



e-CAP CONSUMER FINANCING – eCooking and eMobility Stima Loan Project

Investigating the viability of the StimaLoan starter kit model in consumer financing for eCooking appliances (Electric Pressure Cookers) and eMobility (electric motorbikes 'bodabodas')



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eCooking Capacity Building & Market Development Programme (eCAP)

The eCooking Capacity Building & Market Development programme (eCAP) was implemented in 2023 as a partnership between Kenya Power and two UK-Aid-funded programmes, MECS and UK PACT. eCAP was managed collaboratively by Kenya Power and MECS via the STEER (Sustainable Transitions in Energy, Environment and Resilience) Centre at Loughborough University, UK and Gamos East Africa, Kenya. Kenya Power owns and operates most of the electricity transmission and distribution system in the country and sells electricity to over 9 million customers. Kenya Power's *Pika na Power* (Cook with Electricity) campaign aims to stimulate demand for electricity and increase the social and environmental impacts of electricity access.

Modern Energy Cooking Services (MECS) and United Kingdom Partnering for Accelerated Climate Transitions (UK PACT) are UKAid-funded programmes with the shared vision of supporting Kenya to transition from unsustainably harvested biomass to renewably-generated electricity.

eCAP aims to accelerate the uptake of eCooking in Kenya by building the capacity of key market actors and driving forward the development of a sustainable eCooking sector by:

- Developing institutional capacity within Kenya Power
- Designing and implementing a pipeline of scalable activities in parallel with the Kenya National eCooking Strategy (KNeCS)
- Identifying pathways for scaling up the *Pika na Power* campaign
- Bringing together Kenya's clean cooking and electricity access sectors to empower a network of eCooking Champions
- Generating evidence on the role of eCooking as a tool for stimulating demand and increasing the social impact of electricity access to inform decision-making by Kenya Power's Board of Directors.
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For more information on eCAP, visit www.MECS.org.uk.

This project received additional co-funding from the Rockefeller Foundation via the Climate Emergency Collaboration Group (CECG). Integrate to Zero (I2Z) provided advice and support for communications.

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List of abbreviations

AFD	Agence Française de Développement
AfDB	African Development Bank
API	Application Programming Interface
ARPU	Average Revenue Per User
CAPEX	Capital Expenditure
CCAK	Clean Cooking Association of Kenya
CECG	Climate Emergency Collaboration Group
CRB	Credit Reference Bureau
e-CAP	eCooking Capacity Building and Market Development
EPC	Electric Pressure Cooker
ESCO	Energy Service Company
ESG	Environmental, Social & Governance
GoK	Government of Kenya
GPS	The Global Positioning System
GSM	Global System for Mobile Communications
IDEV	Independent Development Evaluation
IoT	Internet of Things
KEREA	Kenya Renewable Energy Association
KP	Kenya Power
KYC	Know Your Customer
KPLC	Kenya Power and Lighting Company
LMCP	Last Mile Connectivity Project
LPG	Liquefied Petroleum Gas
MECS	Modern Energy Cooking Services
MFI	Microfinance Institution
OPEX	Operational expenditure
OBF	On Bill Financing
OBR	On Bill Repayment
PAYGo	Pay As You Go
SACCO	Savings and Credit Cooperative Organization
SCODE	Sustainable Community Development Services
SDG	Sustainable Development Services
SWOT	Strengths, Weaknesses, Opportunities and Threats
UK-PACT	UK Partnerships for Accelerating Climate Transitions

Executive Summary

The Government of Kenya through the Energy Transition Council directly requested for support to accelerate the transition to electric cooking and develop a National Clean cooking strategy. This project was a response to this request. The knowledge from this project will therefore contribute towards the National eCooking Study and Strategy which will feed into the overarching National Clean Cooking Strategy 2022-2028 and will focus on how energy-efficient eCooking technologies can be scaled-up in Kenya with the intended impacts of minimizing the drudgery and health risks associated with the use of solid fuels for cooking; improving environmental sustainability; and stimulating growth in demand for electricity.

While Kenya Power with its 9.2million customers has had outstanding success in adding electricity connections to its national grid, a recent impact Evaluation of the AfDB (African Development Bank) supported Kenya Last Mile Connectivity Project (LMCP) published in March, 2022 concludes; that the imbalance created by the low revenue generated from last-mile connections relative to the high cost of maintaining and operating an extensive electricity network is likely to affect the financial sustainability of KPLC (IDEV, 2022). It also observes that the electricity consumed by LMCP beneficiaries has remained low even 2-3 years after connection to the grid. In order to unlock growth in consumption, there is a need to address the upfront cost barrier associated with acquiring electric appliances/equipment, key among them Electric Pressure Cookers (EPCs) and electric motor bikes.

Previously, Kenya Power has awarded loans through the Stima Loan and Last Mile Connectivity projects by providing lending to consumers in order to ease the cost of meeting connections fees. One of the Challenges experienced under the LMCP credit line for connection fees was a very high non - repayment rate. By borrowing lessons from this experience, the project has enhanced design of the loan products to ensure that there are higher repayment rates. As a response, this project has sought to enhance the design of the loan product and experimented with the provision of credit for clean cooking appliances and electric bikes to specifically ease the cost of appliance acquisition following closely on the learning delivered by the StimaLoan and LMCP model.

As such, this study aimed to investigate the impact of demand stimulation using a credit mechanism on:

- a. Adoption of eCooking and eMobility among Kenya Power clients who were the target of the marketing and awareness exercises i.e., percentage of those reached with advertising messages who will take up the product.
- b. Adherence to loan term and conditions and monitoring the collection rate, receivables at risk and other credit metrics.
- c. The impact of the uptake on household expenditures, power consumption and demand growth.
- d. The benefits that this uptake will have for women who are mainly responsible for cooking at the household level.

As an innovation, the project has utilized PowerPay's interoperable IoT hardware which is a key enabler for Kenya Power and other companies, operating, or who would like to operate, PayGo (rent-to-own), ESCO (Energy Service Company) or business models with an on-bill financing model. This is important because it gives the utility flexibility to offer a range of delivery models by separating metering for individual electric devices from the whole household's metering whereby lockout of an appliance can be done without switching off the household as a whole.

In terms of methodology, the study used a mixed-methods approach comprising of a literature review, action research to test specific hypotheses around loan product design and stakeholder engagement to explore potential partnerships. A literature review has been undertaken to pick lessons from the StimaLoan model and other examples from other countries. The action research component of this study utilized an experimental design anchored on Lean Innovation and Customer Discovery methodologies in order to make the right business decisions, in less time, with less waste. The experimental design tested some of the hypothesis/assumptions that underpin the viability of utility - enabled financing for the eMobility and eCooking StimaLoan, in particular the viability of extending Kenya Power's existing StimaLoan product, which is already available for connection fees. To address the high-cost perception barrier to adoption of electric cooking the project adopted a '**cooking is believing**' approach which involved cooking demonstrations with on-site metering to prove to customers that the cooking technology was efficient. This was a very successful way of addressing the perceived high cost of electricity which has been a huge barrier to adoption. It is also worth

noting that the EPCs were an effective tool for converting customers who had high - cost perception problems to cooking with electricity.

Hypotheses that were tested during the experimental design include and the results of the study include:

- * **Hypothesis: Kenya Power customers informed about availability of a ‘eCooking & eMobility StimaLoan’ are willing to take up eCooking appliances and electric bikes on credit.**
Findings: To date, a total of 401 potential customers have been reached with the product offering in various joint marketing and awareness forums set up by PowerPay and Kenya Power. Of these 193 have bought an electric cooker. This is a 48% conversion rate. The PAYGo element also increased the uptake of the loans by 250% given that 72% of the loanees needed at least 2 months to be able to pay for the product while 28% were able to pay within a month.

- * **Hypothesis: There is a high collection rate, low level of receivables at risk for the ‘eCooking & eMobility StimaLoan’ if the customers are carefully selected.**
Findings: Over **95% of the loans were being repaid on time** and only 2.2% of the total was receivables at risk at the close of the study.

- * **Hypothesis: Electricity Average Revenue Per User (ARPU) increases for beneficiaries of the ‘cooking appliance StimaLoan’ and electric bike charging station operator.**
Findings: Average consumption of electricity from the EPCs observed was 0.675kWh per day which amounts to **20.25kWh/month**. In a scenario where 70% of Kenya Power’s customers use electricity to cook, this would result in more than 1,564GWh demand every year moving domestic consumption from 3,166GWh per year to 4,73GWh, translating to 50% growth in sales for the company a figure that would increase revenue by more than 20 billion Kenya shillings per year.

- * **Hypothesis: The electrification of cooking and mobility through the “StimaLoan mechanism” can result in substantial carbon emission reductions as Kenya’s generation mix is over 90% renewable.**
Findings: On average, each household has reduced emissions at a rate of 0.714kg/day, which amounts to **260kg of C02 per year**. This suggests that if 70% of Kenya Power’s customers adopted electric cooking the utility would contribute to a reduction in emissions totaling 2,392,000,000 kgs of carbon per year. While this number appears low compared to estimates within the Kenya eCooking Market Assessment February 2022, it is important to note that some of the users adopted the cookers very close to the end of the project hence some had barely started using it.

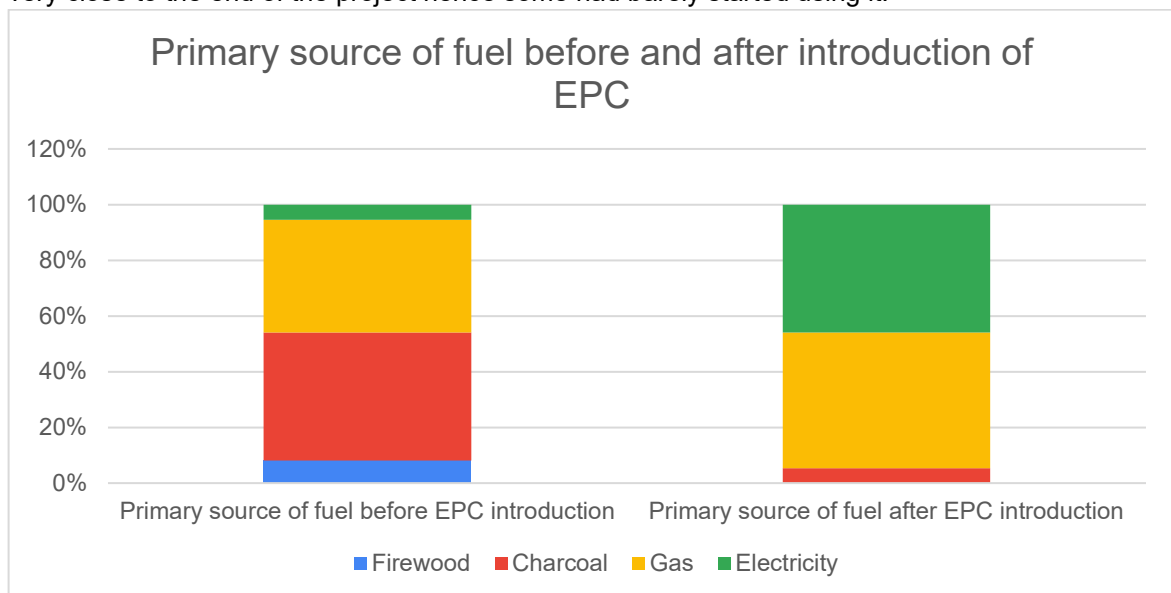


Figure 1: Primary sources of fuel before and after the project showing how customers have switched towards electric cooking

- * **Hypothesis: Participating households and businesses make net savings on their energy expenditures, which can align with the repayment of the appliance/eBikes over a commercially viable repayment period.**
Findings: From a survey conducted at the end of the project, customers are saving a mean of **KES 1,359 per month by cooking with electricity** and at least **KES 3,612 per month by driving electric motor bikes**.

- * **Women, girls and youth in beneficiary households will be impacted positively through time savings, cost savings and health improvements as a result of dirty fuel replacement.**
Findings: **18% of the customers benefiting from the product so far are men, while 82% of the buyers are women.** However, in some cases the buyers of the cookers are not necessarily the users. **78% of beneficiaries said that it is cost effective.** Cost effectiveness is at the top of the reasons why customers are happy with the cooker. Other reasons included versatility, safety and ease of use.

- * **Hypothesis: If the pilot is successful, Kenya Power is willing to extend the “eCooking & eMobility StimaLoan” on its own or in conjunction with other lenders such as PowerPay Limited or Equity Bank beyond the project period.**
Findings: **Kenya Power would like to support electric cooking and mobility as an ESCO and partner PowerPay to scale selling and financing of appliances at scale.** The company would like to build capacity, see more data and larger scale of appliance financing before considering any on the bill financing or collection. In the meantime, working with PowerPay to bring lenders and distributors towards electric cooking and appliances is the immediate focus.

Other findings from the project include the following:

1. Reducing the upfront costs of acquiring electric cooking equipment has the potential to increase adoption. About 50% of those reached with marketing and awareness bought a cooker.
2. A countrywide campaign that brings loans to the general public would still largely benefit the bottom of the pyramid given that 46% of the consumers reached earn below \$5/day.
3. The role of technology has underpinned success in the pilot.

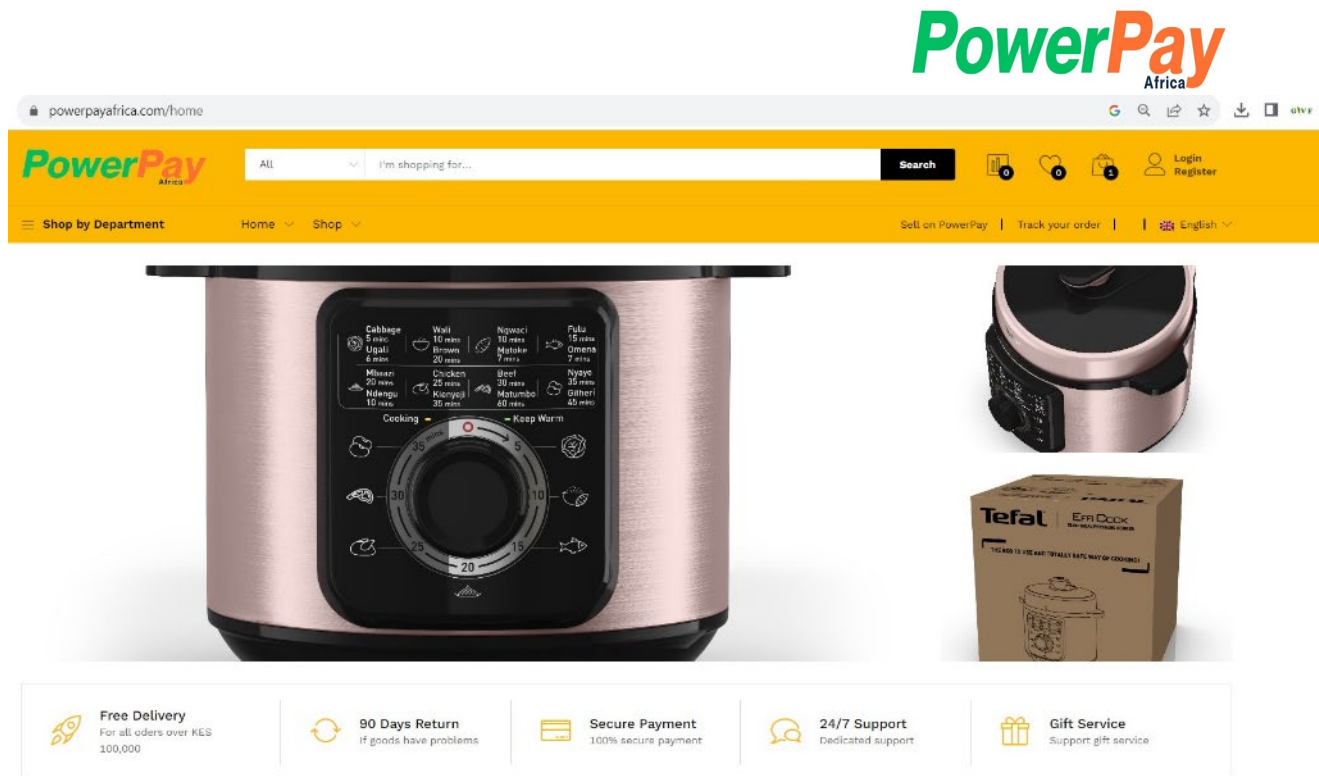


Figure 2: Screenshot of the PowerPay appliance financing marketplace for lenders and distributors

This has been done by digitizing the customer acquisition and on-boarding processes using the <https://powerpayafrica.com> marketplace, as well as digitizing the appliances themselves using PowerPay Internet of Things (IoT). The former allows customers in remote locations to sign up and receive a product from anywhere in the country while the latter enables device visibility, metering, monitoring and control. This has minimized the costs of consumer acquisition and loan management given the ability to collect revenue and activate/deactivate the devices remotely. The project has also shown that bringing in PAYgo technology into the e-cooking/appliances sector enhances credit risk management for lenders since device location and 'switch on switch off' capability will help with device management and enforcing payments. At scale, the PowerPay platform can be utilized by Kenya Power to aggregate demand for lenders and distributors, while at the same time enabling the utility to have visibility of the demand growth from the adoption of e-cooking and e-mobility on the entire grid. Apart from this, the project has demonstrated the importance of the PowerPay IoT in understanding the impact of electric cooking on carbon emission reductions whereby visibility into household level consumption of energy from electric cooking making it possible to quantify project emissions in a simple way. Moving forward, PowerPay will work with Kenya Power to scale the supply and financing for digitalized appliances by making the technology platform available to lenders and distributors of electric appliances and reaching buyers with financing products through its <https://powerpayafrica.com> marketplace. The company will endeavor to work together with Kenya Power to bring together a pool of lenders to scale financing for EPCs and electric bikes with a target to reach at least 2,000,000 customers over the next 5 years. The company would like to build closer data sharing collaboration with Kenya Power which would allow Kenya Power to have real time visibility of eCooking data from PowerPay's digitalized cookers. We believe this data sharing is important in moving the utility towards an electric cooking tariff and defining time of use charges for cooking. In the long term, integration of Kenya Power's customer credit profiles into the lending and credit scoring mechanisms of PowerPay would enable further reduction of credit risk and encourage lenders to lend to KPLC's customers.

Background

About the E-CAP consumer financing project

In line with the Sustainable Development Goal number 7 (SDG 7), Kenya has an ambitious target of achieving universal access to modern cooking solutions by 2030. This study is contributing knowledge towards the National eCooking Study and Strategy feeding into the overarching National Clean Cooking Strategy 2022-2028 and with a focus on how energy - efficient eCooking technologies can be scaled-up in Kenya.

The project overarching objectives were:

(1) to produce a major study highlighting the potential for electric cooking and electric bikes in Kenya and how uptake might best be accelerated.

(2) to support innovative new ventures within the Kenyan electric cooking and mobility sector that can help deliver the above with a particular emphasis upon supply chain development, carbon finance, utility-enabled finance and other forms of innovative consumer financing and profile-raising public awareness activity. These two objectives will contribute to the final objective.

(3) to support the Kenyan government in the production of an integrated and comprehensive new national clean cooking strategy that is sensitive to Kenya's climate as well as energy access ambitions.

This project was also part of a package of studies for eCAP (eCooking capacity building and market development), which ran parallel to the development of the eCooking Strategy. The findings of the projects carried out under eCAP will feed into the baseline study and the strategy.

The project used an experimental approach with the provision of credit for clean cooking appliances and electric bikes and specifically aimed to ease the cost of acquiring electric cooking appliances and e-bikes following closely on the learning delivered by the StimaLoan model.

In this project, PowerPay has provided digitalized Electric Pressure Cookers (EPCs) and electric bikes on a PAYGo (rent-to-own) credit model to Kenya Power customers. However, the expected outcome is much broader reaching, as PowerPay's interoperable platform is designed to facilitate the sale of any electric device on credit, which in turn can be financed by any financier including banks, Savings and Credit Cooperative Societies (SACCOs). The project has also enabled PowerPay to further expand this interoperable platform and explore how it can facilitate the extension of Kenya Power's StimaLoan product.

As such, this study has investigated the impact of demand stimulation using a credit mechanism on:

- Adoption of eCooking and eMobility among Kenya Power clients who will be targets of the marketing exercise i.e. percentage of those reached with advertising messages who will take up the product.
- Adherence to loan term and conditions and monitoring the collection rate, receivables at risk and other credit metrics.
- The impact of the uptake on household's expenditures, power consumption and demand growth
- The benefits that this uptake will have for women who are mainly responsible for cooking at the household level.

Partnering with PowerPay

PowerPay was selected to deliver on the eCAP consumer financing – eCooking & eMobility Stima Loan Project component which is part of a component of the larger Capacity Building and Market Development Programme (eCAP) being implemented in partnership by MECS and Kenya Power.

The findings from the project have been synthesized to inform Kenya Power decision making on where the key opportunities for scaling up eCooking in Kenya lie.

PowerPay sought to engage with the various components of the project particularly consumer awareness, which was being implemented by Kenya Power, Kitchen energy audits being implement by SCODE. PowerPay’s work was also informed by information coming from the other components through the exchange of data to enable a consolidation of results enhancing the results of the study.

PowerPay’s scope of Work

- * Participation in project kick off meeting together with other eCAP implementing organizations.
- * Conducting literature review of the StimaLoan product.
- * Developing a StimaLoan product manual for EPCs and electric motorbikes
- * Consumer awareness, on boarding customers, sales and distribution of EPCs and e-bikes to customers
- * Monitor sales, credit performance and repayment.
- * Perform data collection and feedback from customers and Kenya Power Staff on performance and design of the credit mechanism based on emerging lessons and data.
- * Preparation of a final report and sharing of the results

Key deliverables from the project

Deliverable	Milestone
1.	Inception report
2.	Consumer financing Loan product manual
3.	Identification of target customers
4.	Midterm report
5.	Distribution of 200 EPCS and 1 e bike
6.	Final consumer financing loan product manuals
7.	Final Report

The project has been co-funded by UK Aid via the UK PACT (UK Partnerships for Accelerating Climate Transitions) and MECS (Modern Energy Cooking Services) programmes, as well as the Rockefeller Foundation via the CECG (Climate Emergency Collaboration Group). Integrate to Zero (I2Z) provided advice and support for communications. UK PACT and CECG/I2Z funding directly supports the activities described in this proposal (OPEX and CAPEX respectively), whilst MECS and UK PACT funding supports the management of the eCAP programme as a whole and its integration with the Kenya eCooking Strategy.

Literature review

Kenya Power’s Plans for e-cooking and e-mobility as emerging business opportunities.

Kenya Power intends to transform itself into a utility of the future according to its Annual Report. This includes aligning itself with the global themes of de-carbonization, digitalization and de - centralized energy systems. (Kenya Power Annual Report 2022). To do this Kenya Power must make certain considerations and seize the emerging opportunities as it adapts into the quintessential 21st century energy utility. In this regard, the Company is championing the adoption of e-mobility by purchasing electric vehicles to reduce the carbon footprint. Enhanced adoption of e-mobility will grow electricity sales, particularly during off-peak periods. Kenya Power is also advancing the adoption of clean cooking using efficient electrical appliances as a way of increasing sales while conserving the environment.(Kenya Power Annual Report 2022) Apart from this, the report highlights promotion of electric mobility and cooking as part of its strategy to achieve its Environmental, Social and Governance (ESG) goals and enhance its commitments towards the achievement of Sustainable Development Goal (SDG) 7 on affordable clean energy and SDG 13 on climate action. It is therefore safe to conclude that there is support for clean cooking and e – mobility at the highest level of the company’s governance structure.

The business case for e-cooking

90% of the everyday Kenyan menu can be cooked in an Electric Pressure Cooker (EPC) with significant cost and time savings (Leary J. 2022 Kenya eCooking Market Assessment).¹ The business case for clean cooking using electricity is stronger considering the cost of fossil fuels has risen and efficiency for electrical appliances has increased. An experiment to determine the relative costs of boiling beans using various cooking fuels demonstrated that it is 5 – 7 times cheaper to cook with an electric pressure cooker compared to charcoal, LPG, and a hotplate as can be seen from the figure below. As such, most of the work needed to make electric cooking scalable is needed to address affordability of electric pressure cookers as well as perceptions about it being “expensive”. These findings have also been confirmed by other institutions, including the Kenya Renewable Energy Association Energy (KEREA), the Efficiency for Access Coalition/60 Decibels and the World Bank. The recently released KEREA Price Index found that it is cheaper to cook using electricity than LPG.

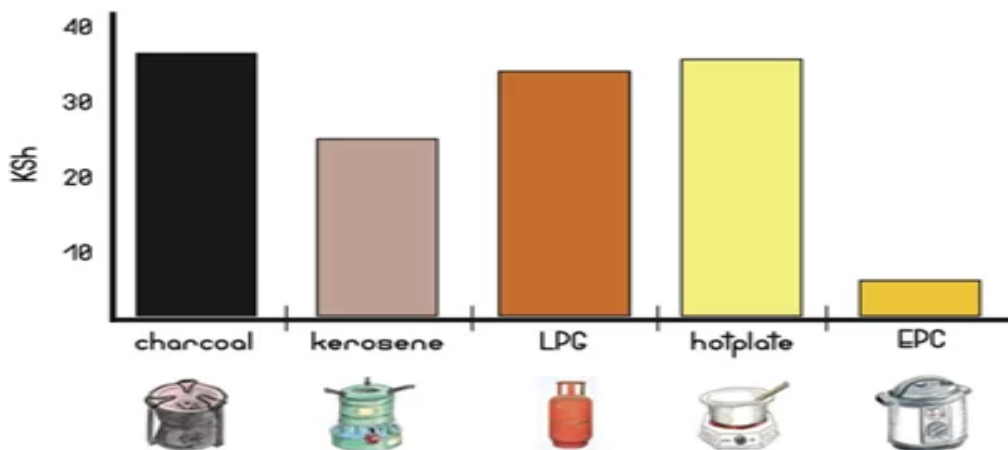


Figure 3: Results of an experiment to determine the relative costs of boiling beans with different fuels and cooking devices. (Source: J, Leary., J., Todd 2019)

*“Data on weekly charcoal expenditure collected from responding households indicates that the **annual market value of charcoal** consumed by the residential sector alone is **KES 68 billion*** almost **40% more than what all domestic customers paid to Kenya Power in 2018** (according to Kenya Power’s annual report)” (MoE, 2019). *38 billion KSh/yr in 2018 rising to 46 billion KSh/yr in 2022 (Kenya Power, 2022)*

Building on KPLC’s past lending experiences

Kenya Power has experimented with on bill repayment before. The “Scale Up access to electricity project” overall objective was to reduce the up-front cost of a connection to the grid of low-income households across Kenya and facilitate access to modern energy services through pre-financing. It was funded by Agence Francaise de Development (AFD) & the European Union (EU) through credit and grant to the Government of Kenya (GOK) which was then on lent and on grant to the Kenya Power & Lighting Company (KPLC). A pilot revolving fund was launched in 2010 and initially supplied with € 6 million through AFD financing facilities (No. CKE 3008 and CKE 3006). After successful implementation of the first tranche, AFD provided additional loan and grant amounts. An amount of € 4 million was transferred to KPLC on 3 December 2014. The amount comprises a loan of € 3 million on lent through GOK and a grant of € 1 million. The Project has disbursed loans to 232,015 customers totaling Shs4,217,690,324 worth of funds received from AFD. KPLC connected at least 228,040 customers from the disbursements made.

The project disbursed loans under two schemes namely, the StimaLoan and the Last Mile Connectivity Project. Under StimaLoan there was a 97% success rate in terms of connections realized within the target group and a 91% full repayment rate. This was targeting households without electricity but with a higher ability to pay and verifiable credit histories. The second scheme which was under the Last Mile Connectivity project had a 99% connectivity rate. However, only 23% of amounts were fully repaid while 53% had a partial repayment; and 24% of the amount disbursed had no repayments at 30 November 2019.

	Payment status				Customers		
	Amount disbursed + 5% admin fee on Stima loan	Amounts fully or partially repaid	Amounts outstanding where there are partial repayments	No customer repayments	Total	Connected customers	Not connected customers
	Shs	Shs	Shs	Shs			
Stima Loan	1,824,471,433	1,668,992,161	125,659,236	29,820,036	72,467	70,626	1841
% of total		91%	7%	2%		97%	3%
Last Mile	2,393,218,892	556,011,481	1,272,667,678	564,539,733	159,548	157,414	2,134
% of total		23%	53%	24%		99%	1%
Total	4,217,690,324	2,225,003,642	1,398,326,913	594,359,769	232,015	228,040	3,975
		53%	33%	14%		98%	2%

Figure 4: Total amounts disbursed and breakdown of customers (connected/not connected) Source: Report of the KPLC Project Implementation Team. (2019). Stima Loan Project report for the period ended 30 November 2019

This discrepancy in repayment rates can be attributed to the process of loan/customers acquisition, requirements to qualify for the loan and the different loan terms under the two-financing scheme. While StimaLoan Access Project customers were required to deposit 20% of the loaned amount and administration fee of 5% and are advanced a loan valid for 24 months with no interest charges and repayment of the loan commences one month after connection, there were no such requirements for customers under the Last Mile Connectivity Project. Even the very fact that the Last Mile Connectivity Project did not have a deposit requirement for customers to access the loan defies the very need to demonstrate a demand led approach in distributing the loans.

SWOT analysis of the current Stima Loan product

Strengths

The StimaLoan Access Project and the Last mile Connectivity Project have both left a database of more than 100,000 customers who paid back their loans. This together with lessons learnt from these projects over a period of ten years since 2012 provide a good basis for the development of a loan product targeting the lower income users of electricity. Kenya Power has already gathered a critical database upon which a pilot and a scale up phase can be built.

Weaknesses

Low collection rates and high default rates among customers under the last mile connectivity need to be addressed. A review of credit risk management mechanisms between the two projects needs to be understood in detail in order to inform the design of the Stima eCooking and eMobility loan products. Kenya Power needs more evidence to be persuaded of the viability of implementing an extended StimaLoan product at scale.

Opportunities

The eCooking Loan is about half or less of what customers were given as loans under the StimaLoan access Project. Given that most of the initial StimaLoan customers were able to repay (over 90%), there is reason to believe that the eCooking Loan is within their ability to pay. Secondly, over 8 million customers are under the lifeline tariff. This means that there is a lot of opportunity to increase demand among this band of customers that represents a huge demand potential. In addition, 70% of Kenya’s population uses biomass as their primary cooking oil.

Secondly, the introduction of a lower e-cooking tariff is possible using PowerPay IoT to target consumers using electricity to cook is now possible. This can go a long way in addressing perceptions of electricity being an expensive cooking fuel which has been made worse by recent tariff increments.

There is a large number of customers on smart prepaid metering which represents a more effective way of collecting on the bill financing as customers pay before they consume power. Having a recovery method that prioritizes the loan over power units can therefore be very effective as a credit risk control measure.

The use of PowerPay IoT provides an opportunity to manage credit risk by enhancing asset management through location tracking, consumption tracking, usage tracking and the ability to switch the devices off and on remotely. Finally, the use of PowerPay IoT provides for an opportunity to collect utilization data using the recommended Gold Standard methodology for electric cooking and benefit from carbon financing to mitigate risks of loan impairment and enable extension of loans to riskier last mile consumers.

Threats

Kenya Power requested for higher tariff approvals from the Energy and Petroleum Regulatory Authority which were granted earlier in the year. This further drives the perception that electricity is expensive to cook with. A well-organized consumer education campaign should be organized to ensure customers understand the competitiveness of electric cooking compared to other methods of cooking. However, Kenya Power can request the regulator for a lower e-cooking tariff and an e-mobility tariff which can be targeted using the PowerPay IoT technology and could be a valuable marketing tool for the eCooking Stima Loan and a great asset in addressing consumer concerns regarding rising costs of electricity. In addition, Kenya Power needs to promote the most efficient cooking methods as a company in order to current perceptions of higher tariffs.

The StimaLoan generated valuable lessons which include:

- a. Having a deposit or contribution requirement for loans offered to end users is a string method of sieving out people who lack ability and willingness to pay for loans and enhances the application of a demand led approach to increasing access to finance.
- b. Establishing ability to pay for loans is critical to the success of any financing mechanism. In this case for the StimaLoan, the eligibility criteria were based on the ability to pay the 20% deposit and the 5% administrative fee for the loan while for the Last Mile Connectivity Project, that requirement was not there.
- c. Having laid down product procedures and requirements is vital for the success of credit mechanism targeting low-income households.
- d. Prepaid and automatic meters as strategies to minimize the risk of non-collection.
- e. Mitigating upfront costs for electricity connections for those who cannot afford lumpsum payments had a positive impact on uptake.
- f. These customers are found in urban, peri-urban and rural areas.

Learning from current typology of delivery and end user payment models

TABLE 4.1 Applicability of various delivery approaches to each system architecture

TOOLS AND APPROACHES ENABLING DELIVERY	SYSTEM ARCHITECTURE		
	AC NATIONAL GRID OR MINI GRID	DC BATTERY-SUPPORTED NATIONAL GRID OR MINI GRID	DC OFF-GRID SOLAR HOME SYSTEM
Electricity price signaling	E.g., time-of-use tariff incentivizes cooking during daylight hours on solar mini grids.		
On-bill financing from service providers/utility	E.g., existing prepaid utility customers repay cost of appliance every time they purchase tokens.		
Cash purchase from service providers/utility	E.g., existing mini grid customers buy appliance at community cooking demonstration.		
PAYG			E.g., solar home system company offers existing customers upgrade from lighting to cooking system.
Cash purchase from commercial distributor/retailer networks	E.g., appliances are sold at supermarkets.		
Productive use			E.g., eCooking appliances are paired with irrigation pumps to allow firewood collectors to earn income to make repayments.
Peer-to-peer women-led product distribution models	E.g., women food bloggers produce eCooking content and sell appliances to their social media followers		
Consumer lending institutions	E.g., women's savings groups set up revolving funds to purchase cooking appliances.		

Note: Highly applicable business model; Potentially applicable business model

Figure 5: An analysis of delivery models being used to drive uptake of electric appliances (Source: ESMAP 2020).ⁱⁱ

Various delivery models are currently being used to drive the uptake of electric appliances. The table above is extracted from a study conducted by ESMAP in 2020 to establish the cost of cooking with electricity. Different models of promoting access to appliances are highlighted from the table above which include Pay – As – You go (PAYG), On Bill Financing (OBF), cash and carry, Peer-to-peer women led product distributions models, consumer lending from financial institutions among others.

PAYGO is a form of digital consumer financing that enhances the affordability of products and services. There are two main approaches of PAYGo financing. These are lease – to – own and fee – for – service. Under the former, customers pay a fixed instalment at defined intervals with the goal being to own the item once the total value of the item is paid off. Under the fee-for-service model, payments are typically made when the consumer needs and can afford power. The consumer therefore pays to use the product, but the asset ownership remains with the service provider and consumers never own the system. PAYGo requires the ability to digitize revenue collection and remotely “switch-on and switch-off” devices. As such PowerPay’s technology platform is a key enabler to this model, giving distributors and lenders the tools to manage repayments and products.

On Bill Financing is another model of digital appliance financing. In this model the devices are financed on the balance sheet of the utility and the repayments are collected through the utility bill. Utilities may offer electric appliances as part of a special promotion, bundling them with existing services, offering on-bill financing, and amortizing the cost through utility bills (in a manner similar to that of PAYGo companies that include the price of appliances in the service fee charged to the customer). Cooking as a service could constitute such a value-

added service. Integrating eCooking thus calls for utilities to become more efficient and agile, which means using different business models and offers to their customers. (ESMAP 2020)

A variation of this model is the **On-Bill Repayment (OBR)** in which the devices are financed by a third party (e.g an asset financier or clean cooking distributor) and the repayments are collected through the utility bill.

At the other end of the spectrum of utility-enabled finance, co-marketing and data-sharing, where the finance and the billing are both done by a third-party, can enable the utility to support appliance financing indirectly by providing data and other support related to their customers for credit scoring and marketing purposes. In reality, most African utilities are cash constrained and are likely to prefer informal partnerships over OBF and OBR. Many are already struggling with payment collections, so will not want to increase the financial burden on their customers through on-bill payments for appliances. Other challenges include potential regulatory hurdles for disconnecting customers, potential consumer finance regulations and the likely need to upgrade billing systems (MECS 2021). As such, PowerPay IoT can be a critical tool in addressing some of these challenges, whereby a utility company can be able to switch off a device rather than the entire consumer’s home.

Distribution through Consumer Lending Institutions: Where microfinance institutions and savings and credit cooperatives (SACCOs) are strong, they can sometimes double as both distribution/retail actors and financiers of energy-efficient appliances. The availability of consumer financing from microfinance institutions has been one of the biggest drivers of pico PV lanterns and, to an extent, solar home system sales globally (MECS 2021). MFIs like RAFODE, ECLIF International, Juhudi Kilimo among others have utilized this method.

The Peer-to-Peer Women-Led Product Distribution Model works by recruiting sales representatives who can tap into their own social networks. An example of this model is Solar Sister, an organization that recruits, trains, and mentors’ sales representatives who are expected to invest their own capital to buy the products and then resell them, first to family members and friends, then to friends of friends, and finally to the community at large (Chepkurui, Leary, Minja, et al. 2019).

In Cash and Carry model, customers pay 100% of the cost of the appliance upfront. This model has been successfully scaled by companies such as BURN Manufacturing and KOKO Networks. Cash sales are also the norm for LPG connections.

Layaway savings are a good alternative where an organization is not able to carry the costs and risks of financing in that while customers are able to pay in installments for their products, they are only able to access and use them only after paying off the full cost of the item. In this way a customer is able to reserve an item and then pay for it before picking it up for use.

Over the years many clean cooking companies have developed partnerships with local financing institutions to finance the sales of stoves. The main advantage of this approach is that the companies do not have to get involved in administering loans and are not exposed to end user credit risk. However, most companies still sell only a relatively small proportion of their stoves through this channel. (MECS 2021).

Asset financing: Bidhaa Sasa is a last-mile distribution and finance company operating in rural Kenya. Bidhaa Sasa has managed to develop its own asset financing portfolio serving rural women customers and making their products available by offering flexible payment plans. (MECS 2021)

Finally, there is the **razor and blades model**, in which a product such as a clean cookstove is sold at a discounted or zero price in order to increase sales of a complementary product such as fuel for the stove. In this method, the distributor makes money not with the product/stove but with the fuel. This requires significant capital outlay in making the products available and a return is made as consumers use the fuel. Koko Networks is a good example of this model. They invest in the infrastructure and stoves in the short term while generating recurrent revenue through the retail of cooking fuel to their customers over a long period of time.

Existing examples of motorbike loan schemes in Kenya

COMPANY	DEPOSIT	PAYMENT TERMS
Mogo	25%	KES 364/day, 20% flat rate interest rate

<p><i>Kenya Commercial Bank</i></p>	<p><i>30% (Bank finances 70% of the value)</i></p>	<p><i>KCB Base rate 13% per annum Negotiation fee - 3% *Charges are not inclusive of tax</i></p> <p><i>Other conditions: An active account with any business institution where business proceeds are remitted for at least 3 months Proforma invoice from Boda Boda and Tuk Tuk dealers Valid driving license of the rider/driver Demonstrate your ability to repay the loan Bank to finance up to 70% while the customer to meet 30% of the cost Guarantee by KCB account holder where a Log book is held on simple deposit</i></p>
<p><i>Mwananchi Credit</i></p>		<p><i>Interest Rate: 3.5% per month. Processing Fee: 4% Application Fee: KES 500 CRB Fees: KES 300 Comprehensive Insurance Fee: KES 7,600 (Strictly by Shimin Insurance Agency) Tracking Fee: KES 10,000 Credit Life Insurance: 1% Loan repayment term: Max 18 Months. Repayment Frequency: Daily or Weekly. Repayment Method: Mpesa Playbill Number. You'll then pay the remaining balance plus interest in equal monthly repayments over the agreed term. Loan repayment term: Max 18 Months. Repayment Frequency: Daily or Weekly. Repayment Method: Mpesa. After you've made all the repayments including any interest, you will become the owner of the motorcycle.</i></p>

Other MFIs playing in this space include Rafiki, Faulu, KWFT and SMEP which charge an interest rate of 22%, 18%, 24% and 26%. The interest rates are charged on a flat rate basis.

The challenge

A brief description of the problem and gap analysis

According to research conducted by Mutiso et. al. 2018; Kenya Power's customer base has grown from under 2 million in 2011 to over 9 million in 2022. Despite this growth, residential customers consume very little electricity — on average 30 kWh/month per household (versus 150kWh in China or over 900kWh in the US). Low consumption is a symptom of stunted socio-economic development, where rural and poor populations have yet to graduate to more consumptive and productive uses of power. Low demand is compounded by the high cost of connecting new customers, who consume even less. This falling revenue per customer is increasingly a serious threat to KPLC's business model.

However, in order to unlock these substantial savings on the cost of cooking, there is a substantial upfront cost barrier to overcome (an EPC typically costs 50-100 USD, whilst an eBike can be an order of magnitude higher). For this to happen, the affordability barrier needs to be addressed. A study by Efficiency for Access in 2019 concluded that consumer affordability is the most significant constraint for the growth of the appliance market. (E for A Coalition 2019). Without micro – credit for electric cooking equipment, electric bikes and other productive uses, consumers rely on dirty fuels which they can buy in small affordable portions that align with their daily wage-earning economic systems. Innovation that allows for automated payment, billing, customer relationship management and credit risk reduction is one of the solutions that will enable households to pay for clean cooking equipment in small manageable instalments the same way they pay for dirty fuels.

In order for a balance to be found between profitability and expanding access, increasing connections to electricity need to go hand in hand with access to appliances which will generate the demand and ensure revenue and costs are growing together. In order to do this, Kenya Power is championing the adoption of e-mobility by purchasing electric vehicles to reduce the carbon footprint. Enhanced adoption of e-mobility will grow electricity sales, particularly during off-peak periods. Kenya Power is also advancing the adoption of "clean" cooking using efficient electrical appliances as a way of increasing sales while conserving the environment. (Kenya Power Annual Report 2022)ⁱⁱⁱ

For this to happen, mitigating the high upfront cost of energy-efficient electric devices is critical for enabling consumers to make savings on their energy expenditures by electrifying part of their energy demand.

PowerPay's interoperable IoT hardware and software platform has been used to monitor utilization of electricity from the deployed electric pressure cookers and eBikes, as well as to manage loans. For Kenya Power to get accurate and reliable data on the cooking and mobility elements from target households, the innovation has been used to track devices' location, usage and power utilization from the devices. It is expected that this project will explore and recommend pathways for expansion of the StimaLoan product into eCooking and eMobility.

Research gaps

- * There is a need to demonstrate the impact of credit on the uptake of electric pressure cookers and electric motorbikes. Currently, less than 1% of Kenyan are cooking primarily with electricity and even fewer are using eBikes.
- * There is a need to demonstrate the value in use of digitalization as a tool for increasing data visibility for utility company (Kenya Power) beyond the meter, enabling the utility to understand and attribute the impact of appliance uptake on revenue.

The solution



e-cooking and e-mobility Stima Loans

The project has developed and tested a StimaLoan Product whose aim has been to mitigate the upfront costs of acquiring electric pressure cookers and electric bikes targeting 200 customers with EPCs and 2 with electric motorbikes. The loan product has been tested over the last 5 months and the experience from is being used to come up with a scalable solution that can be scaled to reach millions of Kenya Power customers who still cook with biomass and drive petrol powered motor bikes.



PowerPay IoT digitalization technology and software platform



Image 2: Image of a digitalized EPC carrying PowerPay embedded IoT hardware. Photo Courtesy of PowerPay

TECHNOLOGY SOLUTION STACK

Three products one platform

- 1

Digitalize! using POWERPAY IoT Hardware – Make all your assets visible and track carbon emission figures in real time


- 2

'Monitorize'! using POWERPAY DEVICE MANAGEMENT SOFTWARE AND CRM: enjoy seamless customer data integration with your digital loan platform through API


- 3

Monitize! Using POWERPAY BNPL PLATFORM FOR APPLIANCE LENDERS: Reach new markets, customers and grow your loan products



PowerPay hardware agnostic Internet of Things platform enables digitalization of electronic appliances for device management, monitoring and financing to be possible. PowerPay® Internet of Things (IoT) is designed to help businesses solve their business challenges as they target last mile consumers through a complete digitalization of electronic appliances. Our IoT platform provides a range of tools including embedded hardware and firmware, web-based software, and cloud connectivity that help accelerate adoption and uptake of appliances and solar energy. PowerPay® IoT makes remote devices visible and monitorable. You can monitor runtime hours, power consumption, carbon emission reduction and device location; improve customer relationship management making appliance loan management and financing easy and cost effective.

Methodology

The study has utilized an experimental design anchored on Lean Innovation and Customer Discovery methodologies in order to make the right business decisions, in less time, with less waste. A literature review has been undertaken to pick lessons from the StimaLoan model and other examples from other countries.

To do this, the study employed an experimental design to test some of the hypothesis/assumptions that underpin the viability of utility-enabled financing for the starter pack, in particular the viability of extending Kenya Power's existing StimaLoan product, which is already available for connection fees.

Hypothesis testing

Hypothesis to be tested during the experimental design:

- * Kenya Power customers informed about availability of a 'eCooking & eMobility StimaLoan' are willing to take up eCooking appliances and electric bikes on credit.
- * Kenya Power's existing customer data can be analysed to identify the customers who are most able and willing to pay for their 'cooking appliance and electric bike StimaLoan'
- * There is a high collection rate, low level of receivables at risk for the 'eCooking & eMobility StimaLoan' if the customers are carefully selected.
- * Electricity Average Revenue Per User (ARPU) increases for beneficiaries of the 'cooking appliance StimaLoan' and electric bike charging station operator.
- * The electrification of cooking and mobility through the "StimaLoan mechanism" can result in substantial carbon emission reductions as Kenya's generation mix is over 90% renewable.
- * Participating households and businesses make net savings on their energy expenditures, which can align with the repayment of the appliance/eBikes over a commercially viable repayment period.
- * Women, girls and youth in beneficiary households will be impacted positively through time savings, cost savings and health improvements as a result of dirty fuel replacement.
- * If the pilot is successful, Kenya Power is willing to extend the "eCooking & eMobility StimaLoan" on its own or in conjunction with other lenders such as PowerPay Limited or Equity Bank beyond the project period.

Data collection

Various data sources were used to determine the viability of the "eCooking & eMobility StimaLoan" including:

- * Literature review for data from the StimaLoan project and other relevant studies.
- * Key informant interviews with Kenya Power staff and staff from other financing institutions such as MFIs banks, Saccos among others.
- * The PowerPay Team worked with Kenya Power to select and target 200 of their most viable customers with electric pressure cookers and at least 2 electric bikes to the financed devices within 6 months. PowerPay has provided the technology for monitoring the appliances and electric bikes and the software to manage the loans during the study. The following data has been collected from this pilot:
 - o Consumption data from PowerPay digitalized monitorable electric pressure cookers and electric motorbikes showing the energy consumption and utilization of pressure cookers and electric bikes.

- Baseline data on purchasing trends from Kenya Powers customer billing database targeting beneficiary households and/or businesses.
- Personal interviews conducted with beneficiary households regarding the impact of electric appliances on their cooking time, costs, fuel replacement as well as other qualitative benefits.
- Collection rate and receivables at risk for the loans extended to customers from the PowerPay software.
- End-line data has been provided by the various sources of data identified above plus impact data: time savings, fuel replacement (dirty to clean), carbon emission reductions and cost savings.

Customer acquisition and onboarding:

The following process was recommended for effective customer acquisition:

Customers were acquired through various channels including:

- * Awareness creation and demonstration events
- * Kenya Power Emails and phone contacts provided by the utility.
- * Through mobilization partners e.g Farming Systems Kenya, Coffee Cooperatives.

A comprehensive loan product manual has been developed to under development that will help in loan customer analysis, onboarding, and risk mitigation. Various mechanisms to assess customers' repayment behavior, reduce risk including the use of guarantors. KYC information was requested from customers and filled in through an online form created by PowerPay. Assistance for those who are not able to access this platform was provided through sales agents to ensure that information is captured about their energy usage. It was however not possible for Kenya Power to support customers assessment through provision of their historical billing, consumption and payment habits given the short timeline of the project.

Criteria employed for selection of customers:

- a. Customers can be rural, urban or peri - urban.
- b. Customers who have received a StimaLoan or Last Mile Connectivity project loan and repaid on time will be prioritized.
- c. Customers must be willing and able to pay a 20% deposit to get the EPC or an electric motorbike and pay the rest in a period of 1 – 12 months.
- d. Customers willing and able to pay a 5% administration fee for the loan.

Customer onboarding process

- e. Customers were required to apply for the loan and sign a 'rent – to – own' contract for the same or apply off the <https://powerpayafrica.com> platform
- f. PowerPay would either directly call customers and arrange to meet them and share details of the eCooking/eMobility stima loan, on-board and finance at least 200 customers for EPCs and 2 for electric motorbikes. Sales agents were also used to reach and on-board customers directly.
- g. Where customers did not have banking data, a credible guarantor was used to ensure customers without banking information can access loans e.g. a civil servant guarantor, a community based organization guaranteeing the loan on behalf of the customer and the like.
- h. Once this data was verified and assessed, the loan would be approved, and customer is allowed to pay deposit and delivery fees on the PowerPay platform.
- i. Customers have been billed monthly and product activation.

End of project survey

- A sample of 37 customers were called and interviewed to understand the results of the project including fuel stacking behavior before and after project, benefits both qualitative and quantitative, savings in costs and time, net promoter score among others.

Activities carried out

a. Awareness creation and on boarding customers

Meeting with JOYWO (Joyful Women Organization)

Founded in 2009, JOYWO recently rebranded to Mama Doing Goodis a registered Non-Governmental Organization (NGO) to empower Kenyan women economically. Over the past 10 years, it has grown tremendously with members spread across all 47 counties in Kenya and more than 100,000 women involved in table baking among the membership which is composed of women Village Savings and Loan(VSLA) groups or chamas.

The organization's conduct capacity development to strengthen skills and abilities of the community it serves to enable them adapt and thrive in the fast-changing world. The organization also carries out livelihood projects with activities geared towards generating activities that members can invest in to improve their standards of living. In addition, they promote table banking which is a group-based funding strategy in which members save and borrow immediately during their meeting times. JOYWO also provides financial linkage to financial institutions for the women represented by their membership groups.



Image 3: From right, Joyce Kibe(CEO - PowerPay), Wairimu Njehia (Kenya Power) and Prudence Lihabi (Mama Doing Good)

Two meetings we held with Joyful Women Organization and mama Doing Good(an initiative of the first lady of Kenya). At JOYWOW we met with Joyful Women Organization Project Manager – Carren Mbatiany and Gaciku Kibino among others with the goal being to collaborate with the organization to distribute EPCs to their member women's groups. We introduced the project to the team and agreed that as a way forward, we should do a demonstration for the Senior Management Team to demonstrate the use of EPCs and allow for a formal MoU to be done to govern collaboration. The organization also suggested that we do a pilot in Nairobi with 2 or 3 chamas upon which subsequent roll out can be planned. In the second meeting we meet senior level management from the Mama Doing Good Initiative to discuss collaboration stemming from the eCap project and beyond.

Meeting with Kenya Power Regional Office in Nakuru

We held meeting with Mr. Daniel Aliri who hosted us on behalf of Mr David Ngua Syengo, the Regional Manager. Other staff present in the meeting included Mr. Collins (Business Development) and Madam Jane – Customer Experience.

We gave them a brief about the project and the need to get the regional office to support the implementation of the project. The team committed to support the project by engaging with local actors and mobilizing the clients within the region targeting specific estates and settlements in Nakuru as a strategy to enhance awareness creation and uptake of electric pressure cookers.



Image 4: From Left, Wairimu Njehia, Jane Gachoka, Geoffrey Mburu, Daniel Aliri and Collins Mukewa at Kenya Power's Regional Office, Nakuru (Photo Courtesy of Kenya Power)

Meeting with Farming Systems Kenya (FSK) and leaders from member cooperatives to demonstrate the use of Electric pressure cookers

Farming Systems Kenya is a Non-Governmental Organization (NGO) that was established in 1981 through the initiative of the Nakuru Lay People Fellowship (NLPPF) of the Africa Inland Church, Nakuru Regional Church Council. The main agenda was to reduce poverty through agricultural development, focusing on smallholder farmers who constitute 80% of the Kenyan farming community.

FSK targets the rural subsistence farmers who to a great extent lack the relevant knowledge, skills and opportunities to improve their productivity and market their products. FSK works with rural farmers' self-help groups, providing them with technical advice, extension and affordable credit for crop and livestock enterprises. FSK also runs a lending product targeting farmers in various counties in Kenya.

At Farm systems we met the CEO and staff including Kenneth Wamuyu, Cynthia Kioko, Stephen Langat (M&E and Fundraising), Elizabeth Njeri (Vet) who constantly engage with the farmers. We discussed linkages between the issues they are tackling with farmers including forest conservation and afforestation, climate change and gender issues around cooking. We also discussed safety concerns and perceptions about safety of EPCs which could be barriers to adoption of EPCS. Farm Systems Kenya has committed to mobilize at least 10 farmer cooperatives as targets from awareness and adoption of electric pressure cookers.

We later met representatives from 10 farmer groups in Njoro, introduced Electric Pressure Cookers to them and agreed to plan meeting dates for awareness creation in their localities and among their members. The cooperative leaders also agreed that the organizations would act as guarantors for loans provided to the farmers to buy electric pressure cookers.



Image 5: Leaders of various farmer cooperatives mobilized by FSK during our meeting in Njoro, Nakuru County

Meeting with Vision Africa Sacco

Vision Africa Sacco is a saving and credit co-operative society on started in November of 2004 by a group of traders who wanted to pool their resources together to create a basket from where they could access loans at affordable rates and avoid the exploitative mushrooming shylocks and financial institutions.

At Vision Africa Sacco, we held a meeting with Jane Mbinya, marketing Manager at Vision Africa Sacco in Nakuru. We discussed the purpose of the project. The representative from Vison Africa Sacco was specifically interested in collaborating as a lender to the project and partnering with the team to reach their members for loans. We agreed that as a way forward, a proposal to the Board and CEO would be necessary in order to formally get the buy in from the top leadership and subsequently agree on an MoU for formalized collaboration.



Image 6: Electric cooking demonstration meeting at with farm workers from Coffee Management Services, Kofinaf Farm (Photo Courtesy of PowerPay)

Awareness and demonstration meetings with Coffee Management Services (CMS) Staff. We have held two awareness creation and demonstration meetings with Coffee management services. One on 3rd April and the other on 11th April bringing together more than. These were done with Staff from CMS we geared towards:

- a. Demonstrating e-cooking to head of sustainability at CMS
- b. Demonstrating e-cooking to staff from CMS who may be willing to get EPCs
- c. Create capacity within the organization for outreach to small holder farmers who supply CMS with products

Meetings with Regional Manager – Kenya

Power North Rift Region and demonstration and awareness with staff from the Regional Office in Eldoret



Figure 6: From left, Wairimu Njehia, Abigail Ng'etich, Eng Kipkemoi Kibias from Kenya Power and Geoffrey Kimiti from PowerPay.

We held a meeting with the regional manager Mr. Kipkemoi Kibias, Regional Manager, North Rift Region at Kenya Power and Lighting Company who is based in Eldoret together with his staff. He underscored the importance of growing sales in the Rift Region as one of his primary goals and is keen to follow up on monitoring the impact of electric pressure cookers on Consumer demand.

He also organized for the team to conduct and awareness and demonstration meeting with the staff members of Kenya Power in Eldoret town. The meeting was well attended with participants placing orders for the EPCS while at least 3 were bought during this meeting by Staff members.

Demonstration and awareness creation among Forcibly Displaced Persons community in Eldoret Town

We held a meeting with 36 members of the Sudanese and Burundian Refugee community who have been given permits to live in Eldoret and Kitale Towns. We visited some of their homes and looked at their cooking methods which included charcoal, kerosene and gas as part of their fuel stacks. The meeting was arranged in conjunction with Nyalore Impact and Kenya Power. The event was opened by Ms. Abigail Ng'etich from Kenya Power, Eldoret Regional Office. This meeting has generated 5 orders for pressure cookers from the refugee community in Eldoret town ensuring that the most disadvantaged can begin to cook with efficient EPCs. It is also notable that the North Rift Region holds a lot of Refugees who are both settled in the town of Kitale and Eldoret and also covers Turkana County where Kakuma Refugee Camp and Kalobeyei settlement are found.

Meeting with Kenya Power Regional Manager, Kisumu and Awareness creation and e-cooking demonstration Kenya Power, Equity Bank, Nyalore Impact in Kisumu

We were hosted by the Kenya Power Regional Manager for Western Kenya and deliberated on the importance and opportunity to promote electric cooking in the region. The Regional Manager shared about her experience with e-cooking and some of the projects being implemented with women's groups in the area. We also held an awareness creation and demonstration exercise on conjunction with Nyalore Impact and Equity Bank who mobilized small business owners from the Kisumu area.



Image 7: 'Cooking in the salon', awareness creation meeting in Maua, Meru County

Loan assessment award and administration

PowerPay has used the project to develop E-cooking and E-motorbike StimaLoan products using the services of a consultant who has been in the micro-financing industry for more than 16 years. We expect this to be used in managing borrower analysis, onboarding, borrower character assessment as well as mitigating risks of non-payment. Experiences from implementation of the StimaLoan and LMCP have also been used as a basis for the design of a new loan products borrowing from lesson learnt and credit management best practices.

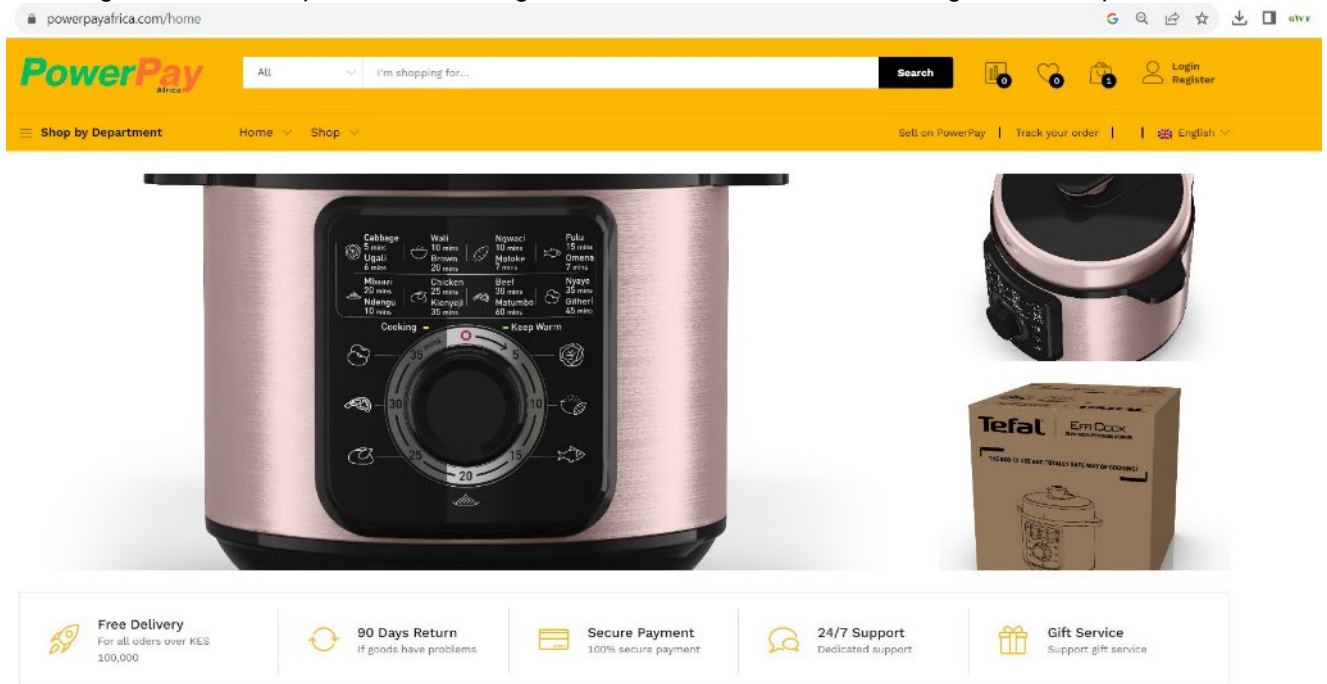


Image 8: PowerPay BNPL platform facilitating lending for appliances (Photo courtesy of PowerPay)

Loan product design

The StimaLoan pilot scheme has been developed to target the bottom of the pyramid (those earning below \$2/day) and the "floating middle class" lower middle class in Kenya/Africa that lies between \$2 - \$4 earnings. For Africa, the African Development Bank which is the most influential source (AfDB 2011) defines the middle-income group as those with an income between 2 and 20 US\$, and refers to the group with 2 to 4 US\$ per capita and day as the unstable 'floating middle class'. From our assessment, this group has some liquidity but can be unstable. However, they can afford a product that is paid off for within 1,2-, or 3-month period. Anyone earning below \$2 will need to be financed for a period of up to 1 year to make repayment comfortable. However, the shorter the period the lower the risk.

The Loan product has taken cognizance of the fact that most loans will have a processing fee that takes care of administrative costs, credit scoring and checks among other processes. A 5% processing fee has been suggested by the micro – loans expert based on various examples in the market. Processing fees: Usually range from 2.5% (e.g. Kenya Commercial Bank (KCB) to 5% (Equity Bank)) of the amount borrowed, the loan processing fee is a one-time charge that is used to cater for the administrative costs related to processing your loan. A customer can either pay it upfront or have it deducted from the loan amount during disbursement - most banks will deduct this upfront when disbursing the borrowed amount. Depending on the bank this fee is also known as the loan appraisal fee, or loan application and credit evaluation (L.A.C.E) fee.

In order to counter the high risk of non – repayment encountered under the LMCP, some of the risk mitigation measures built into the loan products include:

- Requirement to pay 20% deposit before getting the product
- For check off loans, organization remits from salary on behalf of the customer
- For non – salaried or where employer does not provide guarantor support the following are recommended:
 - a. Provide a SACCO, Cooperative or Chama to act as guarantor or,
 - b. Sell cash to the SACCO, Cooperative and Chama and they take the lending role or,
 - c. Provide two guarantors, one of which has to be a relative and the other a friend. These have to be verified or,
 - d. Cash and carry or Layaway for those without a guarantor.

It is also recommended that at scale, all loans should have a Group Life Credit Cover which offers the following benefits.

Death Benefits- accidental, illness and natural causes	100% outstanding loan balance as at the time of death
Permanent total disability- accidental, illness and natural causes	100% outstanding loan balance as at the time of disability
Critical Illness	Critical Illness 30% of the outstanding loan amount, up to a maximum of Kshs 3,000,000
Annual premium	0.5%

Summary of benefits/features provided by group life credit life cover

- Death benefit being the outstanding loan amount as at the time of death. Permanent and Total disablement benefit is equated to death, either of which pays the outstanding loan amount at no additional premium.
- Loan default is not payable.
- Any new loan issued within the period of cover will be charged separately at a rate of 0.5% of Sum Assured per annum & a minimum premium of Kshs 200 per person.
- Minimum premium per group is Kshs 15,000

Underwriting requirements

- The sponsor of the scheme will complete and submit a Group Proposal Form and schedule of member data.
- Individual members will not be required to complete individual proposal forms.

Premium payments

- The premium will be payable annually in advance at the commencement of the cover.

Claims procedure

- Claims notification should be done within 45days.
- The documents required under death in service claims include a death notification letter, original death certificate and a copy of the national identity card of the deceased. • Claims are payable within 14days from the date of receipt of full documentation.

Age limits

- The policy has an age limit of 70 years.
- Those above 70 years are considered at special terms.

A detailed description of the Loan product procedures are provided in Appendix II.

Summary of key findings



Image 9: Awareness creation meeting at Thuita Farmers Cooperative Society, Tharaka Nithi County

The project followed an experimental design with various hypothesis being tested through the implementation of the project.

Below are the findings of the study.

- i. Hypothesis: Kenya Power customers informed about availability of a ‘eCooking & eMobility StimaLoan’ are willing to take up eCooking appliances and electric bikes on credit.

Findings:

To date, a total of 401 potential customers have been reached with the product offering in various joint marketing and awareness forums set up by PowerPay and Kenya Power. Of these 193 have bought an electric cooker. This is a 48% conversion rate. The PAYGo element also increased the uptake of the loans given that 72% of the loanees needed at least 2 months to be able to pay for the product. 28% were able to pay within a month in two instalments.

- ii. Customer spread by county.

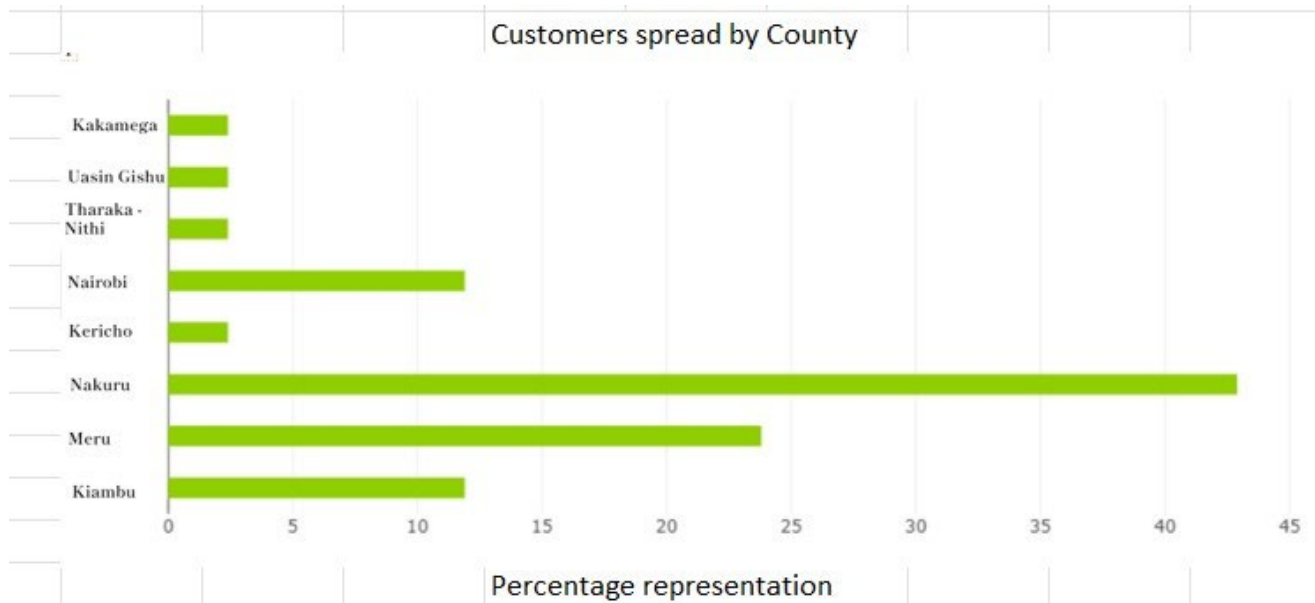
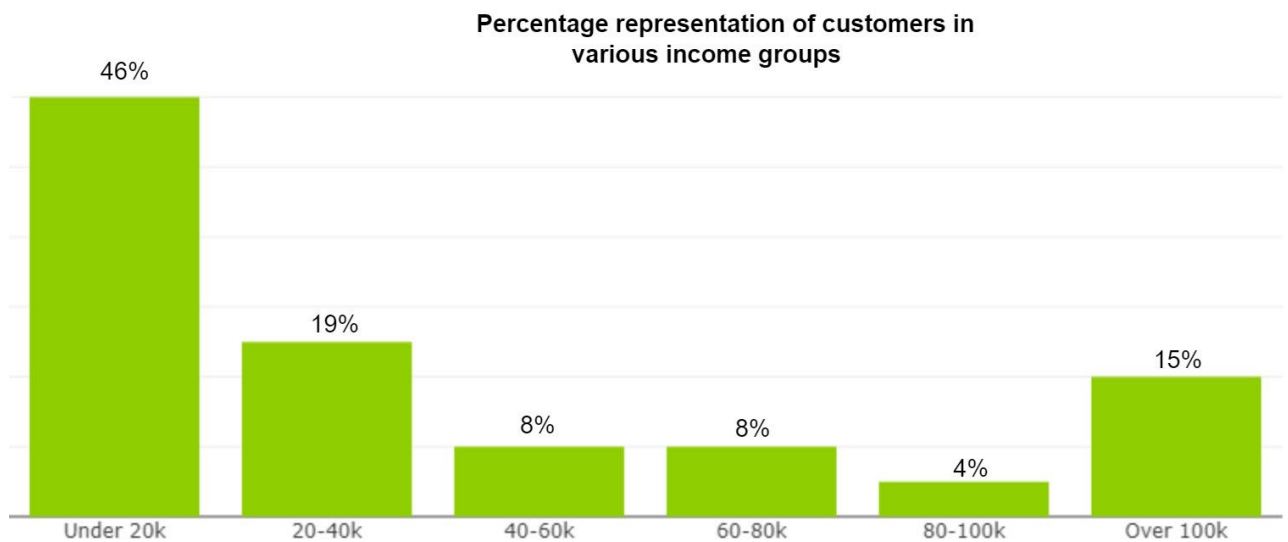


Figure 7: Customer distribution by county

- iii. Income distribution among customers



46% of the customers going for the loan are earning below KES 20,000 per month, and that means they are making below \$5/day.

- iv. Hypothesis: There is a high collection rate, low level of receivables at risk for the 'eCooking & eMobility StimaLoan' if the customers are carefully selected.

$$\text{Collections Rate} = \frac{\text{Cash Receipts from Follow-on Payments During the Period}}{\text{Scheduled Follow-on Payments During the Period}}$$

(Nicky Khaki, 2021)

Findings: 95.6% of those financed are paying on time. Only 2.5% of the loans can be considered receivables at risk.

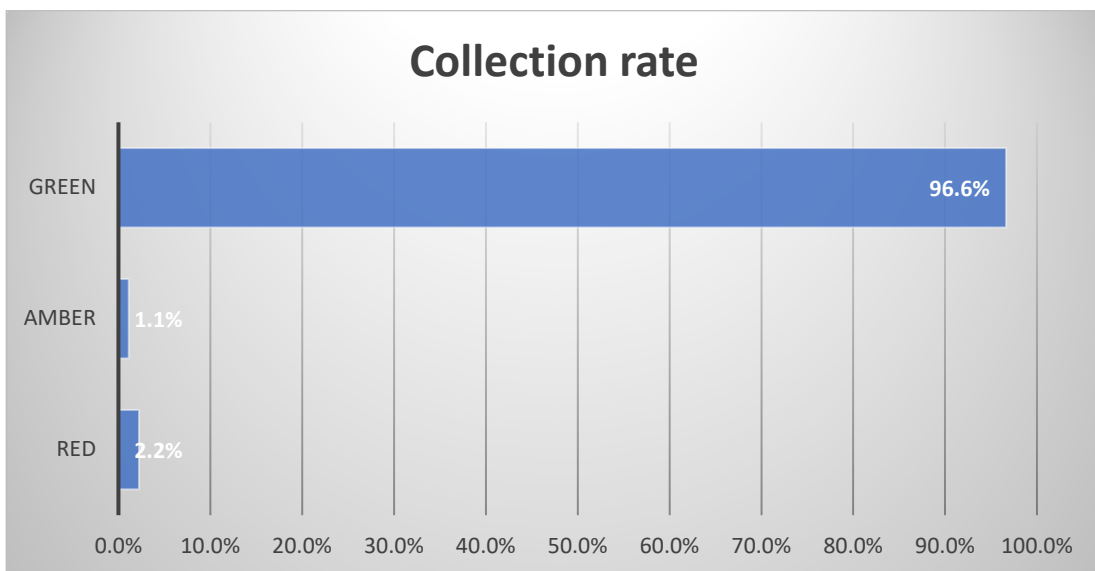


Figure 8: Collection rate

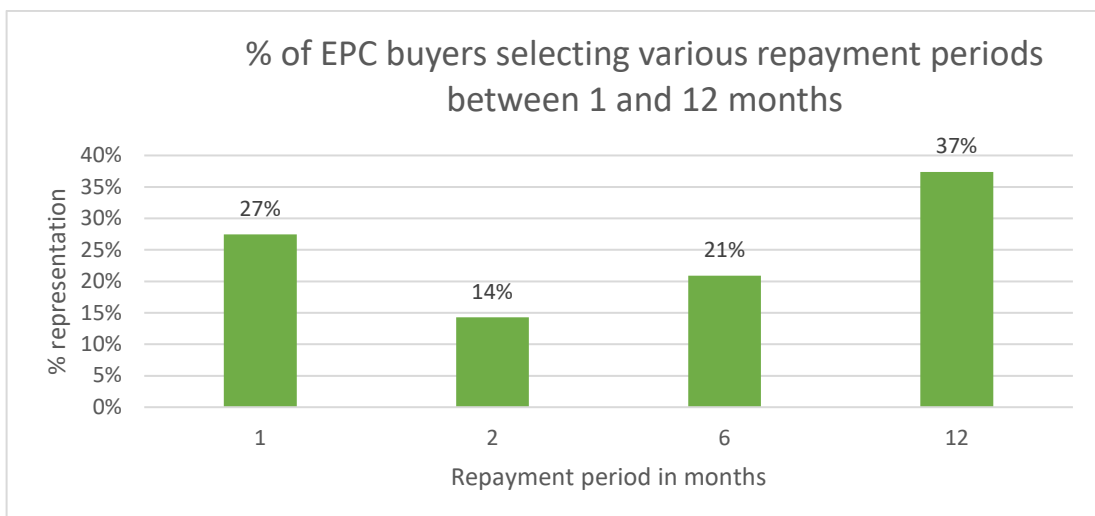


Figure 9: Preferred repayment periods

- v. Hypothesis: The electrification of cooking and mobility through the “StimaLoan mechanism” can result in substantial carbon emission reductions as Kenya’s generation mix is over 90% renewable.

Findings: 46% of those who purchased the electric cookers were using Charcoal as primary source of fuel, while 49% used gas as the primary source of fuel and 5% were using electricity as the main source of cooking fuel before they adopted the EPCs. At the close of the project, it is observed that out of those using charcoal and firewood as primary fuel sources, 88% and 100% of them switched completely to electric cooking respectively. On average, each household has reduced emissions at a rate of 0.714kg/day, which amounts to 260kg of CO₂ per year.

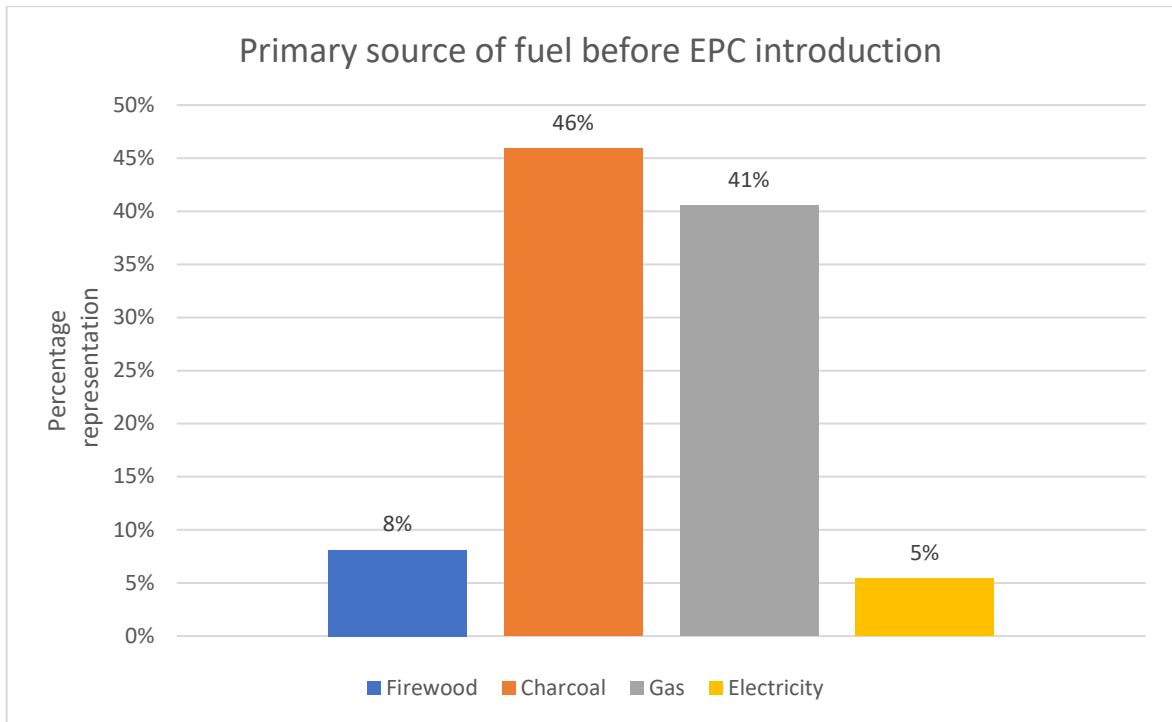


Figure 10: Primary sources of cooking fuel before buying the EPC

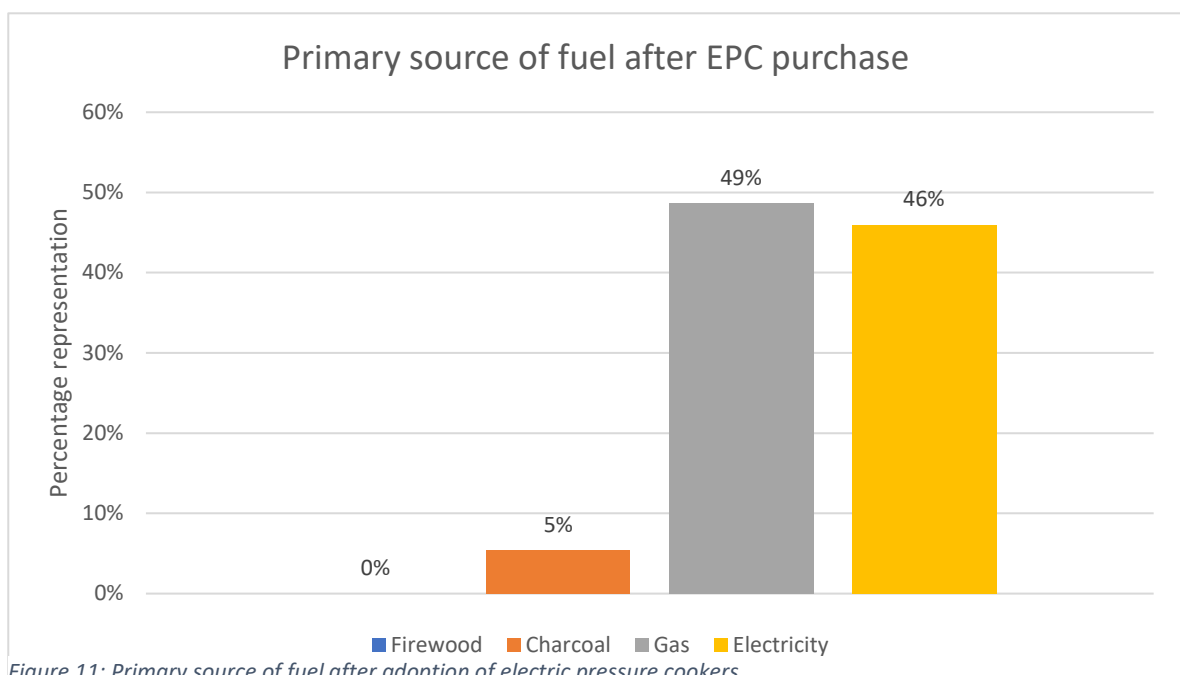


Figure 11: Primary source of fuel after adoption of electric pressure cookers

- vi. Electricity Average Revenue Per User (ARPU) increases for beneficiaries of the ‘cooking appliance StimaLoan’ and electric bike charging station operator.

Findings: The observed typical average consumption of electricity from the EPCs/day 0.675per day from the metered cooking devices. This translates to an average demand of 20.25kWh/month of electricity demand per household on average. If this consumption is scaled to reach 70% of Kenya Power’s customers, it would result in more than 1,564GWh/year of demand. Given the current unit sales from domestic consumption reported in Kenya Power’s annual report stood at 3,166kWh/year, this would translate to 50% growth in sales for the company a figure that would increase revenue by more than 20 billion Kenya shillings.

- vii. Utilization of EPCs by customers. 40 percent of the customers use the electric pressure cookers daily.

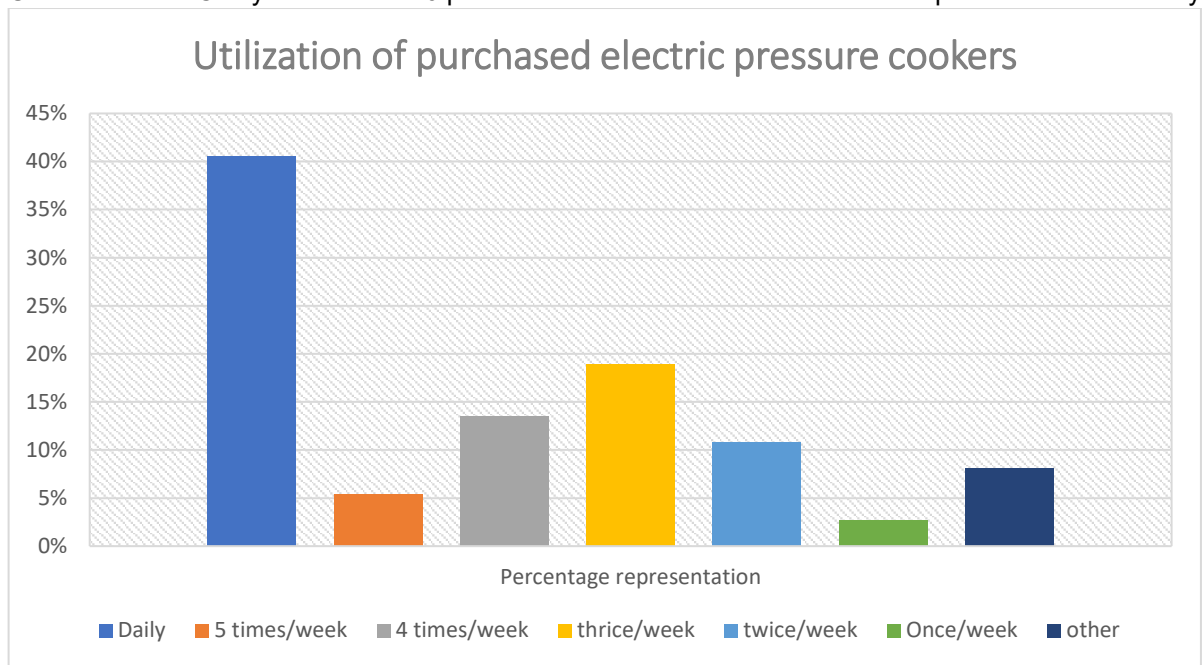


Figure 12: EPC utilization habits by customers

- viii. Participating households and businesses make net savings on their energy expenditures, which can align with the repayment of the appliance/eBikes over a commercially viable repayment period.



Figure 13: Patrick Sila, Electric boda rider using the ovEgo bike for delivery services

Findings: Charcoal prices vary but from our research, this figure ranges between KES 50 and KES 70 for a tin (Ngorongoro). From a survey conducted at the end of the project, customers are saving a mean of KES 1,359 per month by cooking with electricity and at least 3,612 by driving electric motor bikes.

With the electric bikes, the consumption emanating from charging from 30% to 100% bike capacity for the ovEgo – F3B electric bike is 3.4kWh. This will cost about KES 74.57 if the bike is charged using the electric mobility tariff provide for off-peak charging. In order to cover this sort of distance using a normal 150cc petrol bike, this will cost about KES 302 given the current cost of a liter of petrol which is KES 194/liter in Nairobi. Even if charging was to be done at home using the ordinary tariff of KES 20.97/kWh, the bike rider would still only incur a charging cost of KES 130.27 for the same 70km distance. This is a saving of between KES 172 to KES 228 per day which can be used to cover between 20% - 27% of the cost of a new bike if savings are accumulated for one year. This then means a bike can pay itself back in 3.7 – 5 years through saving alone.

- ix. Hypothesis: Women, girls and youth in beneficiary households will be impacted positively through time savings, cost savings and health improvements as a result of dirty fuel replacement.

Findings:

To date, a total of 401 potential customers have been reached with the product offering in various joint marketing and awareness forums set up by PowerPay and Kenya Power. 18% of the customers benefiting from the product so far are men, while 82% of the buyers are women. However, in some cases the buyers of the cookers are not necessarily the users. 78% of beneficiaries when asked why they are happy to use the EPC said that it is cost effective and is saving them money. A survey conducted on a sample of the beneficiaries indicated that 49% are saving an average of 37 minutes per day, 16% indicate that they are saving time but not sure how much while 35% did not give an answer. Cost effectiveness is at the top of the reasons why customers are happy with the cooker. Other reasons included versatility, safety and the ease of use.

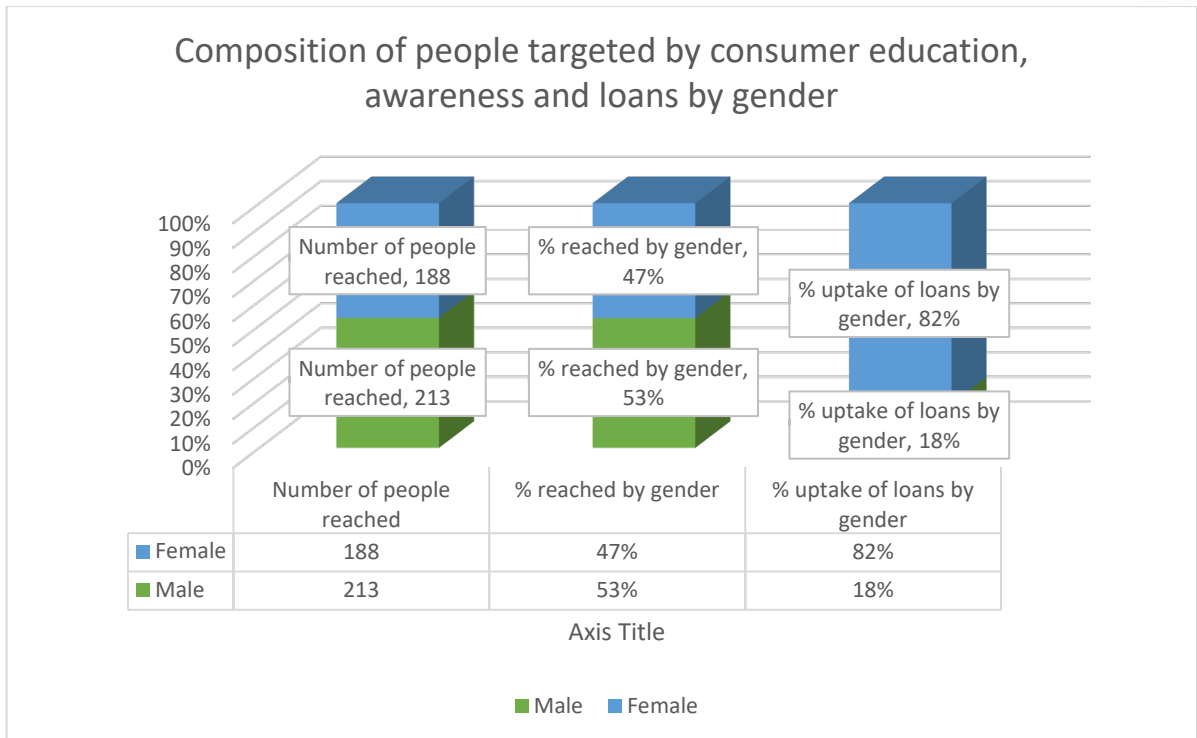


Figure 14: Composition of people targeted by consumer education, awareness creation, and loans by gender

Conclusion and recommendations

As observed from the study, about 401 customers were reached directly through awareness and demonstration events. Our conclusion is that Kenya Power customers informed about availability of a 'eCooking & eMobility StimaLoan' are willing to take up eCooking appliances and electric bikes on credit given that 193 cookers have been sold as a result of these consumer awareness and education representing an uptake of 48%. This shows a very high customer conversion rate. We can also conclude that the messaging, awareness and demonstration activities carried out by Kenya Power and PowerPay are highly effective.

As at 2019, only 3% of households own an electric cooking appliance. This is largely attributed to the high cost of the cookstove and the perceived high cost of electricity as a cooking option. (MoE 2019). This experimental study addressed these two challenges using financing options allowing customers to pay for their products using instalments of up to 12 months in order to address the spring barrier and at the same time tackling the perception of high costs through cooking awareness and demonstration was done to educate customers about electric cooking. While the latter is a costly affair, the importance of proper consumer awareness and education in overcoming adoption challenges cannot be overemphasized. From the project, it has been observed that Secondly, 72% of the customers who bought cookers needed to pay in instalments of between 2 months and 12 months while 28% were able to pay within a month in two instalments. We can conclude that PAYGo technology and business model therefore increased the uptake of the appliances by 250%.

The project adopted a '**cooking is believing**' approach given that for most consumers, the perceived high cost of electricity has been a huge barrier to adoption. This involved on location metering of the cooking exercise where attendees would observe the metered cooking exercise and be able to estimate the cooking costs of the meals together with the PowerPay and Kenya Power team. Going forward, partnerships like this will be essential for utility companies to be able to raise awareness and increase adoption of electric cooking. Due to the metering done during demonstrations, it was observed that the misconception that cooking with electricity once addressed would lead to quick conversion of the customer.

One of the benefits of working with Kenya Power is the wide coverage of offices, infrastructure and networks around the country. In order to have rapid consumer awareness and adoption, working with Kenya Power has proven to be very effective. While this pilot was small targeting to reach 200 consumers, the geographical reach of the project has been tremendous. The project managed to reach consumers in 8 counties in Kenya proving that working with the company even in a small pilot can give a broad reach. Moving forward, leveraging on Kenya Power's existing customer base reaching more than 8 million, county and subcounty offices across the country and their marketing staff who understand the various customer segments will be an asset as electric cooking is moved towards scale.

While Kenya Power can play a big role in consumer awareness and consumer education needs, the efforts need to be combined with provision of information about how one could immediately acquire a cooker i.e. the product needs to be available and accessible as awareness and consumer education are carried out hence the need to strengthen collaboration with private sector equipment sellers. Products were made available by PowerPay and customers could easily just sign up of the PowerPay marketplace <https://powerpayafrica.com> and get a product delivered to their location, Kenya Power Banking halls and cooking demo centers. This was very effective in building confidence from the consumers that they could get quality and convenience in buying the products added to the benefit of paying in instalments.



Image 10: Collaboration in creating awareness and consumer education Among Kenya Power, PowerPay and Nyalore Impact. (Photo Courtesy of PowerPay)

The project observed a high collection rate. Over 95% of the loans were being repaid on time and only 2.2% of the total was receivables at risk at the close of the study. This is an early indication that there is a high willingness and ability to pay for electric pressure cookers among Kenya Power's customers. However, this is a small sample size compared to the population of Kenya Power's consumers who have now reached 8.7 million. Using the loan products developed under this project, a larger scale project is required to really determine what this would look like at scale. In addition, it was envisioned that there would be some form of data sharing between Kenya Power and PowerPay to enable credit analysis using existing Kenya Power data. However, the project duration was too short to allow for formal arrangements between PowerPay and Kenya Power in regard to data sharing and enhancing the role that Kenya Power can play in strengthening the role of lenders for its consumers. This project recommends further exploration of data sharing and how this can improve credit scoring and enhance beyond the meter visibility of consumer demand.

As pertains demand generation data, PowerPay recommends more collaboration in order to mirror the data generated from electric cooking devices with Kenya Power's metered data and understand the growth and trends better. Furthermore, Kenya Power has developed a tool for calculation of grid emission factor which keeps changing from time to time. Linking this grid emission factor data in real time to PowerPay's software would enhance accuracy of carbon emission reduction calculations for consumers and carbon project developers. This would support the entire cooking and electric mobility decarbonization agenda.

Electricity Average Revenue Per User (ARPU) increased for beneficiaries of the 'cooking appliance StimaLoan' and electric bike charging station operator. With an observed average consumption of electricity from the EPCs of 0.675kWh per day from the metered cooking devices, the clean cooking frontier holds immense potential to grow electricity sales for the utility. In a scenario where this consumption which amounts to 20.25kWh/month of electricity demand per household on average, is scaled to reach 70% of Kenya Power's customers, it would

result in more than 1,564GWh of demand. Given the current unit sales from domestic consumption reported in Kenya Power's annual report stood at 3,166kWh, this would translate to 50% growth in sales for the company a figure that would increase revenue by more than 20 billion Kenya shillings. We can therefore conclude that while raising tariffs may have been necessary in the short term, generating additional demand can offer a more sustainable way of increasing revenue longer term given that high tariffs will lead to limited usage of eCooking appliances and more people looking at distributed alternatives for electricity supply aiding Kenya Power's competition.

The electrification of cooking and mobility through the "StimaLoan mechanism" can result in substantial revenue increase and carbon emission reductions as Kenya's generation mix is over 90% renewable. On one hand with an average 20.25kWh consumed by each household, and on the other hand projecting 70% Kenya Power's current 9.2 million customers switched to eCooking, this would result in more than 1GWh (1,564,920,000) of electricity which would be replacing charcoal and firewood. This would result in more than 25 billion shillings in revenue annually from the domestic consumers a figure which has the potential to increase domestic consumer revenue by more than 50% annually. Further incentivization through lower tariffs could add to this revenue but further analysis is recommended possibly using a pilot sample of consumers. In regard to carbon emission reductions, it was observed that 88% of customers using charcoal and 100% of those who were using firewood switched completely from these biomass sources of fuels. That is an indication of the potential direct contribution electrification of cooking can make towards decreasing the rate of deforestation and carbon emissions. On average, each household has reduced emissions at a rate of 0.714kg/day, which amounts to 260kg of CO₂ per year. This suggests that if 70% of Kenya Power's customers adopted electric cooking the utility would contribute to a reduction in emissions totaling 2,392,000,000 kgs of carbon per year. While this number appears low compared to estimates within the Kenya eCooking Market Assessment February 2022, it is important to note that some of the users adopted the cookers very close to the end of the project hence some had barely started using it.

It has been observed that participating households and businesses are making net savings on their energy expenditures, which can align with the repayment of the appliance/eBikes over a commercially viable repayment period. Electric cooking can enable households and businesses make net savings on their energy expenditures, which can align with the repayment of the appliance/eBikes over a commercially viable repayment period. From our research, charcoal costs for example range between KES 50 and KES 70 for a tin (Ngorongoro). Findings: Charcoal prices vary but from our research, this figure ranges between KES 50 and KES 70 for a tin (Ngorongoro). From a survey conducted at the end of the project, customers are saving a mean of KES 1,359 per month by cooking with electricity and at least 3,612 by driving electric motor bikes. This is a saving can be used to cover between 20% - 27% of the cost of a new bike if savings are accumulated for one year.

Women, girls and youth in beneficiary households will be impacted positively through time savings, cost savings and health improvements as a result of dirty fuel replacement. Though more men were reached with consumer education than women, still the latter purchased four times the number of cookers bought by the male counterparts. Consumer awareness and education therefore needs to target women since they remain the primary cooking energy managers at home. This also can further indicate that the decision to buy cooking equipment is done by women. Secondly, 16% of the women surveyed indicated that they have enjoyed time savings while 78% have indicated that they have saved on cost of cooking.

46% of those reached by the loans earn below \$5/day. This means that an electric cooking stima loan campaign even though directed at the general public would still positively impact the bottom of the pyramid most. Subsidies and carbon financing can still be leveraged to benefit this population since disaggregation of data is possible using the PowerPay platform. Moving forward, we recommend a larger scale pilot involving at least 10,000 units to be done to test the loaning mechanism and test a carbon financing element that could bring down the cost of the cookers to see the impact of this on reaching the bottom of the pyramid.

In regard to whether Kenya Power is going to extend the "eCooking & eMobility StimaLoan" on its own or in conjunction with other lenders such as PowerPay Limited or Equity Bank beyond the project period, this project is limited due to the fact that these are decisions that require a higher level of diverse range of stakeholders including policy makers (MoE), EPRA the regulator, the Board of Directors at Kenya Power among others. This

also applies to data sharing arrangements which we have been advised would be dealt with on a case to case where interested party directly engages Kenya Power with a Proposal on specific engagements.

Our conclusion is that PowerPay should continue offering the Stima Loan product on its <https://powerpayafrica.com> as the product is currently structured to work well and has already generated traction from customers. However, there are ways that Kenya Power can support PowerPay to scale faster. These include collaboration in popularizing the PowerPay platform and increasing loan aggregation, financing and digitalization, It can also be done by working together on awareness creation through Kenya Power e-cooking hubs, enhancing credit scoring data using historical customer bill payment information, providing emission factor data in real time through API to the carbon market and consumer engagement through Kenya Power's SMS and digital platforms as well working collaboratively with private sector and government owned banks to bring innovations that could enhance participation of lenders in electrifying the cooking space. However, this needs to be supported by the institution in a more formalized way where efforts can be planned and results measured to evaluate the impact of the utilities efforts towards electrification of clean cooking and mobility space.

The role of technology has underpinned success in the pilot. This has been done by digitalizing customer onboarding process whereby a consumer in a remote location can be able to sign up and receive a product from anywhere in the country. This has minimized costs of consumer acquisition and loan management given the ability to collect revenue and activate and deactivate devices is remote. Bringing in a technology and PAYgo element to the e-cooking/appliances sector enhances credit risk management for lenders since device location and 'switch on switch off' capability will help with device management and enforcing payments. At scale, the PowerPay platform can be utilized by Kenya Power to aggregate demand for lenders and distributors while at the same time enabling the utility to have visibility of the demand growth and the impact of adoption of e-cooking and electric mobility on the entire grid.

In addition, technology has enhanced device visibility beyond the meter which has the potential to improve the impact of utility's demand generation and possibly improve demand side management. It is also important in enhancing collection rates. This in effect has also opened a door to address the challenges of on bill financing where the utility company would have had reservations about switching off a household's whole power supply, the PowerPay IoT has provided a way to turn off the appliance in question to enforce payments.

Apart from this, the project has demonstrated the importance of the PowerPay IoT in understanding the impact of electric cooking on carbon emission reductions. In conclusion the utilization of the PowerPay IoT Technology can enhance measurement and reporting of carbon emission reductions making it easier to bring carbon financing into clean cooking projects at scale and bring transparency that can improve benefit sharing from the carbon market. This project has demonstrated that the interoperable PowerPay IoT and software platform can bring visibility into household level consumption of energy from electric cooking making it possible to quantify project emissions in a simple way.

Moving forward, PowerPay will work with Kenya Power to scale the supply and financing for digitalized appliances by making the technology platform available to lenders and distributors of electric appliances and reaching buyers with financing products through its <https://powerpayafrica.com> marketplace. The company will endeavor to work together with Kenya Power to bring together a pool of lenders to scale financing for EPCs and electric bikes with a target to reach at least 2,000,000 customers over the next 5 years. The company would like to build closer data sharing collaboration with Kenya Power which would allow Kenya Power to have real time visibility of eCooking data from PowerPay's digitalized cookers. We believe this data sharing is important in moving the utility towards an electric cooking tariff and defining time of use charges for cooking. In the long term, integration of Kenya Power's customer credit profiles into the lending and credit scoring mechanisms of PowerPay would enable further reduction of credit risk and encourage lenders to lend to KPLC's customers. As a next step, PowerPay IoT will be aiming to pilot the on-bill financing with Kenya Power and link data sharing through API to the utility's data management platform.

References

R, Mutiso., J, Taneja. 2018: The Seven Major Threats to Kenya's Power Sector.

<https://www.energyforgrowth.org/memo/the-seven-major-threats-to-kenyas-power-sector/>

The Kenya Power and Lighting Company PLC. (2022): Annual report and financial statements for the year ended 30th June 2022

J. Leary. 2022: Kenya eCooking Market Assessment

J. Leary., J, Todd. 2019: The Kenya eCookbook; Beans and cereals edition

Energy Sector Management Assistance Program (ESMAP). 2020. Cooking with Electricity: A Cost Perspective. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO

MECS And Energy 4 Impact July 2021: Clean cooking: Financing appliances for end users. (Report 2 of the financing clean cooking series)

N. Khaki., R. Borst., K. Kennedy., M. Mattern. 2021: PAYGo PERFORM; Financial, Operational, and Portfolio Quality KPIs for the PAYGo solar industry

Ministry of Energy 2019: Kenya Cooking Sector Study

Appendix I – Interview Questions

A. Kenya Power and Lighting Company Staff interview questions

General information

1. Name of respondent:
2. Name of Organization:
3. Position
4. Nature of work

Knowledge about the StimaLoan Product and interaction with the product

5. Are you aware of the existence of the StimaLoan product?
6. How have you interacted with the workings of the StimaLoan?
7. What is your assessment of the successes, challenges that the StimaLoan has had?
8. In regard to StimaLoan and Last Mile Connectivity project loan management, what are Kenya Power's strengths and weaknesses?
9. What can be done to address these weaknesses?
10. What could be done differently?
11. What was done to establish customer willingness and ability to pay and good borrowing character? What can be carried forward?
12. What was Kenya Power's capacity for loan follow up on the ground?
13. What was the procedure for writing loans off?
14. How can Kenya Power better deal with default management?
15. If implemented by another partner, how would Kenya Power help with 11 above?
16. Is it easier to enforce payment with digital or analogue meters?

Institutional arrangements

17. What is the institutional structure of the StimaLoan product and how do various partners interact?
18. Are there any challenges or good lessons that can be scaled from the current structure?
19. Looking forward, what institutional structure would you recommend for a future StimaLoan product focused on electric cooking and e- mobility
20. Are you engaged or plan to be engaged in any activities with future StimaLoan initiatives?
21. How would a future loan product for clean cooking and e-mobility be administered?
22. Is Kenya Power willing to offer on the bill financing?

- 23. Under what circumstances would OBF make sense for Kenya Power?
- 24. Are there other alternatives to OBF that Kenya Power would find viable to support the uptake of electric cooking?
- 23. What role would Kenya Power Play?

Digitalization

- 24. PowerPay will be providing loan management as well as the technology to monitor utilization, location, time of use data for each cooking device. Looking forward are their specific activities or recommendations KPLC would like to engage in with PowerPay?
- 25. How can digitalization of appliances and equipment be useful to Kenya Power in future and what data points would the organization be most interested in from these devices?
- 26. How can exchange of information between Kenya Power and PowerPay be enhanced to improve loan management as well as the utilities ability to have a view of consumer's' demand beyond the meter?
- 27. What legal or other arrangements need to be put in place to make this happen with the least friction?

B. External stakeholders

- 1. Name of respondent:
- 2. Name of Organization:
- 3. Position
- 4. What nature of interaction have you had with Kenya Power's StimaLoan
- 5. Duration of interaction with StimaLoan product
- 6. How has the nature of interaction between yourselves changed over time?

- | | |
|--|--|
| <input type="checkbox"/> Increased focus on information exchange | <input type="checkbox"/> Decreased focus on information exchange |
| <input type="checkbox"/> Increased technical support | <input type="checkbox"/> Decreased technical support |
| <input type="checkbox"/> Increased financial support | <input type="checkbox"/> Decreased financial support |
| <input type="checkbox"/> Increased areas of interaction | <input type="checkbox"/> Decreased areas of interaction |
| <input type="checkbox"/> Other (please Specify) | |

- 7. What are the advantages of working with the Kenya Power StimaLoan team

- | | | |
|--|--|--|
| <input type="checkbox"/> Technical capacity | <input type="checkbox"/> Training Quality | <input type="checkbox"/> Information Quality |
| <input type="checkbox"/> Proximity | <input type="checkbox"/> Reputation | <input type="checkbox"/> Reputation |
| <input type="checkbox"/> Access to customer data | <input type="checkbox"/> Ability to leverage existing customer relationships | |
| <input type="checkbox"/> Others (please specify) | | |

- 8. What are the challenges

- | | |
|---|--|
| <input type="checkbox"/> Lack of technical capacity | <input type="checkbox"/> Information Quality |
| <input type="checkbox"/> Training Quality | <input type="checkbox"/> Proximity |

☰ Others (please specify)

9. What would make Kenya Power StimaLoan facility a more attractive partner to work with?

10. What contribution, as a partner, would you be willing to provide to enhance access to credit for Kenya Power consumers targeting electric pressure cookers and e-mobility?

11. What are the specific concerns and elements you would like to see addressed and included in the study?

Appendix II: Detailed loan product description and procedures for both eCooking and eMobility(bikes)

Electric Pressure Cooker Loan diversification	
The product created for home/commercial use, whose features are as below;	
LOAN AMOUNT	<ul style="list-style-type: none"> 12,600KES
LOAN TERM	<ul style="list-style-type: none"> 3-12 MONTHS GRADUATED AS BELOW 0-1MONTH-12,600KES 3MONTHS-3,784 KES 6MONTHS- 2,104 KES 9MONTHS- 1,544 KES 12MONTHS- 1,264 KES
BENEFIT	<ul style="list-style-type: none"> AFFORDABLE WITH NO HIDDEN CHARGES FLEXIBLE REPAYMENT LOAN PROCESSING WITHIN 48 HRS ACCESS TO BUSINESS AND FINANCIAL EDUCATION
PURPOSE	<ul style="list-style-type: none"> AFFORDABLE COOKING AID LEADING TO INCREASED BUSINESS WORKING CAPITAL
PRICING	<ul style="list-style-type: none"> PROCESSING FEE 5% INTEREST RATE 4.2% INSURANCE FEE 0.6 % OF LOAN AMOUNT
LOAN REPAYMENT	<ul style="list-style-type: none"> LOAN WILL BE PAID MONTHLY TOVIA....BY THEOF EVERY MONTH UNTIL THE LAST INSTALMENT IS DONE.
QUALIFICATION CRITERIA	<ul style="list-style-type: none"> ABOVE 18 YRS OF AGE AND MAXIMUM OF 69 YEARS CONSISTENT CASH FLOWS PREFERABLY LIVE IN THEIR OWN HOMES WITH PROOF OF VERIFIABLE KENYA POWER UTILITY BILLS TO REDUCE ON FLIGHT RISK AND IMPROVE VEIRIFCATION OF CONSUMPTION CLIENT SHOULD BE WITHIN INSURABLE AGE CLIENT SHOULD NOT BE ADVERSELY LISTED (SHOULD HAVE A GOOD CREDIT SCORE)
REQUIREMENTS	<ul style="list-style-type: none"> NATIONAL ID UTILITY BILLS SKETCH MAP DULY FILLED APPLICATION BUSINESS RECORDS/PROOF OF INCOME
LOAN SECURITY/COLLATERAL	<ul style="list-style-type: none"> 2 GUARANTORS (INDIVIDUALS) 1 GUARANTOR IF IT IS AN INSTITUTION
CONSIDERATIONS	<ul style="list-style-type: none"> ABILITY TO PAY 30% BORROWER CHARACTER 20% BORROWER CAPACITY 10% FINANCIAL 20%
INHERENT RISKS	<ul style="list-style-type: none"> DEFAULT

	<ul style="list-style-type: none"> • DEATH OF CLIENT • THEFT • PERMANENT DISABILITY • POLITICAL RISK 			
LOAN PROCESS FLOW				
PROCESS	ACTIVITY	ACTION OWNER	TAT	REFERENCE
Customer Onboarding	Marketing	Field Officer	
Prequalification/Analysis	Analysing of documentation and client applications	Credit Analysis	
Approval of Application	Approval of analysed applications	Approval committee	
Acceptance and Processing	Client acceptance of T&Cs, Dispatch of item	Field Officers	

KEY CONSIDERATIONS;

- Data analyzed in real time and captured in the last month This means the data captured is latest data showing client ability as well as any adverse listings on CRB
- Scoring factors and measures
- Lending is backed by Risk analyst's assessment

- Amount allocated is guided by projected 20% of average turnover. This is just to demonstrate ability. If a client is struggling with income inflows, availability of the deposit will not guarantee future payments and the possibility of the facility falling into default

MODEL RISKS AND MITIGANTS

- DATA is system generated and reviewed by the risk analyst
- All applications will be analyzed and approved by an approval committee
- The pre-qualification team (field officers) will manage the model assessment serving as maker-checker of the process.
- Constant and consistent monitoring to prevent any slippages and ensuring engagement is done within 48 hours of breach. There can also be additional information for say a guarantor who can assist in the eventuality of collection.

4.0 STOP LOSS

Product will have a stop loss of 30 days to trigger monitoring and tracking reported within 48 hours of breach. Circumstances will thereafter determine next course of action including but not limited to collection in full or recovery measures. This is described below;

- Monitoring by officer before slippage
- Visit by monitoring officer on breach and a report provided with a PTP (Promise To Pay) within 48 hours
- Depending on the outcome of the visit, monitoring/ collection officer ensures compliance to the PTP
- Security realization (repossession of Product)

SIGN OFF

NAME	DESIGNATION	SIGNATURE	DATE	
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Image Error! Main Document Only.: E bike loan application page on the <https://powerpayafrica.com>(Photo courtesy of PowerPay)

Electric Motorbike Loan Product Diversification	
The product is created for commercial use, whose features are as below;	
LOAN AMOUNT	<ul style="list-style-type: none"> 185,000KES
LOAN TERM	<ul style="list-style-type: none"> MAXIMUM OF 12 MONTHS
BENEFIT	<ul style="list-style-type: none"> AFFORDABLE WITH NO HIDDEN CHARGES FLEXIBLE REPAYMENT LOAN PROCESSING WITHIN 48 HRS ACCESS TO BUSINESS AND FINANCIAL EDUCATION
PURPOSE	<ul style="list-style-type: none"> AFFORDABLE ELECTRIC BIKE TO CURB FUEL COSTS
PRICING	<ul style="list-style-type: none"> PROCESSING FEE 5% INTEREST RATE 2% INSURANCE FEE 0.6 % OF LOAN AMOUNT
LOAN REPAYMENT	<ul style="list-style-type: none"> LOAN WILL BE PAID MONTHLY TOVIA....BY THEOF EVERY MONTH UNTIL THE LAST INSTALMENT IS DONE.
	<ul style="list-style-type: none">
QUALIFICATION CRITERIA	<ul style="list-style-type: none"> ABOVE 18 YRS OF AGE AND MAXIMUM OF 69 YEARS CONSISTENT CASH FLOWS PREFERABLY LIVE IN THEIR OWN HOMES WITH PROOF OF UTILITY BILLS TO REDUCE ON FLIGHT RISK

	<ul style="list-style-type: none"> • CLIENT SHOULD BE WITHIN INSURABLE AGE • CLIENT SHOULD NOT BE ADVERSELY LISTED(SHOULD HAVE A GOOD CREDIT SCORE)
REQUIREMENTS	<ul style="list-style-type: none"> • NATIONAL ID • UTILITY BILLS • SKETCH MAP • DULY FILLED APPLICATION • BUSINESS RECORDS/PROOF OF INCOME
LOAN SECURITY/COLLATERAL	<ul style="list-style-type: none"> • 2 GUARANTORS • EBIKE LOGBOOK • COMPREHENSIVE INSURANCE COVER • JOINT REGISTRATION • TRACKING
CONSIDERATIONS	<ul style="list-style-type: none"> • ABILITY 30% • CHARACTER 20% • CAPACITY 10% • FINANCIAL 20%
INHERENT RISKS	<ul style="list-style-type: none"> • DEFAULT • DEATH OF CLIENT • THEFT OF BUSINESS PREMISES • PERMANENT DISABILITY • POLITICAL RISK

LOAN PROCESS FLOW				
PROCESS	ACTIVITY	ACTION OWNER	TAT	REFERENCE
Customer Onboarding	Marketing	Field Officer	
Prequalification/Analysis	Analysing of documentation and client applications	Credit Analysis	
Approval of Application	Approval of analysed applications	Approval committee	
Acceptance and Processing	Client acceptance of T&Cs,	Field Officers	
Security Perfection	Joint Registration Comprehensive Insurance Installation of Tracking Device with service provider	Risk Analyst	

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KEY CONSIDERATIONS;

- Data analyzed in real time and captured in the last month. This means the data captured is latest data showing client ability as well as any adverse listings on CRB

Scoring factors and measures

- Lending is backed by Risk analyst’s assessment
- On approval, security perfection must be done before dispatch or collection of the bike. Joint registration as well as comprehensive insurance must be done prior to release of the Ebike.
- Risk mitigation will be done by constant and consistent monitoring to prevent any slippages and ensuring engagement is done within 48 hours of breach. There can also be additional information for say a guarantor who can assist in the eventuality of collection. Installation of a tracking device is recommended to be mandatory as this will greatly reduce the chance of default due to theft.
- A Deposit of 10% is also mandatory as part of the qualifying criteria. Cash inflows(via account statement or MPESA statement is also crucial to demonstrate ability over and above deposit provided. This is to curb under or overfunding which will mitigate default.

MODEL RISKS AND MITIGANTS

- DATA is system generated and reviewed by the risk analyst
- All applications will be analyzed and approved by an approval committee
- The pre-qualification team (field officers) will manage the model assessment serving as maker-checker of the process.
- Installation of tracking device from a reputable service provider to ensure the bike can be tracked in the event of default. This will aid in tracing as well as help to shut down the bike for repossession purposes.

4.0 STOP LOSS

Product will have a stop loss of 30 days to trigger monitoring and tracking reported within 48 hours of breach or missing tracking signal.

Circumstances will thereafter determine next course of action including but not limited to collection in full or recovery measures as described below;

- Monitoring by officer before slippage
- Visit by monitoring officer on breach and a report provided with a PTP(Promise To Pay) within 48 hours
- Depending on the outcome of the visit, monitoring/ collection officer ensures compliance to the PTP
- Security realization (repossession of Product) via tracking system followed repossession.

5.0 SIGN OFF

NAME	DESIGNATION	SIGNATURE	DATE	

