



Uganda eCooking Market Assessment

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Lead authors: Martin Price, Meron Tesfamichael and Vimbai Chapungu

With contributions from:

MECS Uganda Team: Agnes Naluwagga

EnDev/GIZ Uganda Team: Ruth Victoria Butegwa, Florent Eveille, Helen Kyomugisha, Pia Hopfenwieser

MECS Workstream Leads: Jon Leary, Matt Leach, Nick Rousseau, Simon Batchelor

EnDev eCooking Team: Gregor Brömmling, Simone Fehrenbach, Verena Brinkmann

EnDev/MECS eCooking Market Assessments

- Part of a series of publications produced jointly by Energising Development (EnDev) and the Modern Energy Cooking Services (MECS) Programme.
- Strategic insight on the current state of electricity access and clean cooking, identifying the key opportunities and challenges to the scale up of eCooking in 8 countries across sub-Saharan Africa and South Asia.



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Overview

- Summary of the opportunity for eCooking in Uganda
- Clean cooking & electricity access
- Deep dive into:
 - Enabling environment
 - Consumer demand
 - Supply chain
- Recommendations for strategic interventions

Summary

- Despite historically **low electrification rates**, cooking with electricity is now becoming a viable and scalable option for Uganda.
- **24% of households** now have access to grid electricity and **27% use off-grid sources such as solar systems.**
- **Significant investment in generation capacity** has helped to mitigate against the country's dependency on hydropower, which in 2005 led to significant, drought-induced load shedding and power outages. The total installed generation capacity doubled from 600 MW to 1200 MW between 2010 and 2019.
- Uganda today produces **an electricity surplus of almost double current demand** and is proactively stimulating demand for its predominantly renewable (92%) electricity.
- **21% of Ugandans use charcoal as their primary cooking fuel**, however intensive charcoal production is depleting forests and the population is set to double by 2050. Charcoal users are an attractive market segment to target as they have a guaranteed existing expenditure on a polluting fuel that could be repurposed to electricity units.
- As a result, the government of Uganda has put in place an array of policies and **targets to facilitate the transition away from biomass**, including the Draft Energy Policy (2019), which made specific mention of energy-efficient eCooking appliances.

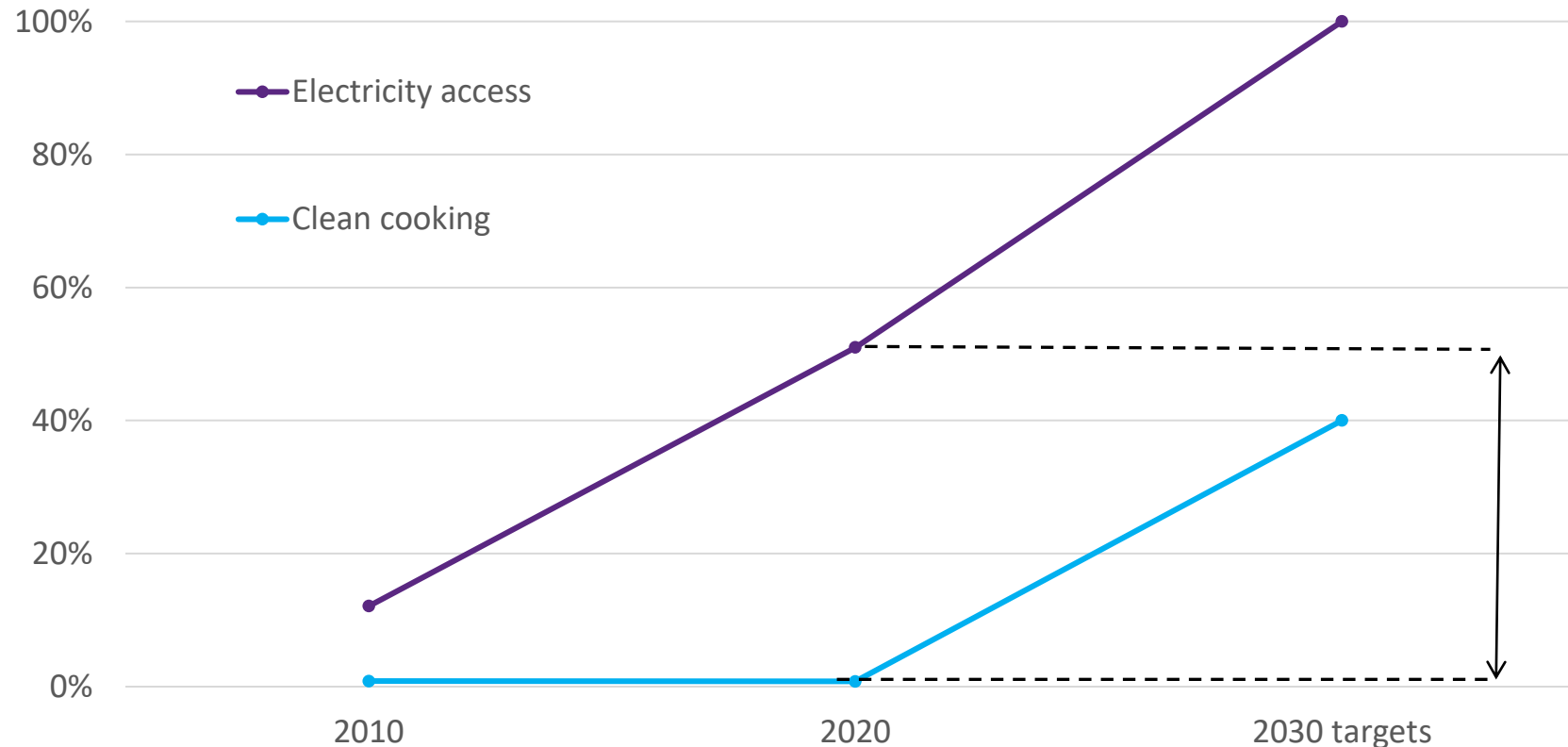
The clean cooking challenge

- At present, the vast majority of Ugandan households use either firewood (73%) or charcoal (21%) as their primary cooking fuel (AEPL,2021).
- Intensive charcoal production is depleting forests and the population is set to double by 2050.
- Currently only 1.4% of households in Uganda use electricity and alternative non-biomass fuels such as LPG as their primary cooking fuel.
- In urban areas, 4% of households use electricity as their primary cooking fuel (6% in Kampala), and yet 74% of have access to electricity (Uganda Bureau of Statistics, 2021).

The opportunity for eCooking

- The last decade has witnessed a significant increase in electrification in Uganda, with total installed generation capacity doubling from 600 MW to 1200 MW between 2010 and 2019.
- Electricity in Uganda derives mainly from large scale hydropower (68%) and mini-hydro solutions (16%), with thermal, cogeneration, and grid-connected solar account for the rest ([ERA, 2020](#)).
- Significant investment in generation capacity has helped to mitigate against the country's dependency on hydropower, which in 2005 led to significant, drought-induced load shedding and power outages.
- In contrast to 2005, when electricity demand was double the supply available, Uganda today produces an electricity surplus of almost double current demand of 680MW ([AEPL, 2020](#)) and the major electric utility, Umeme, is proactively seeking ways to boost household demand, i.e. through the use of electricity for cooking.
- Uganda has a sizeable and well-financed SHS sector which may lay the foundations for a future profitable business model for off-grid eCooking solutions.

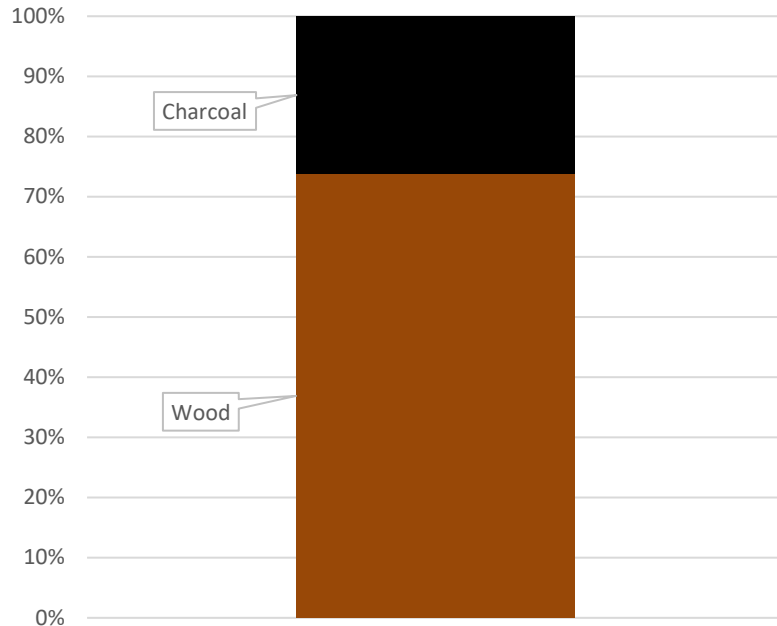
Clean cooking and electricity access in Uganda



50% now
connected to electricity,
but still primarily cooking
with polluting fuels

Cooking energy

0% cook primarily with electricity

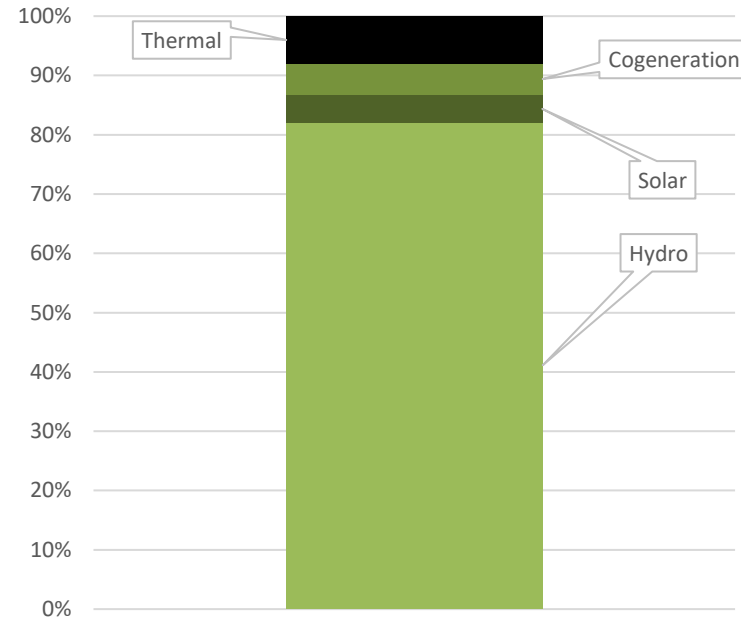


26% cook primarily with **commercialized** polluting fuels (charcoal)

100% cook primarily with polluting fuels (charcoal & firewood)

Electricity generation (on-grid)

92% renewable

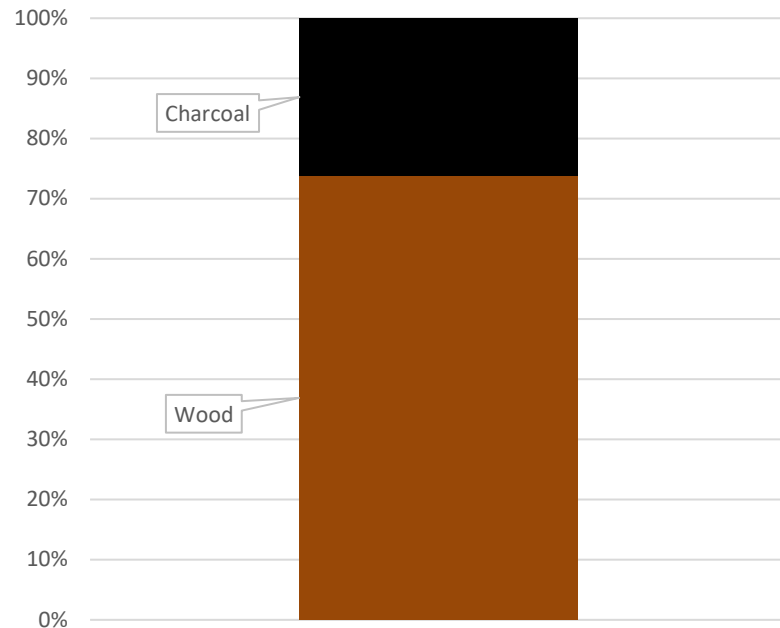


76% (520MW) surplus power generation

Increasing reliability: 65% power availability (SAIDI*SAIFI=3,072hrs/yr)

Cooking energy

0% cook primarily with electricity



26% cook primarily with commercialized polluting fuels

Electricity generation (off-grid)

Rapidly developing mini-grid and off-grid sectors:

- **0.1m** mini-grid customers
- **36** mini-grid developers
- **5m** off-grid lighting/appliance customers

MECS eCooking GMA viability scores/rankings

- GMA = Global Market Assessment
- Scored all low & middle income countries using international indicators for:
 - economics (clean fuels, market size, financial sector strength)
 - human (policy, health, gender, development, business environment)
 - infrastructure (electricity access, reliability, RE share)
- MECS.org.uk/GMA

Uganda	Overall:	On-grid eCooking:	Mini-grid eCooking:	Off-grid eCooking:
	32nd/130	0.45 – 88th/130	0.38 – 39th/130	0.48 – 7th/130

Key opportunities

- Uganda has a sizeable and well-financed SHS sector which may lay the foundations for a future profitable business model for off-grid eCooking solutions.
- Electricity utility Umeme are pro-actively looking at electric cooking as a way of boosting electricity demand.
- Uganda continues to accelerate rapidly with electrification as installed capacity is set to increase substantially from a variety of sources, however this includes the country's first nuclear plants
- The integration of electrification and eCooking in the NDPIII.
- Energy efficient appliances are highly compatible with Ugandan cuisine, in particular the EPC, which can drastically reduce energy consumption for the most energy intensive dishes (heavy foods).
- Integration of the East African Community (EAC), suggesting common trade policy relating to the importation of electric cooking appliances.

Key challenges

- Mini-grid sector at a nascent stage
- Duties on solar products and suitable electrical appliances constrain the off-grid energy market
- Limited lifeline allowance causes affordability issues for some consumers
- Military, state and business elite involvement in charcoal production creates a disincentive for top-down strategies for clean fuel adoption.
- The perception that electricity is too expensive for cooking is deeply embedded in society.

Potential impacts of scaled uptake in most viable market segment

- If 40% of Uganda's grid-connected charcoal users (7.8m ppl, 1.7m HHs) switched to eCooking, the [WHO's BAR-HAP](#) tool suggests that:
 - **6,115 DALYs/yr** avoided
 - **9.4m tonnes/yr CO₂eq** emissions reduced
 - **1.7m tonnes/yr** reduction in unsustainable wood harvest
 - **1,041m hrs/yr** of women's time saved (593hrs/HH/yr)
 - **11 months payback** for eCooking appliances (\$70/HH upfront cost, \$77/HH/yr savings on fuel energy costs)
 - **892 GWh** demand for electricity stimulated



Enabling environment

Enabling environment

- **eCooking policy outlook:** promising policies in place to integrate electrification with clean cooking with the hope of tackling both issues simultaneously.
- **Key policy stakeholders:** Electricity Regulation Authority (ERA), Ministry for Energy and Mineral Development (MEMD), African Development Bank (AfDB),

RISE (Regulatory Indicators for Sustainable Energy) scores:

74%	72%	54%	19%
Electricity Access	Clean Cooking	Renewable Energy	Energy Efficiency

eCooking cuts across all 4 pillars

Targets:

Electricity access
100% electricity access by 2030
(grid/off-grid)

Increase annual electricity
consumption from 100kWh per
capita by 2030

Clean cooking
40% clean cooking access by 2030

Key government/NGO programmes creating the enabling environment in which eCooking can scale

- The Energy Development Programme of Uganda's Third National Development Plan (NDPIII)
 - Seeks to reduce the share of biomass for cooking, increase electricity access and enhance grid reliability.
 - 2019 draft National Energy Policy (NEP) makes specific mention of EPCs as a new efficient technology that should be promoted alongside LPG, biogas, and solar cookers.
- MEMD's Charcoal to Power initiative began implementation in July 2021 with the aim of transitioning 500 institutions (and eventually 50,000 households) to electric cooking.
- Umeme hoping to launch a demand stimulation programme around eCooking

Key barriers/drivers in the enabling environment

Drivers

- The integration of electrification and eCooking in the NDPIII & Draft Energy Policy is a significant step forward to eCooking in Uganda.
- Successful economic growth rates, poverty reductions and consequently increased energy access.

Barriers

- Military, state and business elite involvement in charcoal production creates a disincentive for top-down strategies for clean fuel adoption.

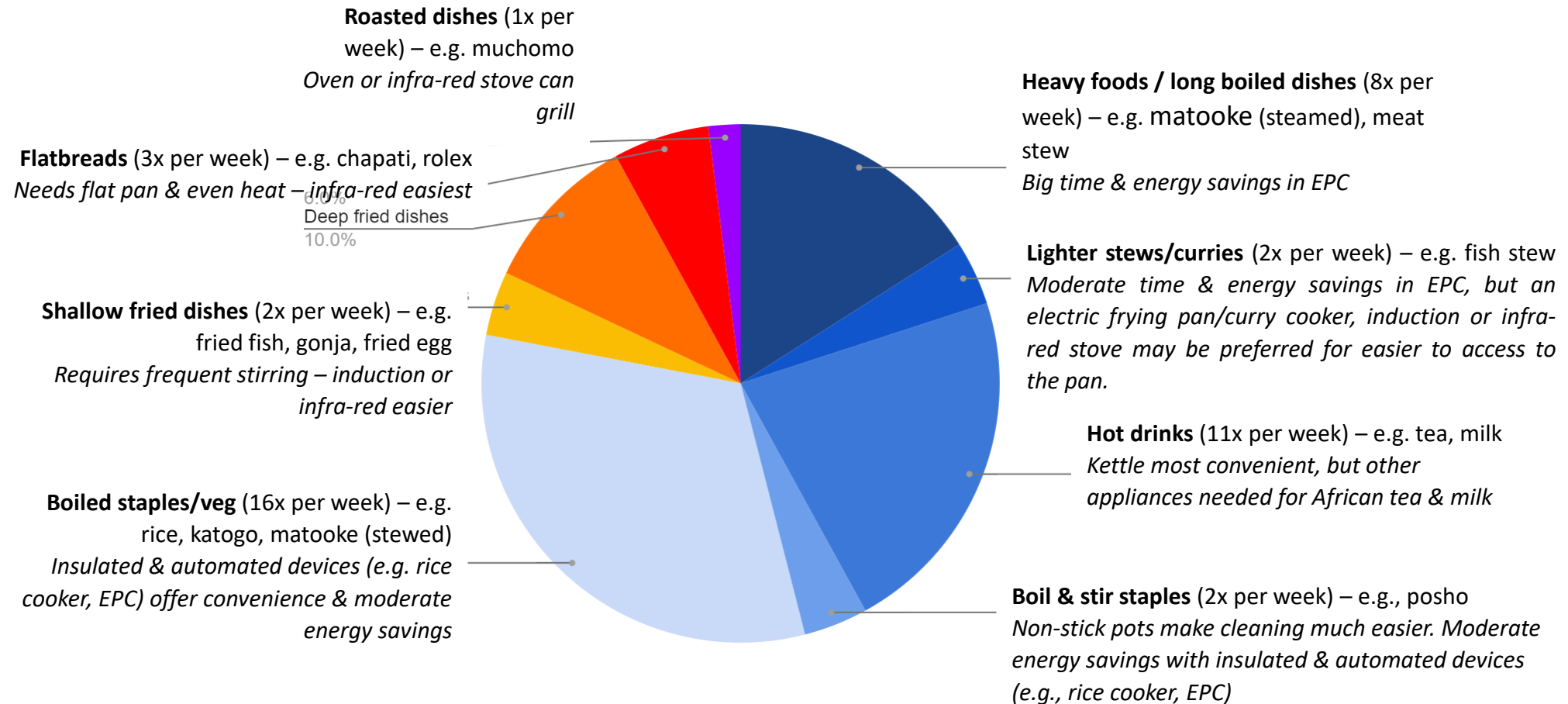


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Consumer demand

Consumer demand

In an average week, a typical Ugandan household might prepare:



Popular meal combinations in Uganda

- A typical Ugandan meal usually pairs a staple food with *erani* (relishes).
- The choice of staple foods is seasonally affected based on affordability and availability. Popular staples include *emere* (maize) or *posho* (millet), as well as rice, potatoes, cassava or matoke. Most staples are boiled or stewed, meaning that they are well-suited to an EPC (with or without pressurising) or a rice cooker.
- *Matooke* (banana variety that is usually steamed and mashed) is culturally significant in Uganda particularly in central and western regions. Steamed matooke usually takes several hours to prepare, but this time can be cut in half with an EPC.
- The eriani (relishes) dishes typically consist of groundnut flour, green vegetable or beans, onions, tomatoes and when available, meat/fish stew. These relishes are usually fried and/or boiled. Some require boiling for several hours (e.g. beans), making them well suited to the EPC, however others are fried and require frequent stirring (e.g. green leafy vegetables), so induction/infra-red may be preferred for easier access.
- Most viable energy-efficient appliances: **EPCs, rice cookers, induction, infra-red, kettles**

Demand creation

- Key marketing messages:
 - Energy-efficient appliances offer substantial time and cost savings and enable multi-tasking.
 - EPCs are the cheapest and most convenient way to cook heavy foods.
- Key demand creation programmes
 - Umeme hoping to launch a demand stimulation programme around eCooking.

Key market segments

- *Charcoal users*

- 26% of Ugandan households rely on charcoal for their cooking needs, the majority of whom are located in urban areas and are now connected to the national grid.
- Unlike firewood, charcoal is almost always purchased, creating an attractive existing expenditure to convert into electricity units. Despite Uganda still having cheaper charcoal than its neighbours in the region, the price of charcoal has increased. For example, a standard 50kg bag of charcoal has increased from 20,000 to 30,000 shillings (5 to 7 EUR) in Kabale district (western region of Uganda). They can go for more in Kampala and Masaka (southwest of Kampala).
- Charcoal is typically preferred for heavy foods, as it burns slowly and many people still believe it is the cheapest way to cook them. The EPC offers a highly attractive modern alternative that can greatly reduce expenditures on cooking fuel, however the upfront cost is a substantial barrier for many who use charcoal, which can be purchased in small quantities.

Key market segments

- *Electricity & LPG users*
 - *According to Rhamz International, fuel satisfaction for electricity and LPG respectively in institutional settings is significantly high with 47.2% claiming satisfaction with electricity and 58.5% for LPG. Affordability is the main reason for the high uptake.*
 - *However, the rate of uptake in households is low due to high costs, lack of awareness and limited supply of fuels and devices. In the sample produced by Rhamz International, only 16.6% used electricity and less for LPG (13.5%) for some of their cooking needs, however charcoal and fuelwood remained a primary fuel.*
 - *High tariffs and appliance costs mean affluent households gain the benefits of eCooking, particularly adding the fact they have more reliable electricity supply.*
 - *CREEC found that typical Ugandan dishes cooked on an EPC are 2-4 times cheaper than cooking on an electric hotplate.*

Key demand side barriers/drivers

Drivers

- Energy efficient appliances are highly compatible with Ugandan cuisine, in particular the EPC, which can drastically reduce energy consumption for the most energy intensive dishes (heavy foods).
- The removal of VAT on LPG in 2020 has made LPG more affordable, which increases the viability of a completely clean fuel stack of LPG and electricity.
- Research conducted by CREEC/MECS showed that participants are willing to continue using the EPC due to the high efficiency of the appliance and participants keeping with budget on their energy consumption.

Barriers

- Low-income households feel pressure to reduce their fuel consumptions with cooking, therefore would often substitute slow-cooked foods for quick foods such as eggs.
- The perception that electricity is too expensive for cooking is deeply embedded in members of society.



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Supply chain

Supply chain

- **Key domestic eCooking appliance manufacturers:**

- N/A

- **Key eCooking appliance distributors:**

- Bamukungu Enterprises Limited, Anisuma Traders Limited, Appliance World Limited, Translink (U) Ltd, Mr. Ronald Musekura

Innovative eCooking pilot projects

- Pesitho ApS- build solar-powered community kitchen in refugee settlements. Additional funding from the Humanitarian Innovation Fund and ELRHA is allowing the company to expand its PAYC (Pay-as-you-cook) systems and carbon credit schemes.
- Energrow – MECS Electric Cooking Outreach (ECO) project in partnership with Burn Manufacturing aiming to sell EPCs to 200 households using their utility-enabled financing model.
- MEMD- Charcoal to Power initiative; a five-year programme which started in July 2020 - aiming to transition 500 institutions to eCooking and other clean fuels including LPG, biofuels and sustainable charcoal.
- ERA- working with UNDP Uganda to transition part of Mulago Hospital from biomass to electric cooking.
- Umeme- Uganda's primary electric utility sought to promote electric cooking to promote overall household consumption and enable affordable electricity tariffs. Piloted EPCs in Kampala and collaborated with EnergGrow, working on consumer finance schemes.
- UpEnergy- developed customised EPC product for the Ugandan market. Pilot Study in collaboration with PowerUp is due to commence October 2021.
- CREEC- preparing to pilot battery-supported grid-connected and solar electric cooking systems in weak-grid and off-grid regions respectively.

Key supply side barriers/drivers

Barriers

- Common External Tariff (CET) makes implementing tariff reductions for electrical appliances just for Uganda difficult.

Drivers

- Integration of the East African Community (EAC) has been increasing steadily, suggesting common trade policy relating to the importation of electric cooking appliances.
- Uganda continues to accelerate rapidly with electrification as installed capacity is set to increase substantially from a variety of sources, including the country's first nuclear plants, which will add 2,000 MW of power generation

Popular appliances in Uganda today

- The category imported in greatest number is the oven/cooker (nearly 1 million units in 6 months), with 27 different models available for sale. The cheapest models available were all above \$100 (USD) and the most expensive cost between \$300-600.
- Kettles are also imported in large numbers (just over 400,000 in 6 months), with 33 different models available. These sell for between \$10-40.
- Hotplates and rice cookers are the next largest category in terms of imports (167k and 140k, respectively). Hotplates are selling at between \$15-70.
- Induction stoves have a very small footprint in Uganda with just over 7,000 imported and only two models available across the selected retailers – costing \$49.

Table 1: Import volumes and typical retail prices for selected eCooking appliances in Uganda.

Appliance	Sales volumes (Jul-Dec 2019 import data)	Typical retail price (MECS Appliance Availability Survey – Ugandan online retailers)
Oven/cooker (elec & elec/gas)	930,469	350,000-2,100,000 UGX (100-600 USD)
Hotplate	167,381	50,000-250,000 UGX (15- 70 USD)
Rice Cooker	140,226	n/a
Kettle	404,110	35,000-140,000 UGX (10-40 USD)
Electric Pressure Cooker (EPC)	2,300	90,000-350,000 UGX (25- 100 USD)
Induction/infra-red stoves	7,000	180,000 UGX (49 USD)

Popular appliances in Uganda today

- Only 2,300 EPCs were imported in the 6-month period in 2019, showing that these represent a very small fraction of the market for electric cooking devices, despite there being over 20 different models available in the retailers we studied. These vary in price from \$25-100.
- The main features highlighted in the promotional text were warranties, energy efficiency, durability, control and capacity.
- The data indicates that there is no one dominant importer of electric cooking devices, with the five companies listed above sharing over 70% of the market. Over half (57%, by value) are imported from China.

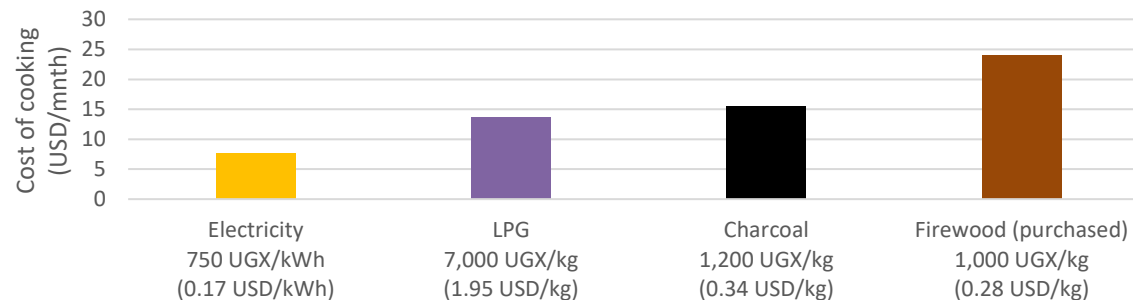
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Relative cost of eCooking vs. popular cooking fuels

Research by CREEC (2020) shows that:

- The EPC can save half the time and 60-90% of the cost on dishes with a long boiling stage. Cooking staple foods such as matooke and beans stew, an EPC uses 3x less energy than other popular cooking devices.
- For vegetables or dishes that generally take a short time (and involve frying), the EPC uses – more or less – the same amount of energy as the other cooking devices. However, comparing with LPG, cooking with an EPC still costs significantly less.
- Cooking typical Ugandan dishes in an EPC is 2-4 times cheaper than an electric hotplate, which in turn is cheaper than LPG.



Grid electricity tariffs:	
• Regular (>15kWh/month):	750 UGX/kWh (0.17 USD/kWh)
• Lifeline (<15kWh/month):	250 UGX/kWh (0.07 USD/kWh)
Mini-grid tariffs:	
Private sector avg.: n/a	

• Figure 1 suggests that cooking all your food with grid electricity is already the cheapest way to cook in Uganda.



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Recommendations for strategic interventions

Recommendations

	Current status	Recommended interventions
On-grid	Utility keen to stimulate demand for surplus electricity, but the cost of appliances and electricity are an important barrier.	Support Umeme to develop a cooking with electricity demand stimulation programme, including appliance/ service bundling and special tariffs to encourage electric cooking.
Mini-grid	Incentives for mini-grid developers are lacking, and the sector remains at a nascent stage of development, with a regulatory framework in draft form.	Conduct an electric cooking pilot in rural Uganda, building on MECS pilots in other countries, beginning with food enterprises and expanding to households if/when appropriate
Off-grid (SHS)	Pesitho piloting SHS eCooking in humanitarian settings.	Support Pesitho to expand SHS piloting outside of the humanitarian space.

Recommendations

	Current status	Recommended interventions
TToC dimensions	Supply chain eCooking appliances are expensive to consumers, as they are imported and subject to a range taxes and duties	Support PowerUp (UpEnergy) to reduce appliance costs by accessing carbon finance for eCooking leveraging the new streamlined Gold Standard methodology for eCooking. Develop and deploy a Results Based Financing programme for EPCs, similar to the EnDev/CLASP EPC RBF programme in Kenya
	Consumer demand Early pilots indicate cultural compatibility of EPCs with local cuisine, but most consumers unaware of this new appliance.	Set up consumer awareness campaigns involving a blend of live cooking demonstrations, TV and social media. For example, MECS featured content on EPCs on Shamba Shape Up in Kenya, which has now expanded into Uganda.
	Enabling environment There are no specific policy targets for electric cooking, and the policy focus on modern energy remains focused on LPG.	Host regular eCooking policy dialogues with the Ministry of Energy to disseminate research findings and facilitate the development of evidence-based policy for eCooking.



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Find out more

Visit www.MECS.org.uk or <https://endev.info> for:

- The full Uganda eCooking Market Assessment
- The full set of 8 country studies
- Cross-country comparison
- Impact modelling methodology
- Guiding framework

