

Uganda's LPG Fuel Market Assessment

Assessing M-KOPA's fit in Uganda's LPG value chain to increase access to modern cooking

MECS and M-KOPA Labs are exploring how to provide LPG cooking for 2.5M Ugandan households

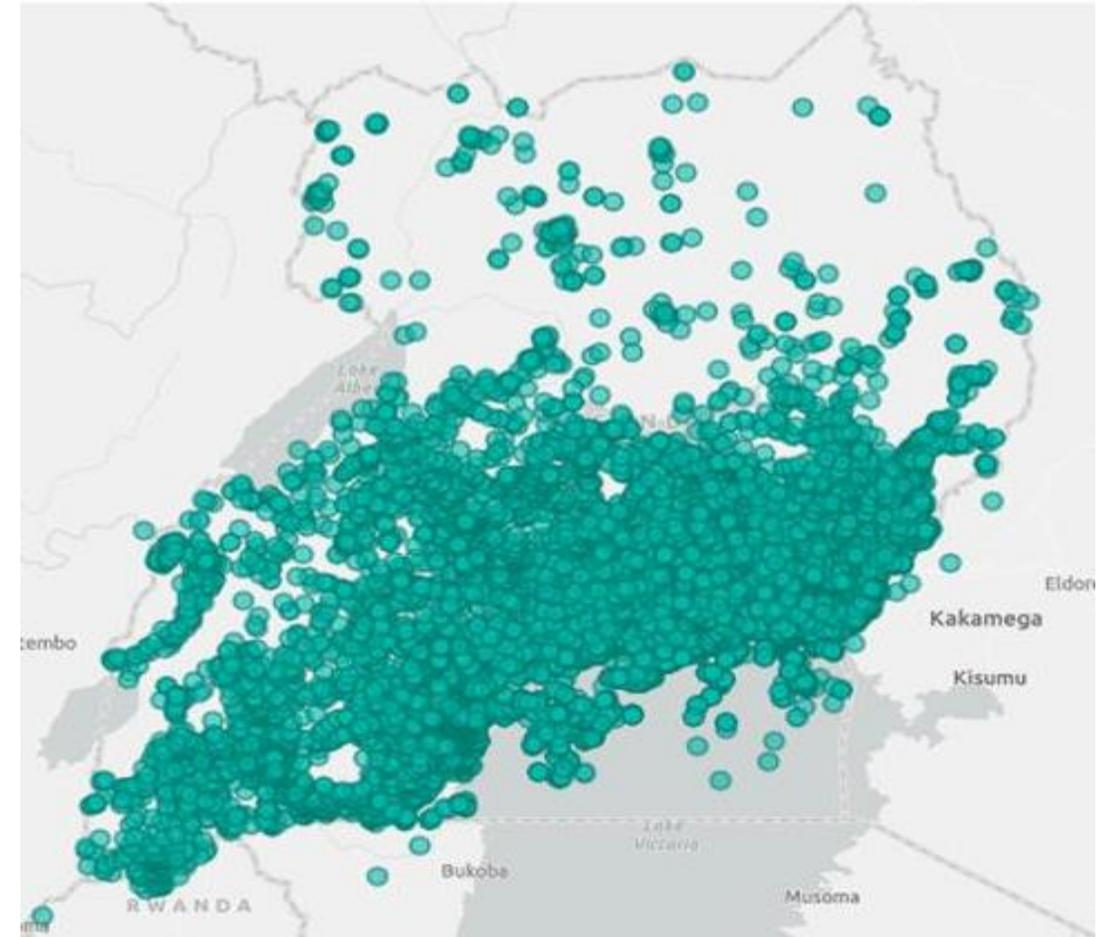
- ▶ MECS and M-KOPA share a common vision to displace the toxic use of charcoal cooking in Ugandan kitchens with LPG to generate household savings, CO2 reductions, and improved health
- ▶ To achieve this outcome, M-KOPA LABS, the dedicated R&D arm of M-KOPA, set out to uncover and evaluate the demand and supply side challenges and opportunities related to the adoption of LPG fuel for daily cooking needs
- ▶ Evidence is thin for the Uganda market, therefore Labs liaised with Carbon Trust and Energy4Impact to identify the macro-level factors influencing the market, while Labs conducted primary research amongst M-KOPA's Ugandan customers to understand micro-level influence factors linked to the uptake of LPG fuel
- ▶ The goals of this study are to:
 - ▶ Estimate the market potential for LPG usage for cooking by households in Uganda
 - ▶ Develop a top-down and bottom-up view of the opportunities and challenges to expand the use of LPG cooking in Uganda
 - ▶ Outline where and how the role of M-KOPA's PAYG financing platform can drive adoption

Exec Summary: Uganda's weak LPG distribution and low price of charcoal limit PAYG feasibility

- ▶ Uganda's LPG market is significantly underdeveloped in the East African region, despite its steady growth
 - ▶ LPG grew 13.4% between 2016-18; yet it consumes one-tenth the LPG consumed in Kenya
 - ▶ 1% of Ugandan households cook with clean fuels (LPG, ethanol and biogas); 70% of whom cook with LPG
- ▶ Key barriers to LPG adoption include 1) low prices of alternative fuels, which are better suited to local cooking styles and 2) high distribution costs which are passed on customers by retailers
 - ▶ Charcoal suits a slow cooking style which matches 60% of the traditional Ugandan cuisine, whereas LPG is suitable for fast cooking. Given their opposing fuel-meal fit, LPG is not like to be a suitable substitute for charcoal in Ugandans' preferred fuel stacking mix. However, anecdotal evidence suggest a Ugandan household's price sensitivity means charcoal is also used for fast cooking for reasons related to cost, not preference.
 - ▶ As a land-locked country, Uganda is exposed to higher distribution costs. Transport from Mombasa to Kampala adds c.\$0.18 per kg for customers
- ▶ Despite the challenges, customers aspire to cook cleaner and there are signs of a growing market spurred by Government policies
 - ▶ 61% of surveyed M-KOPA Uganda customers would prefer to cook with LPG versus charcoal (n=200)
 - ▶ Government support: 18% VAT scrapped for LPG and completion of benchmark surveys for a National LPG program

M-KOPA has a strong interest and ability to serve a large base within Ugandan with modern energy cooking services

- ▶ M-KOPA PAYG SHS provides affordable, safe and clean energy to 118,000 homes (or 590,000 individuals) in Uganda.
- ▶ Population: 43 million (2018)
- ▶ No. of Households (HHs): 10 million HHs
- ▶ Urban population: 2.5 million HHs
- ▶ Urbanization rate: 5.7%
- ▶ National electrification rate: 18.1% (2018)
 - Urban electrification rate: 71.2%
 - Rural electrification rate: 8%



M-KOPA's distributed sales network extends nation-wide, achieving one of the highest penetrations of solar lighting, TVs and Fridges in Uganda, and could support deployment of more value-add goods and services



Uganda's LPG Market Overview & Potential

Uganda's low energy access level and high cost of energy mirror the access and affordability barriers for modern cooking fuels

0.7% of Ugandan households use LPG to cook, with access and use strongly correlated to urbanity

Electricity Access:

- ▶ Nationally, <20% of the population has access to grid electricity, as the distribution network has yet to reach beyond urban centres
- ▶ Even for households with grid access, the cost of service is prohibitive for many lower-income customers.
- ▶ However, Uganda has the lowest lifeline tariff in the region, which is a subsidized rate to cover basic electricity needs for the first 15 kwh/month. After which, the cost of electricity more than triples. In contrast, Kenya's lifeline tariff covers the first 50 kwh/month units and Tanzania's the first 75 kwh/month.

Clean Fuel Access:

- ▶ Uganda has one of the highest prices for LPG in the East African region. In 2016/17, the retail price of LPG was \$2.6/kg in Uganda v. \$1.6/kg in Kenya
- ▶ 95% of Ugandan households rely on charcoal, wood, or other forms of biomass for their household cooking needs (UBOS, 2017)
- ▶ SE4All forecasts that the use of clean fuels will grow by 10 times to 7.5% of cooking access by 2030, representing just over 1 million households.
- ▶ The remaining 12.2 million households (88.7 % of the total) are expected to continue to cook with wood and charcoal.

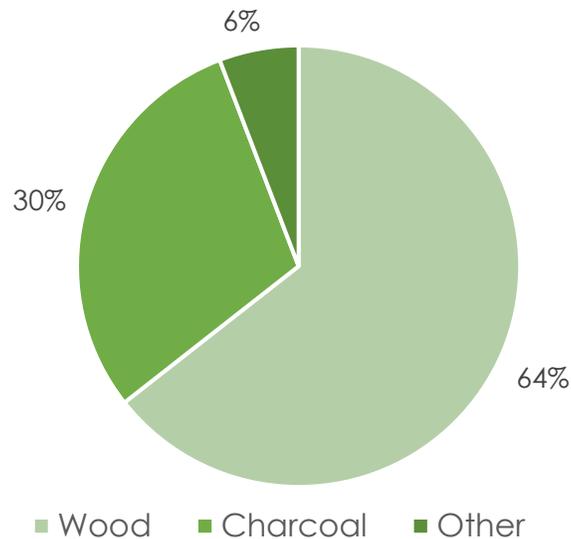
Year End	2018	2030
Population (millions)	37.7	55.4
Households (millions)	8.9	13.8
Grid access (%)	19	47
Mini-grid access (%)	0.04	0.5
Stand alone solar access (%)	19	52.8
Clean fuel usage (%)	1.3	7.5
ICS Usage (%)	4.2	100

Source: Taking the pulse of energy access in Uganda (SE4All, 2019). End-2030, figures reflect model outputs for the forecast scenario

Ugandan's cooking fuel preference is defined by availability, strongly linked with urbanity

The different mixes of fuel/stove stacking in rural and urban areas is influenced by local access and, consequently, price of fuel

Uganda's Cooking Fuel Mix



Fuel Type	National (%)	Urban (%)	Rural (%)
Wood	64.4	22.3	80.8
Charcoal	29.8	66.4	15.5
Other	5.8	11.3	3.7

Other includes electricity, kerosene, LPG, etc

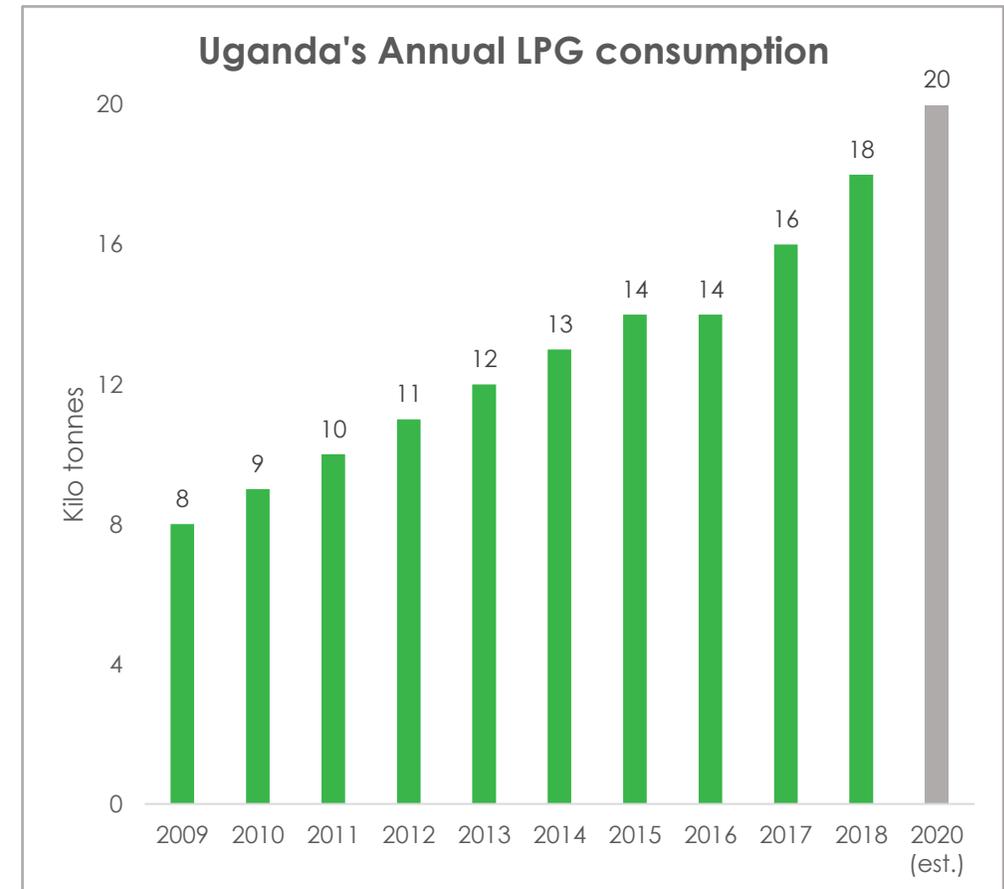
- ▶ Kampala, with 0.35M households, has the highest use of 'other' fuels at 20% and charcoal use at 79.4%
- ▶ The use of 'other' fuels has risen by 2.4% from 2012 to 2016 in urban areas.

For M-KOPA, this illustrates the need to focus a PAYG LPG proposition on needs of urban customers who are aware of this fuel type and have aspiration to displace charcoal with a price-competitive, higher-quality cooking fuel

LPG consumption in Uganda has doubled since 2010, with home kitchens representing the lion share of demand

LPG consumption grew an average of 13.4% between 2016-2018, and continues to trend upward

- ▶ c.83% of LPG consumption in Uganda is for domestic cooking, representing approximately 15 kilo tonnes of fuel in 2018
- ▶ Uganda's estimated 2020 LPG consumption level grew to 20 kilo tonnes
- ▶ Key macro factors are expected to shift demand upward:
 - ▶ 25% of the population is urban and growing by 5.7% annually, putting more Ugandans within reach of LPG for stacking
 - ▶ Greater awareness and aspiration for modernity increases the desirability of LPG for end customers
 - ▶ Government interventions set to make modern fuels price-competitive with charcoal



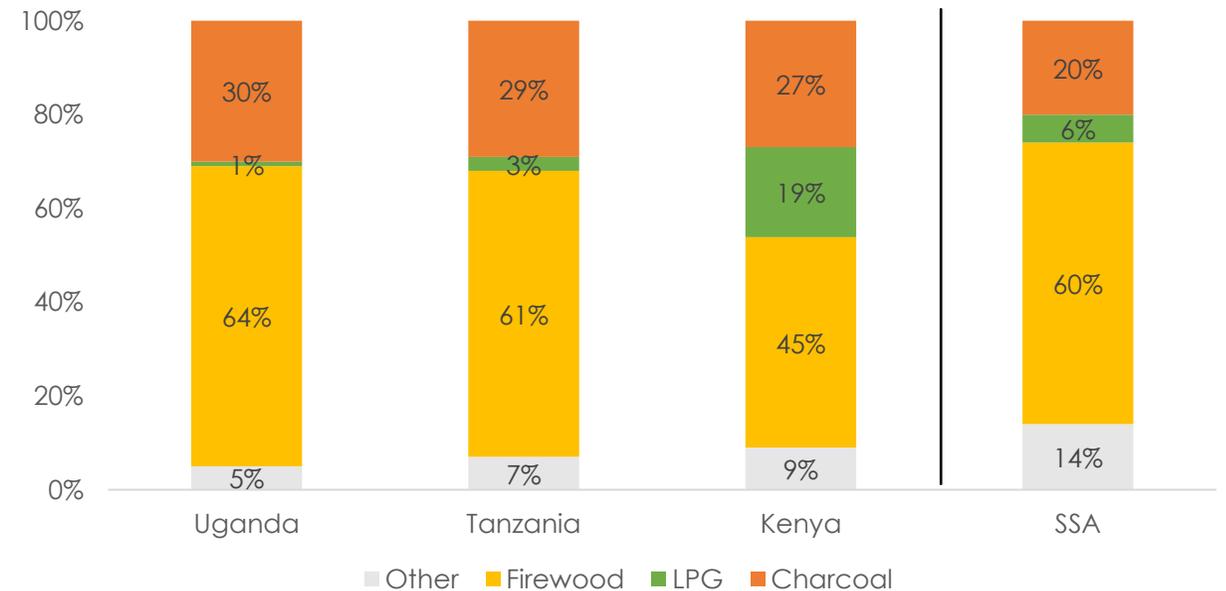
Source: World LPG Association (2019). Statistical Review Of Global LPG. [private report]

Despite its market growth, Uganda's LPG market is still nascent compared to other East African countries

Uganda's small urban population and lower GDP per capita are critical barriers to LPG growth

- ▶ Uganda's LPG penetration is 1/20th that of neighbouring Kenya and 5 points less SSA average
- ▶ Like most African countries, Uganda's landlocked position makes LPG less accessible as weak infrastructure poses challenges to cost-efficient delivery
- ▶ Comparatively, Uganda uses a higher percentage of firewood compared to SSA (64% vs. 60%) likely due to a higher percentage of the population living in a rural setting (75% vs. 59%) where this fuel is collected and not paid for
- ▶ Even though Uganda and Tanzania have similar LPG penetration, Tanzania has 5x more LPG cylinders in circulation than Uganda
- ▶ Uganda has a significantly higher usage of charcoal than the SSA average (30% vs. 20%)

Fuel Mix of East African Nations and SSA



GDP Per Capita (2019)	\$2,271	\$2,770	\$4,509	\$3,919
Urban Population	25% (2.5M HH's)	35% (4.6M HH's)	28% (3.6M HH's)	41%
Est. LPG cylinders in circulation	400,000	2,000,000	7,000,000	N/A

The Bukasa port on Lake Victoria planned for completion in 2030 expected to realise significant cost efficiencies for LPG imports

Constraints

Uganda's position as a landlocked country makes it reliant on imports through its neighbours.

Lack of economies of scale, lower in-come levels, and higher distribution costs mean that the rural and remote market is broadly associated with higher risks and lower returns.

Market is quite small – players charge a premium to a few customers for infrastructure investments which makes the price high.

Low volumes of cylinders and reluctance to make large investments in a small market. Lack of availability of working capital to increase cylinder pools.

Drivers

The economics of LPG are becoming increasingly attractive as charcoal prices rise.

Some landlords in Kampala prohibit the usage of charcoal in their buildings driving households to switch to LPG or electricity.

Planned infrastructure investments including upgrading rail linkages and ports on Lake Victoria to be completed in 2030.

Development of standards and regulation could mean safety becomes less of a concern.

A planned government programme will reduce the upfront cost of cylinders and build awareness with end users.



LPG's price competitiveness relative to alternative fuels

Ugandans prefer charcoal because it strongly suits the local cooking style

Fuel choice depends on cooking style, LPG is used for fast cooking and costs too much for slow cooking

- ▶ There is a trend for cooks to increasingly use charcoal as the day goes on and, conversely, less LPG
- ▶ Reason being, Uganda's cooks prefer LPG at breakfast for fast cooking (e.g., eggs, tea) and charcoal for lunch and dinner which are traditionally slow cooked meals (e.g., matoke, beans). The table shows that charcoal usage rises 12% over the course of the day, whereas LPG usage falls 16%.
- ▶ Hence stacking charcoal and LPG for cooking needs is prevalent amongst Ugandans for their complementary cooking styles. This is likely explained by combination of recipes eaten at lunch and dinner, which are a mix of slow and cooked dishes.

	Charcoal	Electric	Kerosene	LPG	Char+LPG	Char+Elec	Elec+LPG
Breakfast	20%	5%	2%	31%	25%	2%	6%
Lunch	25%	5%	1%	27%	26%	10%	0%
Dinner	32%	6%	1%	15%	37%	11%	0%

Source: MECS report [Cooking with Electricity in Uganda: Barriers and Opportunities](#).

Charcoal's use as a single form and in a dual-fuel stack (either with LPG or grid) reinforces customer's strong dependency and cultural tie to this traditional fuel.

LPG is less price competitive than other cooking fuels

The 1,150km LPG journey from Mombasa to Kampala adds an additional freight cost of \$0.18 per kg

- ▶ The \$2.27 price of LPG in Uganda is higher than in neighbouring countries such as Kenya and Tanzania where end-user price is 40% less, or ~1.4 USD per litre
- ▶ Charcoal prices are also lower than in neighbouring countries – for example charcoal in Nairobi costs close to 0.5 USD/kg, 60% more than price in Kampala
- ▶ Charcoal prices increased by almost 30% in 2017 and are likely to increase further due to growing transportation expenses
- ▶ VAT was removed from LPG in the 2020/21 financial year budget. It was previously charged at 18%
- ▶ As a result, LPG prices will reportedly drop to 38,000 UGX for a 6 kg refill, which would be \$1.7 USD / litre

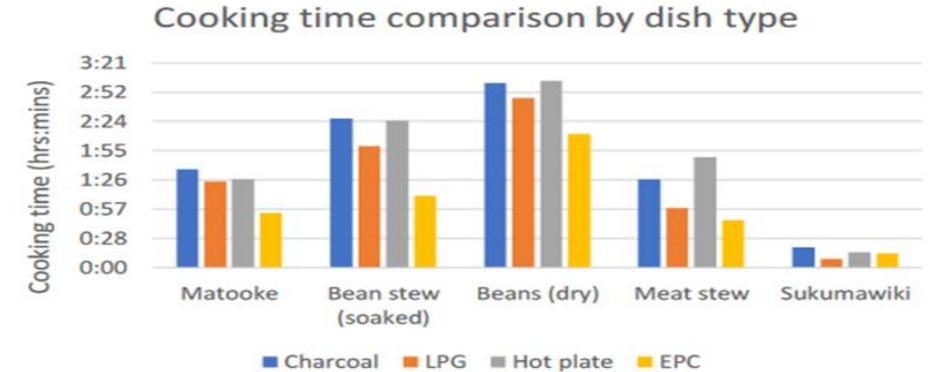
Fuel Type	Price USD
LPG	\$2.27 per kg
Kerosene	\$0.70 per kg
Kampala charcoal	\$0.32 per kg
Electricity	\$0.20 per kwh

With expected rising charcoal prices and falling LPG prices, incentives becoming increasingly attractive for households to switch breakfast cooking from charcoal to LPG. This is an importantly implication for M-KOPA to measure potential household savings from fuel displacement as a proxy for the daily payment price in a PAYG model.

LPG cost per meal must fall below charcoal to encourage clean cooking amongst Ugandans

At new prices, LPG is still 30% more expensive on a daily 'cost of cooking' basis

- ▶ MECS research shows that LPG is faster at cooking traditional meals comparison to charcoal, especially frying (sukumawiki)
- ▶ However, despite its speed, Ugandan customers are more sensitive to price than time for cooking, explaining the comparatively low use of LPG versus charcoal



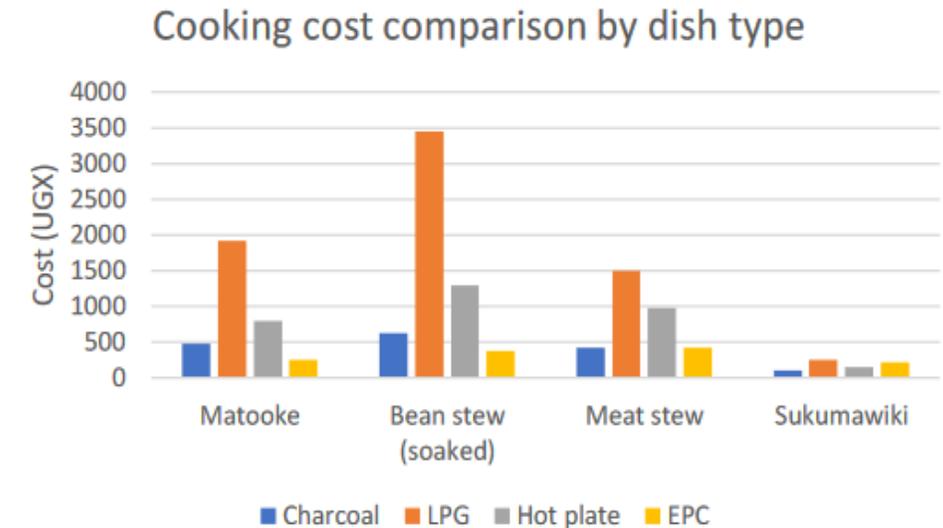
Scenario	MJ required per day	Calorific value of fuel / MJ per unit	Stove efficiency	Fuel needed per day / unit	Cost of fuel / USD per unit	Cost of cooking per day / USD
LPG in Kampala	10	46	60%	0.36	2.27	0.82
Charcoal in Kampala	10	30	22%	1.52	0.32	0.48
LPG at new reduced price	10	46	60%	0.36	1.7	0.62
Charcoal at higher price with more efficient stove	10	30	35%	0.95	0.5	0.48

Uganda's LPG price must fall to \$1.3/unit (kg) to compete with the cost of charcoal cooking per day to underpin a PAYG model's ability to realise household savings

LPG has a lower barrier of adoption for biomass cooks than electrical cooking

LPG start-up cost is cheaper than an electric connection for an EPC, and there is lower education cost

- ▶ MECS confirmed that cooking with an EPC is cheaper than LPG
- ▶ **However**, <2% of Ugandan HHs use electricity for cooking:
 - it costs ~\$95 (UGX 360,000) for a legal electricity connection, a high outlay for most households
 - grid does not reach much of the population living in rural settings (8% rural electrification rate)
 - Low confidence in utility provider sways households to use alternative fuels amongst households with access
- ▶ The all-in cost for Ugandan households to adopt electric cooking is \$145, accounting for stove and interconnection
- ▶ In comparison, the total LPG start-up cost for a 6kg is between \$50-75
- ▶ Given pre-existing awareness of LPG, it incurs a lower education cost than the electric pressure cooker



Start up items	LPG	EPC
First Cannister / Electricity connection	\$ 35 - 50	\$95
Cookstove	\$15 - 25	\$50
Total	\$50 - 75	\$145

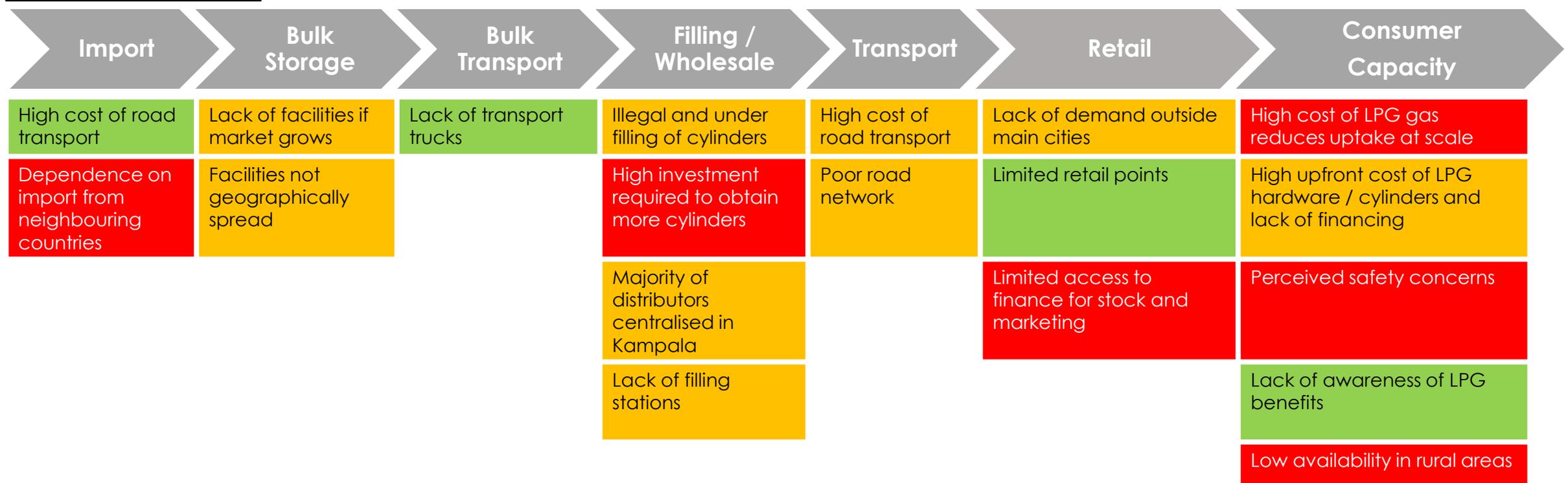
Given the complementary cost savings and cooking styles of EPCs and LPG, there could be an opportunity for Labs to explore a bundled offer of a PAYG EPC and LPG fuel voucher to match customer's fuel stacking and finance needs.



Uganda's LPG value chain assessment and enabling environment

The value chain is complicated, with challenges that limit scale for providers and affordability for customers

Consumer capacity is limited because of the high upstream costs that are passed on to customers



Policy

- ▶ Infrastructure projects (Bukusa Port and Standard Gauge Railway) will reduce the distribution cost of LPG per kg
- ▶ The National LPG Promotion Program will raise customer awareness and potentially grow number of cylinders in circulation to 1 million

Select players dominate the chain end-to-end to realise cost efficiencies, yet creating an oligopoly

Market players charge a premium to customers to recover on the high cost of distribution

- ▶ There are around 22-25 LPG suppliers, with new entrants (e.g., Oryx, Hass Gas) entering the market between 2013-15. Many players expanded from neighbouring countries and have sister companies or partner organisations to support in-market activity. Shell and Total, together, have 50% of the market share
- ▶ Challenger start-ups like Fenix Fumba and WES Gas are piloting PAYG LPG; there is little intel from Fenix but WES Gas have 3,250 customer on PAYG
- ▶ UNACC are currently developing an online marketplace where people order gas online and have it delivered



Growth of Uganda's LPG market shaped by weak enabling environment for providers to serve customers

Uganda's growth potential is constrained by poor/no infrastructure and limited market enforcement

- ▶ The Global LPG partnership identify five principles for rapid and sustainable LPG market development. Uganda scores low on most of these principles; however, current plans will have positive impacts. The market growth is likely to be smaller than other markets.

Principle	Status	Future Potential
Implement and rigorously enforce effective, self-consistent LPG market rules, with central emphasis on property rights protection in marketer-owned LPG cylinders and on public safety.	Yellow	Energy policy includes plans to further develop and enforce regulation.
Ensure stability and continuity of the LPG fuel supply in all regions to be served.	Red	Infrastructure investments and the National LPG Programme should improve supply chain. Development of inland refinery will reduce reliant on imports.
Implement stable, market-sustaining and market-stimulating policies	Yellow	Energy policy outlines several strategies to develop the sector, LPG promotion programme and removal of VAT will support market growth.
Ensure high LPG retail density	Red	Market growth should result in an increase in retail density.
Develop a consensus-based national master plan for coordinated LPG investments and interventions.	Yellow	National LPG programme will go some way to coordinate the sector.

Lack of LPG standards is a policy blind spot for Uganda

Despite strong plans, Uganda lack quality standards and demand-side incentives hinder greater adoption of clean cooking. Five important policies are emerging to support customers and industry.

- 1 The Renewable Energy Policy (2007) and investment plan (2011) both illustrate a commitment to promoting modern energy services including the LPG to Ugandan households
- 2 The draft National Energy Policy (2019) identifies a lack of inadequate regulations, technical standards, certification of LPG cylinders and lack of safety standards for LPG filling stations as key issue that must be further addressed. The policy laid out strategies to overcome these industry level weakness.
- 3 The SE4ALL Agenda targets 1 million urban households to use LPG by 2030. UNACC will play a strategic role in developing the LPG market
- 4 Local northern districts (e.g., Gulu and Adjumani) have imposed bans on logging for timber and charcoal burning. Other districts have not taken such measures due to few affordable alternative cooking fuels.
- 5 The Petroleum Supply Act (2003), the draft Petroleum Supply General Regulations (2009), and the Petroleum (marking and quality control) Regulations (2009) cover supervision and monitoring of the importation, exportation, transportation, processing, supply, storage, distribution and marketing of petroleum products.

Consumer-focussed policy

Industry-focussed policy

A national program will raise awareness, but a similar [Kenyan program](#) has been stalled for years

The government is planning to implement a National LPG promotion programme which is likely to start in 2021 and run for 5 years. Details of the programme are not yet agreed or public. Conversations with stakeholders indicated that it may include the following aspects.

- ▶ The programme will make available subsidised LPG cylinders/ starter kits to promote the uptake of LPG;
- ▶ Cylinders will be managed by the Ugandan National Oil Corporation;
- ▶ Likely that companies will apply for the subsidised kits through an open tender;
- ▶ Plans to integrate a nationwide awareness campaign on the benefits of LPG alongside the roll out of kits;
- ▶ Aim to have 1 million cylinders available in the country;
- ▶ Plans to increase LPG usage to 10% of the population by 2025 and to 20% by 2030 (potentially through a second phase);
- ▶ Programme should have impact of increasing the market which could subsequently reduce gas prices;
- ▶ Government has already completed pre-feasibility and baseline surveys



Understanding
customers'
attitudes,
perceptions
and concerns

M-KOPA gathered relevant data points to build a robust understanding of LPG in Uganda

200 Ugandan M-KOPA customers were interviewed to dig deeper into LPG perceptions and attitudes

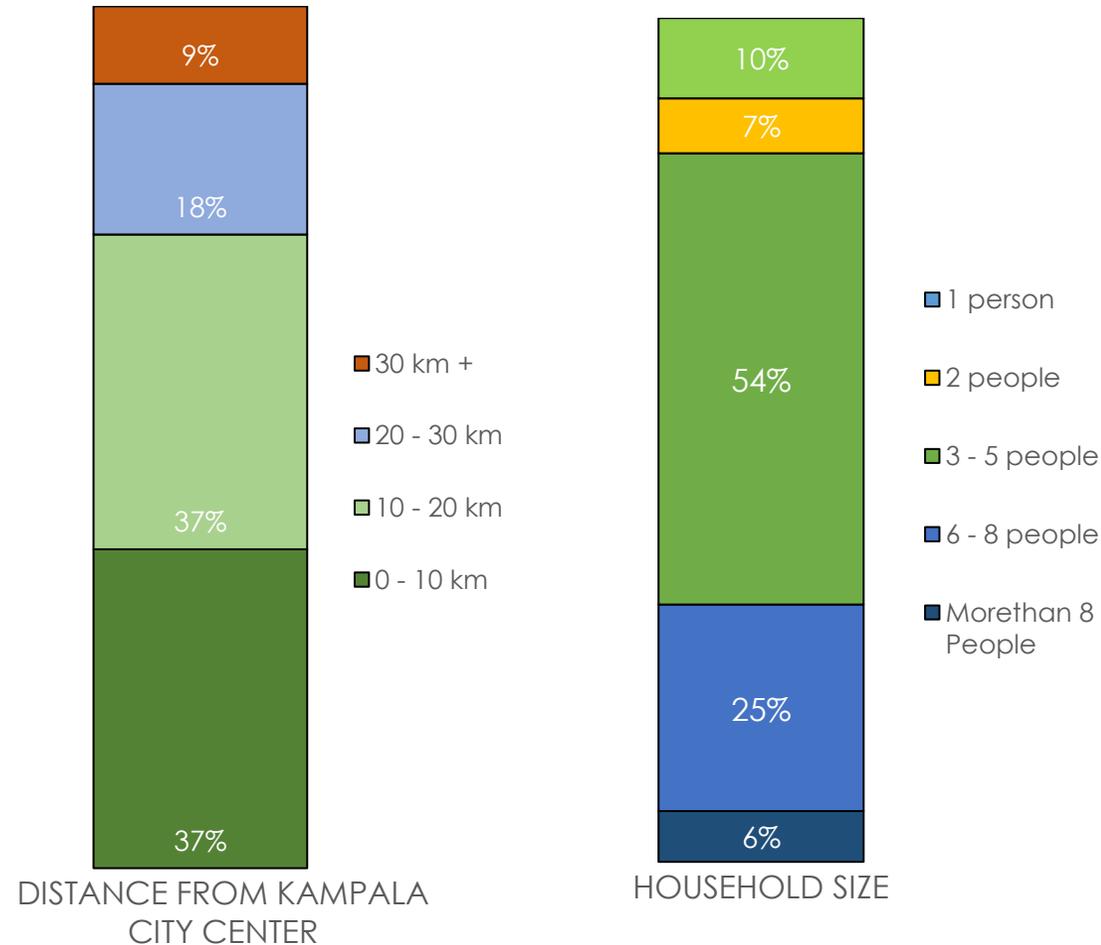
Survey Methodology

Methodology: Phone Interviews

Data Collection: Structured Questionnaire

Sample Number: 200

Period: November 2020



Data Points Gathered:

- ▶ Location
- ▶ Family Size
- ▶ Current Fuel
- ▶ Cooking times/day
- ▶ Weekly cost of fuel and transport
- ▶ Preferred cooking fuel
- ▶ Impressions of LPG
- ▶ Willingness to pay

Our ideal customer is primarily concerned with time savings and improving their health.



Maria Transitional Cook

Age: 27

Profession: Parttime Shopkeeper

Location: Nansana, Wakiso

Bio

Maria lives in Nansana, 9.8 km away from Kampala with her husband and two children. She does all the household cooking and often gets money from her husband to buy fuel for the month. She is conscious of her time spent cooking and she would like to cook faster.

Views on the PAYG LPG...

"I know of LPG but I will need some education on how I should use it."

"It will be nice to use LPG without worrying about trying to make it last!"

"Eventhough it is slow payment, it is still expensive. Will it become cheaper?"

"I would like a hose, regulator and two-hob cookstove aswell."

Attitudes

Maria works hard and enjoy making big meals for her family. She strives to build a strong family through her love and support. She wants to spend more time with the family and improve their living standards.

Behaviors

Maria manages everything to do with cooking in the household. She enjoys cooking for her family; it fills her with pride. Her favorite meals are matoke and rice with meat stew.

Needs

Maria needs a quick multiple hob stove so that she can cook quicker and not worry about rationing. She wants to cook faster and for longer.

Familiarity with M-KOPA

Maria's husband recently bought her the M-KOPA smartphone, which she likes a lot.

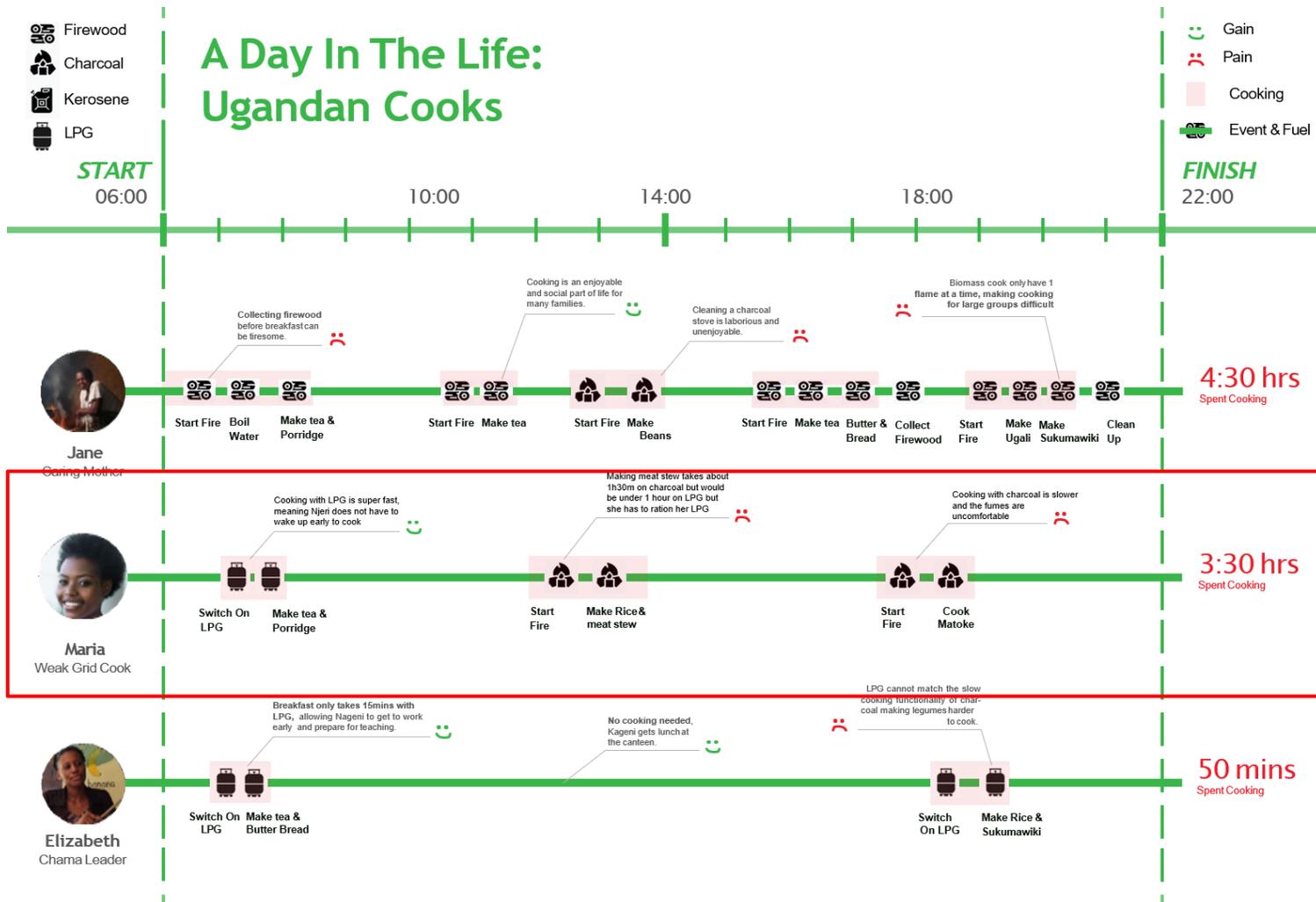
Opportunities for this user

PAYG LPG as ...

- a way of accessing modern, efficient cooking.
- a way of improving one's living standards and health.
- a way of saving time.

Ugandan cooks are highly aware of their fuel usage and will adeptly stack fuels

Maria carefully rations her use of LPG to ensure that she sticks to a monthly refilling plan



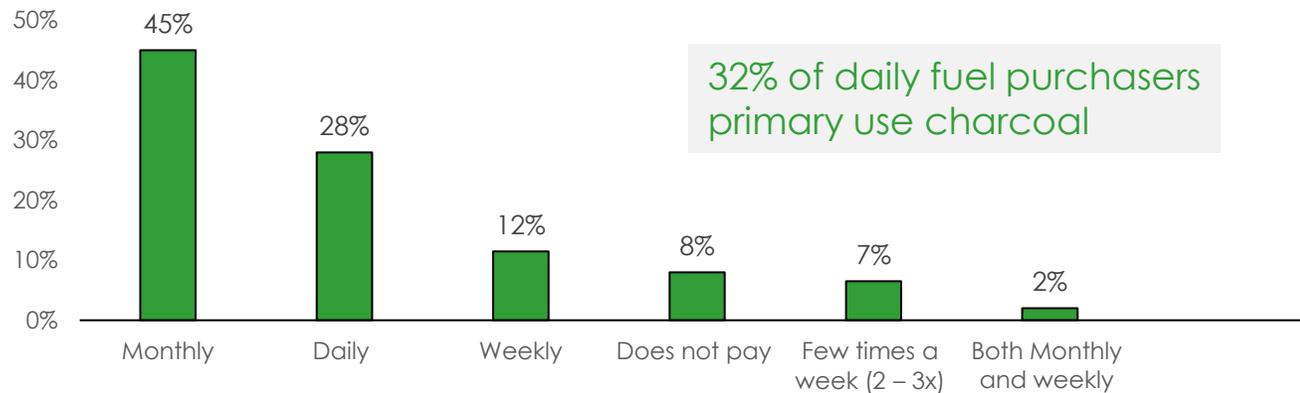
For Maria to increase LPG usage, she still has concerns about:

1. Safety and Education
 - She wants to make sure that she is using the canister correctly, so she doesn't harm her family
2. Refilling
 - She would like more clarity on this process to have a secure supply

Charcoal is the most preferred fuel by respondents, and has a stronghold in Ugandan homes

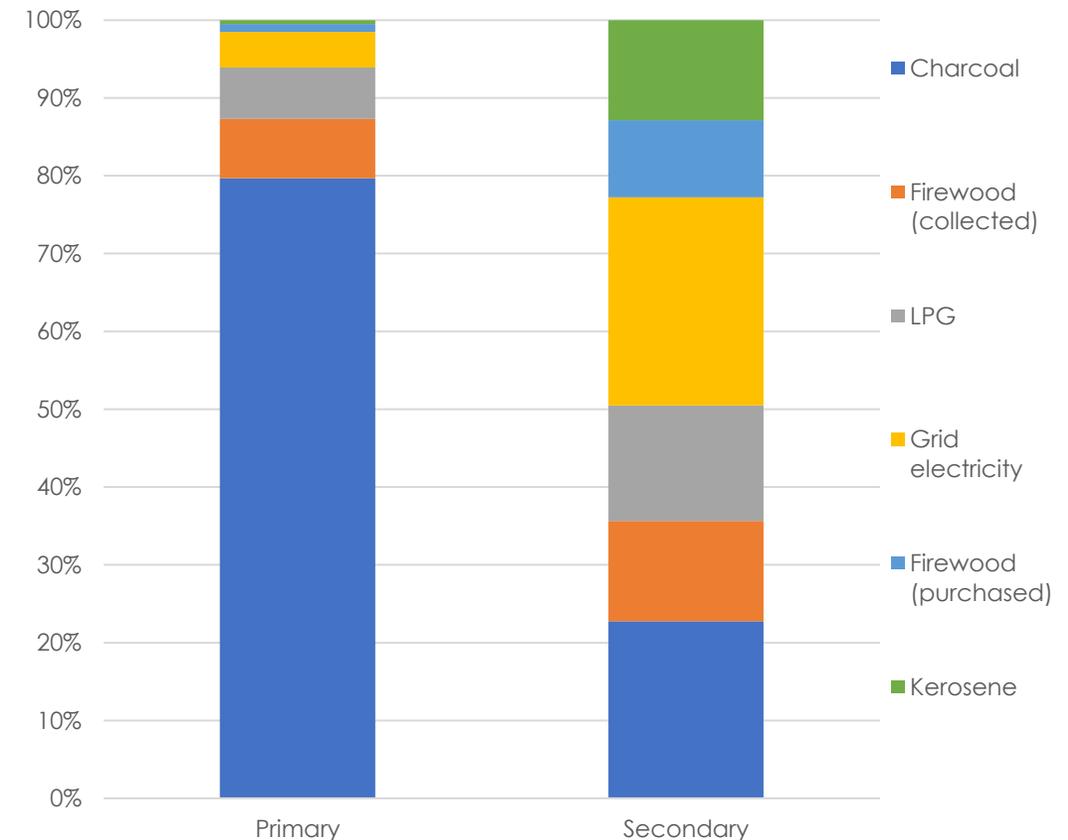
79% of respondents use charcoal as their primary fuel, with roughly 1-in-3 using a secondary source

Frequency of Fuel Purchase



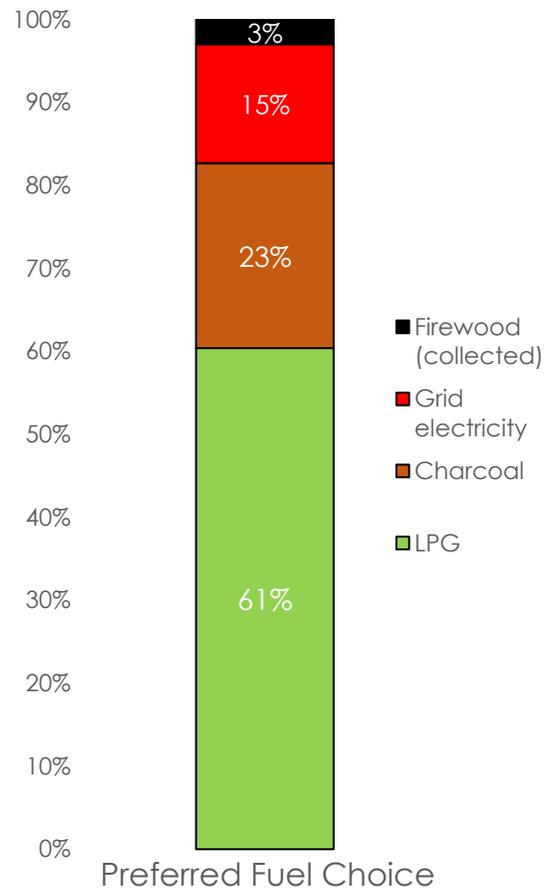
- ▶ Respondents spend UGX13,468 (\$3.54) per week on cooking fuel and UGX 1,418 (\$0.37) per week on transport on average
- ▶ Only 36% of respondents had a secondary source of fuel, illustrating the cultural barrier that providers face in encouraging adoption of other fuel types

M-KOPA Customer Fuel Stacking



61% of customers would prefer LPG to be their primary fuel

However, only 32% of current charcoal users would adopt a PAYG LPG plan provided by M-KOPA, and customers voice sentiments and reasons for adopting versus avoiding



Positive and negative consumer perceptions of PAYG LPG model

“A good way for M-KOPA”

“Yes, make refilling efficient”

“Make it more affordable”

“I am financing another loan”

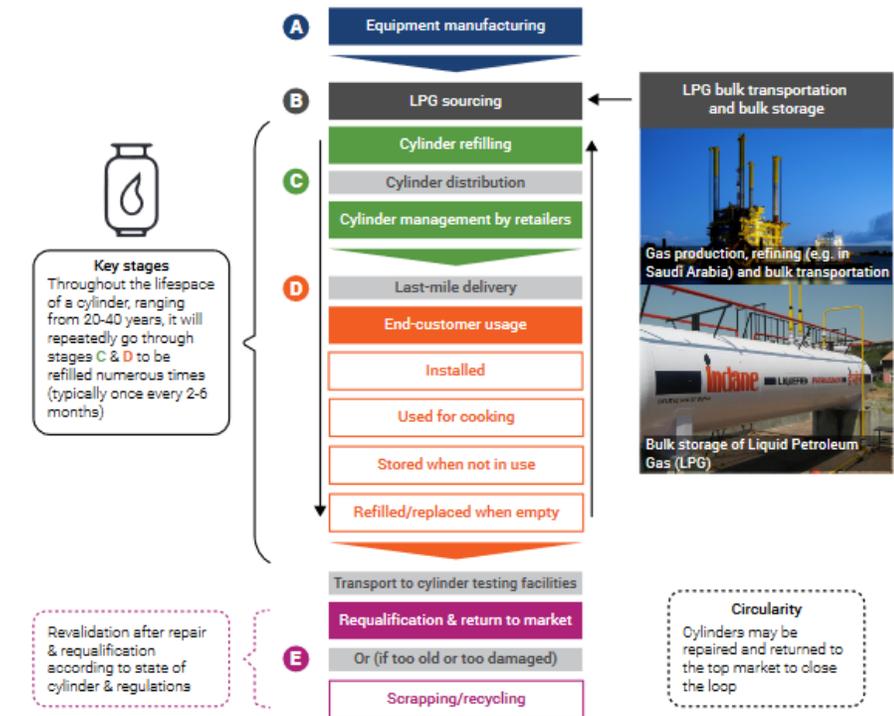
“I want more education on how to use the product”

Safety concerns amongst customers linked with willingness to pay

Overcoming this barrier through marketing awareness and customer education is key for success

- ▶ LPG is a safe cooking fuel when safety cautions are adhered to; strongly held negative safety perceptions exist (see accident reports [here](#) and [here](#)) within the market and it remains a barrier to market development and investment in the sector
- ▶ LPG-related accidents occur more frequently in less developed countries, where safety standards are ill-enforced
- ▶ Illicit refilling is a known practise within the market
- ▶ Ensuring that LPG is handled safely along the supply chain, from importer to the final consumer is critical to behaviour change and adoption amongst customers

Figure 3 - Break down of the LPG cylinder lifecycle



M-KOPA must ensure that it builds reputable partnerships that have high quality safety checks and procedures across the value chain. Widely sharing these practices will empower the customer to confidently use LPG.



Conclusion and next steps

Access to LPG in Uganda is multifaceted and consumer financing is not enough to drive market development

Adoption of LPG in Uganda will be shaped by interventions that address affordability, availability and awareness

	Key Drivers	Notes
Affordability	Infrastructure development Rising price of charcoal Develop local gas production	The Bukasa Inland Port will reduce distribution costs of LPG If charcoal prices rise, it reduces the opportunity cost to use LPG Local production of gas will drive down LPG prices for customers
Availability	Stronger distribution network More refilling stations Reduce rural and urban disparity	There are no distributors in rural Uganda, there is a high concentration of LPG dealers in Kampala and other urban markets
Awareness	Nationwide customer education Development and dissemination of safety practises	The National LPG programme to grow customer awareness is crucial to alleviate concerns such as safety Uganda's development and enforcement of strict LPG standards will build customer confidence

Tracking the development of LPG infrastructure in Uganda, the retail price of LPG/kg, and the National LPG Promotion Program will inform M-KOPA's PAYG LPG business model creation

PAYC model is dependent on enabling customers to generate savings with charcoal displacement

Dependency on imported gas and distribution costs must be reduced for a successful PAYG model

Potential Challenges	Example Data	Additional considerations
<ul style="list-style-type: none">▶ Scale required to reach economic viability and attract investment▶ High price to cover the additional upfront costs and generate adequate profit margins▶ Unpredictable or insufficient revenue due to stove stacking▶ LPG price fluctuation affect the final price to the user▶ PAYC customers may decide to go back to traditional way of purchasing LPG / other fuels if they are displeased	<ul style="list-style-type: none">▶ 86% of PAYGO's customers were first-time LPG users▶ PAYGO's customers consumed 4.1kg/month of LPG, which resulted in \$7.3/month. This was a predictable pattern from their customers▶ PAYC Wes Gas customers in Uganda paid half of the expected monthly price of \$15/ month	<ul style="list-style-type: none">▶ Building a scalable and comprehensive LPG set that evokes safety, confidence and fairness for prospective customers▶ Assess which parts of the current business will enable a better cooking service▶ Understand cooking behaviour and figure which clean cooking solution will be most value additive in the Ugandan fuel stack▶ Build sustainable partnership to enable a consistent supply of fuel to the end customer▶ Evaluate how M-KOPA's current customer relationship evolves with fuel delivery

M-KOPA's deeper understanding of the Ugandan cooking context reduces our solution-bias as we further explore the market for the appropriate fuel that unlocks household savings and expands use of PAYG financing to increase access to modern energy services.



Appendix

Stakeholder	Details
Wana Energy Solutions	Ugandan company started in 2008, promote and sell LPG. Offer pay-as-you-cook solution – have 3250 customer under this model. Have around 42,000 clients total buying from them. Planning to expand into the solar market. Report challenges in access to capital for new cylinders and PAYC meters.
Oryx Energies	In Uganda since 2012. Have a mini fuel storage depot and an LPG filling plan. 11 service stations mainly in and around Kampala and over 100 points of sale and retailers across the country. Company has strategy of promoting LPG as a modern replacement for firewood, charcoal and kerosene across sub-Saharan Africa.
Fenix International	Fenix Fumba is a startup within Fenix focused on developing a pioneering, pay-as-you-go LPG (liquified petroleum gas) cookstove. Delivered straight to the customer's door along with a gas canister for a small set up fee,
Shell / Vivo Energy Uganda	Well established in the market. Goal Zero, which means zero harm to people, assets and the environment in all our operations. Has large inland LPG storage facilities and fleet of 360 trucks. LPG bottling plant in Kampala has a daily filling capacity of 20 tonnes. Invested in efforts to educate the public on LPG use. Supply commercial and retail customers.
Stabex International	Partner with reliable bulk LPG transporters to deliver from Mombasa. Have an LPG cylinder refilling plant in Namawajjolo Uganda, cylinder distribution trucks, pickups for large deliveries and motorcycles and bicycles for door to door deliveries to the last mile. Around 50 service stations.

Key commercial players

Stakeholder	Details
Total	Over 200 active service stations countrywide. Focus on energy access through solar lantern sales. Sell 3kg cylinder size. Offer free gas delivery
PETGAS	Operate oil terminal at Kyengera, Kampala, which is equipped with two bulk LPG storage facilities 70,000 Kg each and refilling plant. Has network of around 100 Retail outlets spread across Uganda.
Uganda National Oil Company	Import and sell petroleum products in bulk. Run Jinja Terminal with One Petroleum Limited. Managing development of Kampala Storage Terminal (KST) which will include LPG storage.
Ultimate Gas	Distributors of Total Gas. Also offer consultancy services and completed baseline surveys as part of feasibility on the National LPG Promotion Programme.
Ramco Gas	Importer and distributors of LPG offering a door to door services. 15,000 customers. Focus on serving low income households and new technology.
Abbarci Gas	Involved in LPG transport and distribution. Owns the first factory in Africa for the manufactures gas cylinders and tanks.
Lake Gas	Lake Gas is part of Lake Group with headquarters in Tanzania. They provide retail and bulk supply of LPG.
Mogas	Offer LPG in standard 6Kgs and 13Kgs at their retail outlets.
Hass Gas	Deal in LPG with 25 petrol stations spread out across the country.
Ola Energy	Rebranded from Oil Libya. Sells LPG through its presence in Uganda.

- ▶ [Energizing Finance Series: TAKING THE PULSE OF ENERGY ACCESS IN UGANDA](#), SE4All 2019.
- ▶ [Interview with Emmanuel Mangeni from 2016 on the Uganda LPG sector](#)
- ▶ [Scaling LPG for Cooking in Developing Markets - Insight from Tanzania](#), CCA 2019.
- ▶ [Cooking with Electricity in Uganda: Barriers and Opportunities](#), MECS 2020.
- ▶ [Increasing the Use of Liquefied Petroleum Gas in Cooking in Developing Countries](#), Livewire article, WB, 2017.
- ▶ [Clean” Cooking Energy in Uganda –technologies, impacts, and key barriers and enablers to market acceleration](#). K4D Helpdesk Report. Institute of Development Studies, 2017
- ▶ [LPG Safety, Innovation and Market Growth](#), CCA 2019