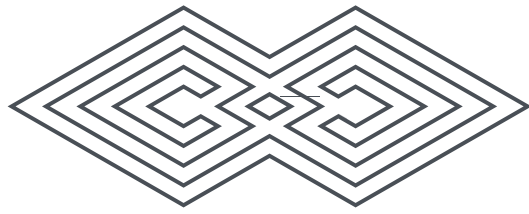
Store Pick-up



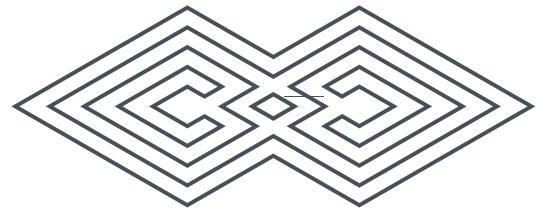
Warranty Details

Always look for a warranty and back up services. Retailers often offer a range of options from 1 to 10 years.

You can always source products directly from manufacturers and distributors too.



07



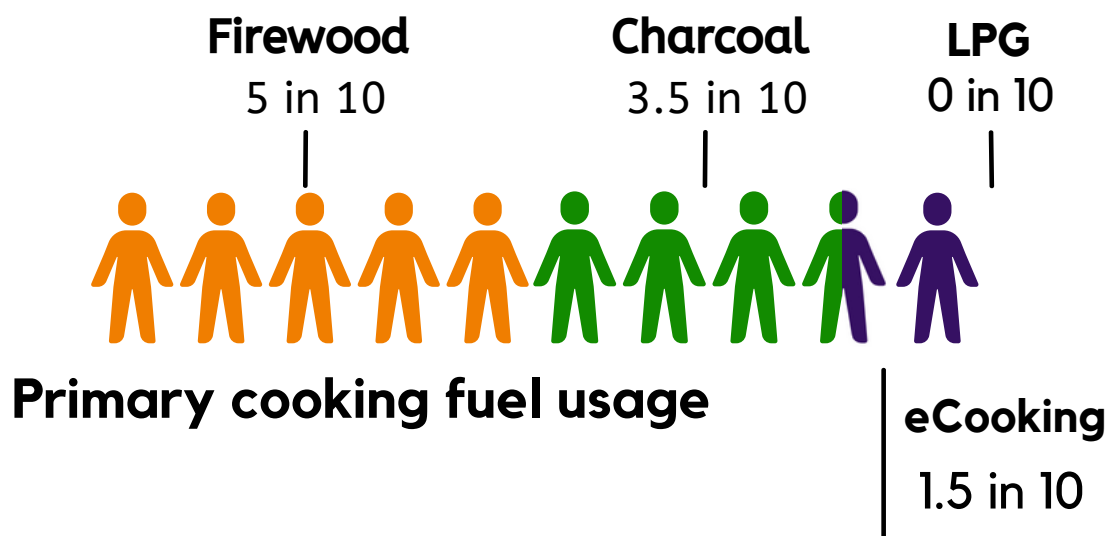
Cooking with Modern Energy



Electricity Access and Cooking with Modern Energy in Zambia

40% of households in Zambia have access to electricity, yet only 16% use electricity as their primary cooking fuel source. The majority of the population use either firewood or charcoal.

While Zambia has one of the highest electric-cooking rates in Sub-Saharan Africa, (which indicates a strong willingness to cook with the fuel), the limited reach and reliability of the grid continues to contribute to households' over-reliance on charcoal.



Urban households



Electricity access = **7 in 10 people**



Using electricity as primary cooking fuel = **3 in 10 people**

Rural households



Electricity access = **1 in 10 people**



Using electricity as primary cooking fuel = **0 in 10 people**

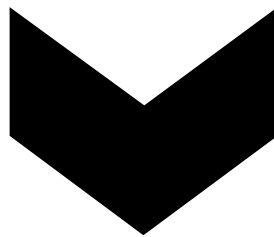
Urban Zambia presents a particularly attractive market for eCooking, as electricity connectivity rates are higher, supply chains are shorter and consumers are more familiar with modern appliances. Importantly, urban people are more likely to be paying for their fuel than their rural counterparts, which creates a more attractive business proposition, as this existing expenditure can be more easily converted into electricity units and repayments on a financed appliance.

Government of Zambia

Urban Energy Strategy

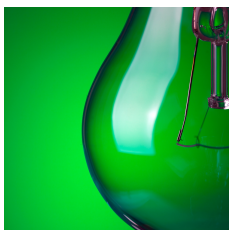
As of 2022, the Zambian government are committed to strengthening modern energy cooking. At the moment, this looks to combine promoting LPG, Ethanol, Biogas and electricity. This is designed to reduce the reliance on charcoal, from its current level of 59% use to 20% by 2030. If these objectives are met, modern energy cooking will increase in Zambia over the next decade, and we believe that energy efficient electrical cooking can play a strong role in this.

Current urban primary cooking fuels



By 2030

Electricity



60% - Modern Energy

LPG



Charcoal



20%

Firewood





20%


Current Urban Cooking Scenario


Urban charcoal users are a particularly attractive market segment to target as they have a guaranteed existing expenditure on a polluting fuel that could be repurposed to electricity units or LPG refills.

59% of urban households primarily use Charcoal for cooking.

Safety  Fumes released as it burns (Carbon monoxide)
Highly Flammable

Time  Rural population believe firewood burns faster and cooks faster compared to charcoal


Health  Affects lungs and causes breathing problems in the longer term


Convenience  Easy to access in urban areas (door-to-door sales, available in street corners)




5% of urban households primarily use firewood for cooking.

Safety  Burns

Cost  Free when collecting. In institutional settings they usually buy as they don't have time

Health  Affects lungs and causes breathing problems in the longer term, and causes red-eyes (stigma)

Convenience  Collecting firewood considered inconvenient as it takes long to collect.

Current Urban Cooking Scenario



10%

of urban households primarily use LPG for cooking.

Safety



Generally safe if used correctly
read safety tips

Time



Cooks fast and saves time

Health



No harmful smoke, however
needs good ventilation
read safety tips

Convenience



If near outlets or filling stations
read LPG availability

34%

of urban households primarily use electricity for cooking.

Safety



No flame reduces risk of burns

Time



EPCs can cut boiling times in half

Health



No smoke in the kitchen at all

Convenience



Modern appliances enable multi-tasking, but cooking stops when load shedding strikes!

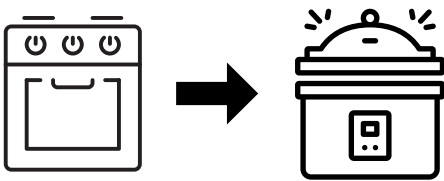


Tackling Load Shedding

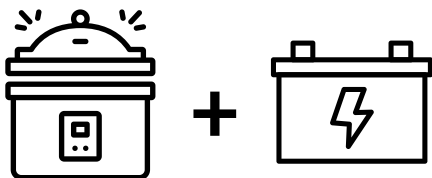
In the past 7 years, Zambia has experienced load shedding on several occasions, with the worst episode in 2019, lasting up to 15 hours/day. Load shedding occurs when demand for electricity exceeds the available supply. Most of Zambia's electricity generation is dependent on hydro power (85%) and this has been negatively affected by the recent occurrence of late rainfall causing the national utility to enforce loadshedding. Climate change and deforestation are making the rains more unpredictable and as a result, load shedding has become more prevalent in recent years.



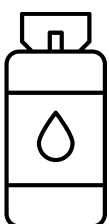
When load shedding strikes, electric appliances become useless and many people are forced to revert back to charcoal to get food on the table. Efficient electrical appliances, such as EPCs, offer cleaner, cheaper cooking that uses less electricity so reducing the risk of load shedding. Several modern energy alternatives are available to use:



Energy-efficient appliances reduce the loading on the grid, meaning there is more energy available for everyone. Insulated appliances, such as an EPC, can also keep cooking even when power disappears.



Supporting your energy-efficient appliances with a battery can enable you to cook with electricity at any time, whether there is load shedding or not.



LPG is not affected by load shedding and by switching from electricity to LPG, you can reduce the loading on the grid, meaning that load shedding is less likely to occur.

Myth Buster: eCooking

Clement

Clement had reservations about cooking more with electricity, so he spoke to Precious to help find out the truth

VS.

Precious

Precious had been cooking with electricity for some time now, so she helped shed some light on things

Electricity is too expensive for cooking

“

I believe cooking with electricity is expensive and is for high income earners who live uptown.

”

Energy-efficient appliances

Even if electricity is expensive, cooking with it can still be cheaper if you switch from low efficient cooking appliances to Modern energy-efficient appliances such as the EPC which use a fraction of the electricity when compared hotplate to cook the same meal

”

Electricity can shock someone while cooking

“

I'm worried that cooking with electricity isn't as safe and may harm me or my family.

”

Check your wiring

Lighting a fire is much more dangerous than plugging in an appliance. However do make sure the wiring in your house is strong enough for cooking - if in doubt, get it checked by an electrician.

”

Food cooked with electricity has no taste

“

People say that food cooked with electricity doesn't taste as good and I can't even imagine how to cook nshima with an EPC

”

Range of appliances

This cookbook shows just how easy it is to cook nshima with an EPC and the best thing about the non-stick pot is that even the washing up is easy! In fact the EPC makes some dishes taste even better as it locks the flavours inside.

”



Cooking with Modern Energy sounds like a good idea, but...

Modern energy fuels such as electricity can provide a fast and cost-effective solution to cooking. However, people can experience setbacks when using electricity with low resources. Below are recommendations on how to continue benefiting from using modern fuels without having to revert back to using the less efficient, dirty fuels.

Scenario

LPG

Electricity

Shared meter



LPG helps save electricity credit. Control energy usage without the housemates interference. No power blackout interference when cooking. But is not cost efficient for long cooking dishes.



Use energy-efficient appliances like the EPC and show your landlord this cookbook so they can see how little electricity you really need to cook.

Low credit/units



Households can stack efficient appliances and fuels such as EPC and LPG to extend how long the electricity credit/units last. The EPC consumes less energy and can be used to cook all dishes when electricity is available. LPG is a clean backup for when there is a power outage



Living or moving to an unelectrified house



Plan to purchase and use LPG. Advantages include: it is clean and safe to use indoors; and setup in the kitchen is easy (i.e. no wiring involved.)



Install a solar electric cooking system. The cost of solar PV and battery storage have fallen substantially in the past 10 years, making solar eCooking increasingly affordable.

Myth Buster: LPG

Precious

Precious had reservations about cooking with LPG, so she spoke to Clement to help her find out the truth

VS.

Clement

Clement has been cooking with LPG for some time now, so he helped shed some light on things

Lighting

“

I am afraid to light a gas stove in case I do it wrong and burn myself.

”



Safe lighting practices



If the appliance does not have any automatic ignition, turn on the appliance by lighting the match first and holding it close to the edge of the burner, then turn the knob to let the gas out.

”

Availability

“

I don't think LPG is available near me.

”



Expanding supply chain



The LPG supply chain continue to show an upward growth trajectory in urban Zambia with more players entering the LPG market as off-takers. Currently, there are 8 distributors (e.g, Cadac, Mount Meru, Oryx etc) supplying LPG for either commercial or household use.

”

Gas leaks

“

I'm worried that gas will leak out and cause an explosion.

”



Safety tips



Place cylinders in a well-ventilated area and away from sources of ignition. Check for leaks regularly using water with soap. Ensure the regulator is securely connected to the cylinder valve. Replace the regulator every 5 yrs & the hose every 2 yrs.

”

Zambia's Modern Energy Cooking Future: The Clean Fuel Stack

LPG and energy-efficient electric appliances offer complementary cooking experiences:

LPG offers a manual cooking experience where you can quickly fine tune the heat levels. EPCs offer an automatic cooking experience that allows you to put your feet up.

When the power is out, you can still cook with gas. Likewise, when the cylinder is empty, you can still cook with electricity.

EPCs are the most cost-effective option for dishes that require boiling, however LPG is much more versatile for different types of frying that require different heat levels and different shape utensils.



By using LPG and energy-efficient electric appliances together in your kitchen, you'll have a much better chance of getting dinner on the table on time. Since both are clean fuels, you can also ditch the charcoal and keep your kitchen completely clean!

