ZAMBIA

OPPORTUNITIES AND BARRIERS

MECS
Modern Energy Cooking Services

Zambia Opportunities and Barriers Report

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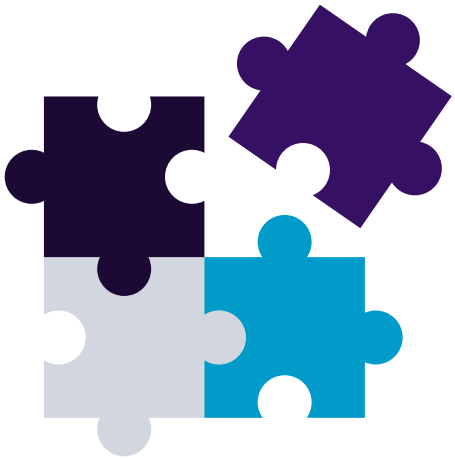
Loughborough University

ESMAP
Energy Sector Management Assistance Program

UKaid
from the British people

CEEEZ
Centre for Energy, Environment and Engineering Zambia Limited

Introduction



Purpose and Intent

The purpose of this paper is to collect and share evidence of opportunities and impediments to Zambia's multi-stakeholder network on modern energy cooking services.

This report contains excerpts from the results of work done in Zambia for the MECS programme, as well as information regarding other ongoing initiatives carried out by stakeholders such as the government, the corporate sector, and cooperating partners. The document focuses on ecooking and explores engagement opportunities by identifying gaps and hurdles to ecooking and highlighting key clean cooking stakeholders' actions.

Stakeholder Map

Stakeholders with a clean cooking agenda in Zambia have been identified and mapped. A visual illustration of the stakeholders and how the MECS programme seeks to interact with them is provided below

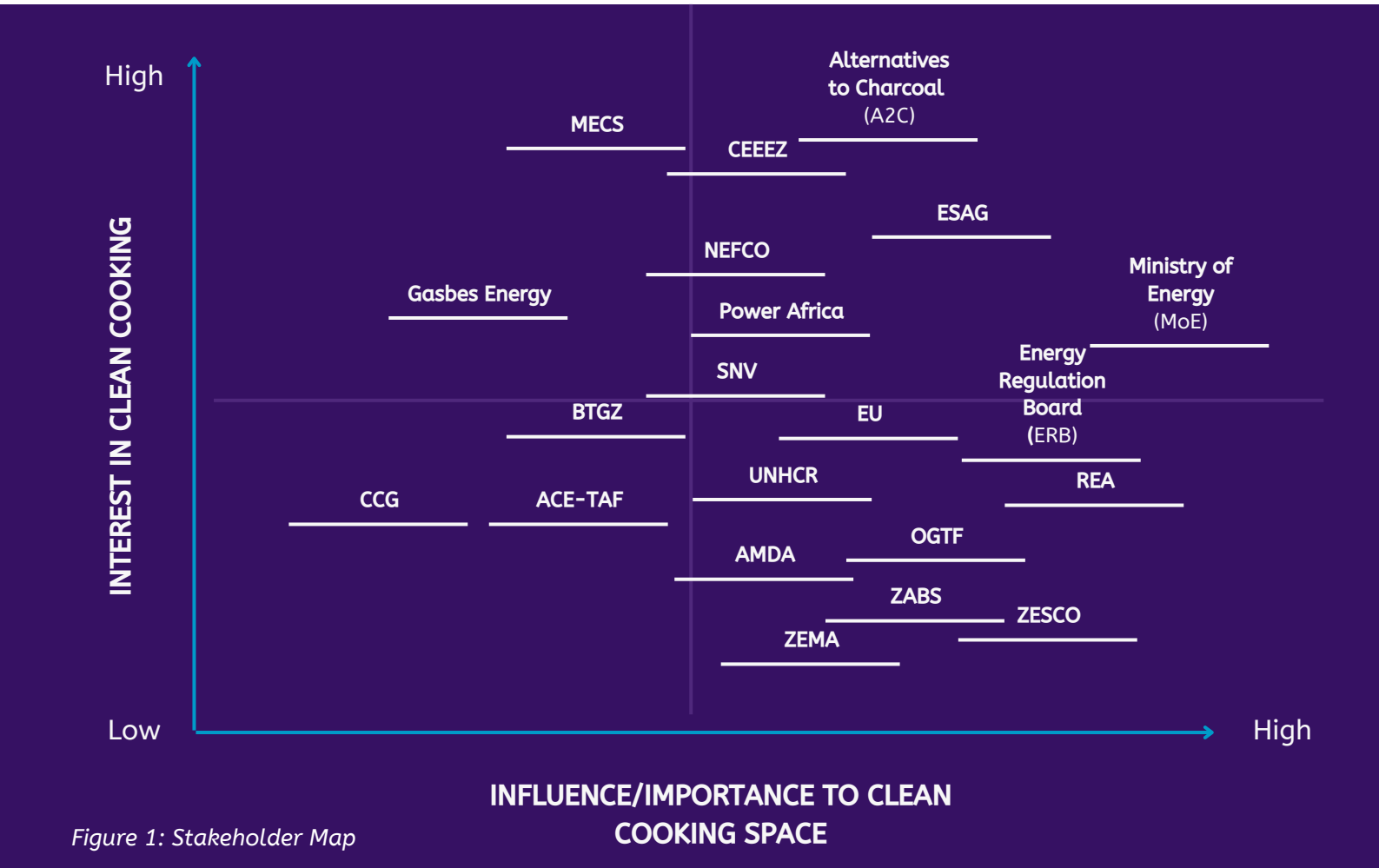


Figure 1: Stakeholder Map

MECS Zambia Activities

CEEEZ

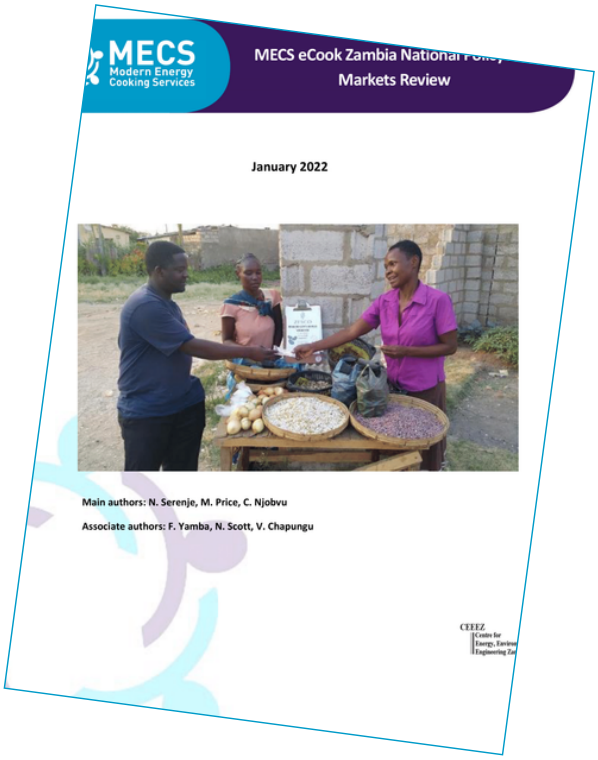
The MECS programme has being implemented in Zambia by it's Southern country partner Centre for Energy Environment and Engineering Zambia (CEEEZ). The activities undertaken were divided into four Work Packages (WPs). These were:

WP 1: Preparatory activities which included: - the Kitchen lab tests on five common dishes; Conducting tests on LPG, electric stove, EPC and charcoal stove. These two activities were to feed into the Zambia eCookbook.

WP 2: Multi stakeholder assessment, awareness, and advocacy to influence improved enabling environment of MECS. The Stakeholders included government, utility, cooperating partners, retailers, end-users. The methods have included interviews, events, and media outreach.

WP 3: Understanding the compatibility of Zambian cooking practices with on grid / mini grid and off grid electrification. Data collection has involved cooking diary and FGD activities with participation of persons with disabilities; training and trialling LPG and EPCs.

WP 4: Understanding the supply chain for MECS. The Appliance availability survey was conducted in 6 selected districts across the country.



Kitchen Laboratory Test

The Kitchen Lab tests report provides insight into the role that energy-efficient cooking devices can play in Zambia's clean energy future. Kitchen lab test methodologies have been developed by the MECS Programme to investigate the potential energy, time, and cost savings from using more efficient cooking devices, as well as the suitability of the devices for local cuisines. This is a mixed-methods approach, combining Controlled Cooking Tests (CCTs) with qualitative data that takes account of the cooking experience as well as the quality of the dish from an eating perspective. This report focuses on the results concerning four cooking devices: two that are commonly used in Zambia today (a charcoal mbaula stove and an electric hotplate) and two modern, clean and energy-efficient devise (an electric pressure cooker (EPC) and an LPG stove). Tests were completed on five dishes that are regularly prepared in a typical Zambian household. The fives dishes are: nshima, bean stew, chicken stew, porridge (with groundnut powder) and rape vegetable **[1]**

The cost and time savings of the electric pressure cooker show that electric cooking can play a significant role in Zambia's clean cooking transition without overloading the national grid. In fact, if inefficient electric appliances such as hotplates and ovens were phased out and replaced by EPCs, Zambia's reliance could be significantly reduced below the 20% target for urban areas by 2030. Currently, LPG appears to also be a better alternative than the inefficient electric hotplate at the highest electricity tariff. Despite charcoal stoves being extremely affordable without the need for consumer finance solutions, the cost of cooking with charcoal tends to be higher than the cost of cooking with modern energy alternatives.

Zambia modern Energy Cookbook

The cookbook, known as 'Zambian Modern Energy Cookbook' builds up on the kitchen lab studies. It does so by showcasing energy, time and cost savings that are possible using energy efficient cooking devices for typical Zambian dishes. The cookbook includes stories from two cooks who have integrated energy efficient electric cooking and LPG in their daily lives; the fives dishes and looking at energy and cost saving tips during preparation; and various fuels available in Zambia **[2]**.

The modern energy cookbook aims to show how:

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

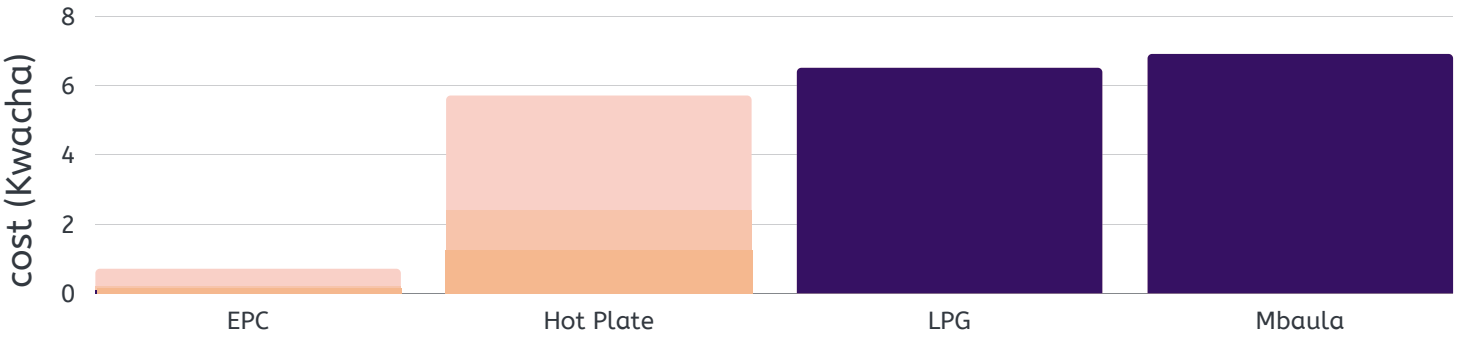


Figure 2: The cost of cooking beans in various fuels, shown in the Zambia eCookbook

Policy and regulatory framework

The Policy and regulatory framework report of 2022 is an updated from the first report published in 2019. The report reveals that there has been an increase in the number of stakeholders within the clean cooking sector with most international players advocating for higher Tier stoves (3 and above) which focus on electricity, LPG and biofuels. Nonetheless there continue to be barriers in the clean cooking sector, particularly when it comes to addressing past issues such as poor grid connectivity, while at the same time proposing an ideal fuel mix for Zambia. For example, to date, there have been few clean cooking projects looking at electric cooking, as ZESCO are actively encouraging their users to switch to LPG in an attempt to reduce the loading on the grid and prevent further load shedding **[3]**

Awareness raising (Agritech TV, radio, SSU, EPC manual)

Awareness raising has been conducted via different means to increase information outreach to different stakeholders, especially end users. The Agritech Expo is a professional business led event servicing the needs of the entire agri-value chain in Zambia and its neighbouring countries **[4]**. This event is held annually but had not taken place for close to two years because of the COVID-19 pandemic. In April 2022 the Expo opened to the public, and while working in partnership with Harvest Plus **[5]**, CEEEZ demonstrated modern energy clean cooking with the EPC. Nshima was prepared and the Expo participants were invited to taste the dish. Flyers containing results from the Kitchen Lab tests and links/QR Codes to the YouTube videos of how to prepare the five selected dishes in an EPC were also handed out.

CEEEZ appeared on ABN TV Zambi and Millennium radio to talk about the MECS programme and the importance of clean cooking.
An EPC Training Manual has been prepared by CEEEZ to aid stakeholders who would like to introduce the appliance train households/communities.

It gives information on what an EPC is, how it has evolved and explain its unique features to ensure safe and efficient use by the end user.

The MECS programme through their partnership with (Mediae) the producers of Shamba Shape Up **[6]** aim to inform 520,000+ small holder framers on the range of benefits associated with modern energy cooking services in the following 6 ways 1) Myth-busting regarding electricity being too expensive. Use hot plate vs EPC to show that electricity is not the problem, but the misuse of it using inefficient devices. 2) Cooking nshima as an example (to show how diverse the EPC is. 3) Focus group-type discussion on EPCs in Copperbelt area with an EPC demo on how to use. 4) Safety of LPG- myth-busting of dangers of using LPG- safety tips on how to use. 5) LPG/electricity fuel stack- demonstration of meals and scenarios of when to use EPC and when to use LPG or induction. 6) Visit a supermarket to highlight which devices are energy efficient.

Mini-gird survey

The report aims to showcase the results from focus group discussions that were held with high, medium, and low-income clusters in two communities in Lusaka to understand whether electricity and LPG are the aspirational fuels for most households and establish the main challenges preventing wider adoption of modern energy cooking.

The FGDs identified several issues that need to be addressed to scale up the use of mecs.

- Infrastructure needs to be strengthened to improve the quality of the supply of electricity and to improve the availability of LPG.
- Business models should include affordable delivery of LPG and flexible refill amounts.
- Marketing and awareness-raising campaigns should emphasize the convenience of modern fuels, such as time savings and cleanliness, and ongoing fuel cost savings.
- Marketing and awareness-raising campaigns should include community-level activities to take advantage of neighbourhood linkages.
- Marketing and awareness-raising campaigns need to address consumer concerns, including safety, and impaired taste (EPCs).

Appliance Availability

The report presents further understanding of the availability of electric cooking appliances in Zambia **[7]**. Five major cities were mapped for the survey. Findings show that the markets were dominated by high energy consumption appliances. Several recommendations of how to scale uptake of energy-efficient appliances in Zambia are made, including tax waiver incentives, behavioural awareness programmes, and the need to develop financing models for electric cooking appliances tailored to the needs of low- and middle-income grid connected households.

Cooking Diaries

The aim of this study was to assess potential cooking practices using energy efficient appliances, such as EPC, hot plate and LPG, through cooking dairies to ascertain the cooking time, fuel stacking, appliances usage, energy consumption in urban and peri urban households.

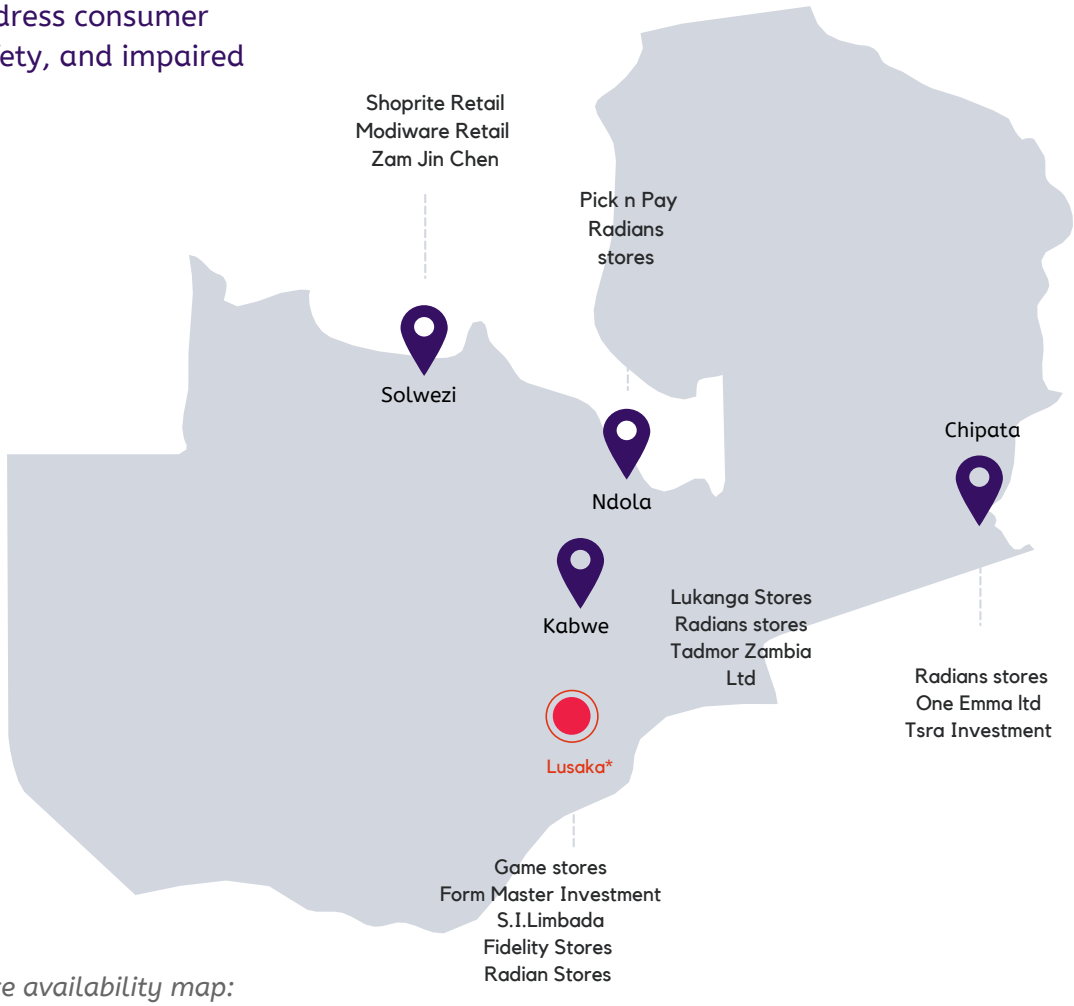


Figure 3: appliance availability map:

Mini-gird survey

The survey was undertaken to gauge the interest and willingness of mini-grid operators to support the uptake of electric cooking technologies such as Electric Pressure Cookers (EPC), to appreciate their capacity to develop demand-tailored systems that integrate and optimize electric cooking on either solar or mini-hydro grid. The survey investigated funding opportunities for electric cooking innovations in Zambia. Six companies were surveyed and these can be categorised into two groups (a) operators and (b) enablers. Of the operators interviewed, two were generating surplus power, and suggest that they would welcome additional customer loads to increase revenue; and the third expressed an interest in piloting EPCs. In the enablers category, one company proposed to install solar systems and sell to the national utility; the other is developing a Ready board to support EPCs on mini-grids; another is supporting bi0ethanol activities, and the last one is aware of EPCs.

NEFCO

MECS is providing technical assistance for NEFCO's Modern Cooking Facility Africa programme supporting access to clean cooking solutions.

UNHCR

UNHCR and FAO are working with MECS to conduct a baseline survey in urban displacement settings.

ATEC

MECS are collaborating with ATEC and Gold Standard to enhance the provision of clean cooking and accelerate higher scale and impact for emission reductions, thereby enhancing health and lives.

Accountable Partners
Collaborating significantly with MECS on specific project/s

Consulted Stakeholders
Regularly providing input or helping to move MECS agenda forward but MECS projects are not their sole focus.

Informed Beneficiaries
Wants to stay up-to-date and will provide feedback/input when necessary

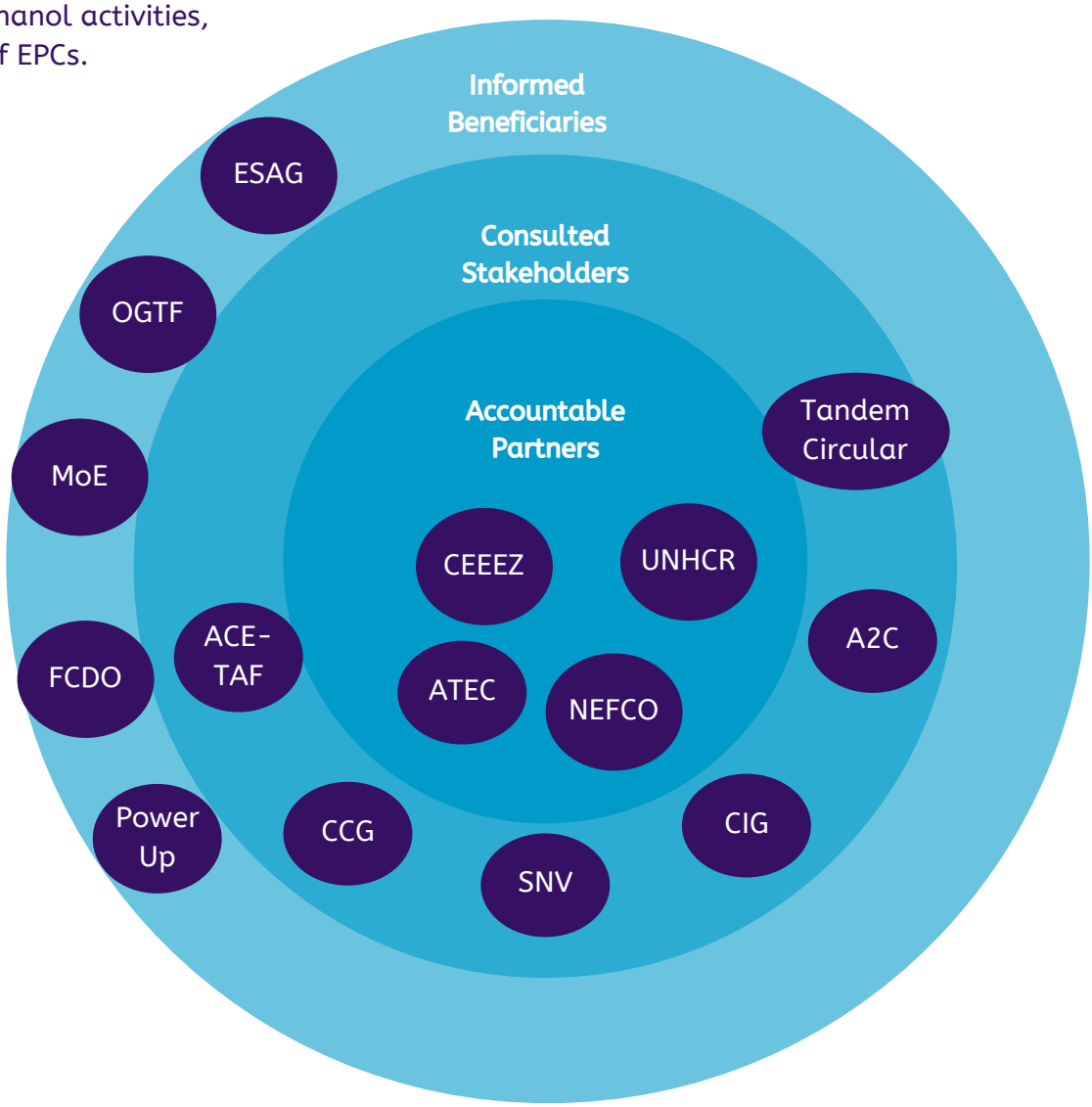


Figure 4: RACI matrix of MECS stakeholder engagement

Policy Enabling Environment

State of Access to electricity and clean cooking

Zambia has 2,800 MW of installed electricity generation capacity, of which 85% is hydro-based. National access to electricity averages at 31% with 67% of the urban and 4% of the rural population having access to power. The domestic sector consumes around 34% of the national electricity supply while the mining sector requires 51%. The Government of Zambia (GoZ) set a goal for universal electricity access for all Zambians by 2030. Zambia's energy is currently undergoing a massive transition after the government change in 2021 which includes restructuring of the national utility, Zesco as well as the review and adjustment of energy policies, planning approaches, and appliance standards.

According to the World Bank, access to clean cooking fuels and cooking technologies (as a percentage of the population) in Zambia was 10.4% in 2020 **[8]**. Electric cooking is used by 34-40% of the population in urban and peri-urban regions, and there is significant untapped potential to improve clean cooking and alleviate fuel stacking. Charcoal use continues to be high, and deforestation is a major issue in Zambia. Although some government planning has created a national aim of 40% cooking with LPG by 2030, the target does not appear feasible given the nascency of the industry, absence of supply chain and infrastructure, LPG fuel cost, and COP26 agreements.

Barriers and Drivers for Policy enabling environment in Zambia

Overall, clean cooking has played a very minor role in previous policies and strategic plans, as there are no coherent targets. However, it presently receives increasing attention from policy stakeholders and foreign donor programmes with a strong focus on the reduction of deforestation and higher-tier biomass stoves. The government is currently aiming to establish a national clean cooking strategy and has initiated a clean cooking committee at the Ministry of Energy (ESAG). The topic is also part of the off-grid task force. These efforts are significantly driven by external donors, especially USAIDs Alternatives to Charcoal (A2C) programme. The discussions are at an early stage.

Despite the MECS engagement and demonstration of the feasibility and cost-efficiency of ecooking in Zambia, key stakeholders remain critical of electric cooking which is also due to limited awareness of the benefits of ecooking and the belief that ecooking constitutes a significant proportion of demand on the grid(which is the case in some instances due to the use of old, inefficient cookers).

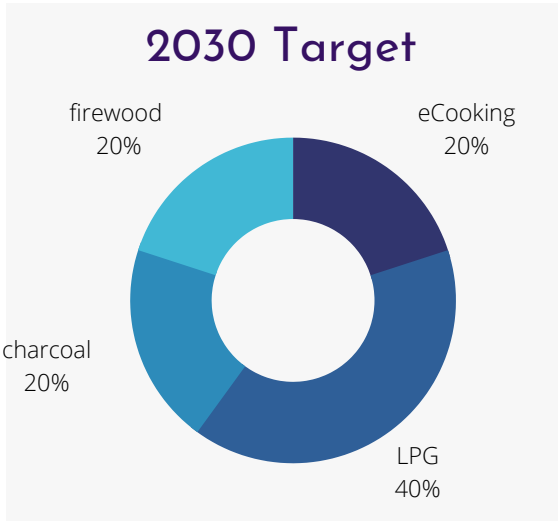


Figure 5: Government's national 2030 targets

Nonetheless, Increased grid connectivity through multiple electrification projects is a significant opportunity for eCooking, as there is an opportunity for cooking load to be considered in electrification plans and tariffs.

As charcoal and LPG prices continue to rise, ecooking could present itself as a more suitable alternative for both investment institutions and end-users.

Potential Drivers for eCooking	Barriers for eCooking
comparatively high levels of urban electrification compared to the SSA average	rapid scaling of ecooking are overall electricity access rates that are below the sub-Saharan African average
rising charcoal prices (A 25kg bag of charcoal in 2019-2020 was around K90-100. It is now K130-K145 and up to K160)	challenges in electricity generation (shortages) and supply (outages) as it is dependent on hydro power (85%) and this has been negatively affected by the recent occurrence of late rainfall
enhanced efforts to limit illegal charcoal production and trading (A2C are supporting forestry department on reducing deforestation)	Lack of alternative livelihood activities for those involved the charcoal value chain.
increasing availability of more energy efficient appliances (EPCs)	Lack of financing mechanisms for end-users to purchase appliances as it is currently via cash only payment system
investment in energy generation (+4MW added in 2020; 430MW wind & solar in the pipeline for the mining sector alone)	low energy tariffs and costly energy imports which create an opposition towards ecooking among certain players (e.g. Zesco).
potential adjustment of the tariff scheme based on a cost of services study which will help to make the domestic sector more attractive for energy infrastructure investment	
proven cost-efficiency of ecooking (MECS kitchen lab) and low/no-impact of scaled-up ecooking on grid-supply (CIG and A2C study – upcoming)	
LPG can be a complementary fuel for eCooking in the cases of load shedding	SE4All LPG goal is currently un-attainable and lack of policies supporting eCooking means clean cooking agenda goal is under threat.

Policy Enabling Environment Stakeholder Activities

A2C

Cost-Benefit Analysis

A2C have submitted their cost-benefit analysis report to MoE for analysis. The report is favourable to eCooking as it claims it plays a significant role for Zambia's clean cooking future. The recommendations also include reducing and/or tax exemptions for modern fuels.

Clean Cooking Strategy

MECS has been in exchange with A2C to support the design of their programme for Zambia. A2C is aiming to develop a clean cooking strategy for Zambia and is currently pulling together stakeholders & designing the TORs. A2C is strongly focused on biomass and LPG stoves although it includes ecooking. Despite not being the strategic lead due to limited resources – MECS can play a stronger role in supporting the development of a national clean cooking strategy and ensure the link between energy access and clean cooking as well as ecooking.

ESAG- Clean Cooking sub-committee

The Energy Sector Advisory Group (ESAG) is a committee formed under the Ministry of Energy (MOE), containing representatives from government ministries and authorities, development agencies, and commercial enterprises. Its purpose is to encourage harmony between all sectors of the economy in terms of energy policy and provide an informed opinion on energy matters to policy-makers. The committee was relaunched in 2021 by A2C after it was dormant for a few years. The Clean Cooking Sub-committee deals with matters relating to clean cooking solutions including eCooking.

Support to Energy Regulations Board

A2C:

- has been supporting the ERB to review and update the standards for LPG and bioethanol (gel and liquid ethanol).
- support ERB to develop a strategy to increase access to validated cylinders. There are currently no checks or inspections on cylinders at national level. Also working on trying to ensure safety downstream.
- will be assisting them to intensify awareness campaigns on biogas, LPG, and other alternatives for clean cooking.
- have submitted applications for proposed fiscal incentives on modern clean cooking appliances and fuels to the Ministry of Finance

Grants programme

The A2C project had issued a Request for Applications from eligible organizations working in the clean cooking supply chain to increase the uptake of low-emission Alternative Technologies and Fuels (ATFs) in urban areas (Lusaka, Ndola, Solwezi and Kitwe) through market-based approaches. They were looking for submissions that resulted in a reduction in urban charcoal consumption and addressed barriers related to affordability, acceptability, and accessibility experienced by households. The eligible ATFs included those that relate to LPG, electricity, biogas, tier 3 and above biomass stoves and ethanol, as well as their associated technologies. Improved cookstoves (wood or charcoal), carbonized fuels such as briquettes and sustainable charcoal were *not* eligible for support. The first round of evaluation of the applicants was completed in April.

Cost of Service Study

In 2022, A2C commissioned a 'Cost of cooking study' to compare the cost of cooking with different ATFs, and charcoal, for standard Zambian dishes, to allow the project to better understand and communicate the benefits, and realities, of ATF adoption to potential users. The test fuels and technologies include charcoal and the following alternative technologies and fuels (ATFs)- ethanol, electricity (for operation of induction, hotplate and EPC), pellets, and LPG. The results of this study, which covers more fuels and technologies than the MECS Kitchen Lab tests, provides valuable information for decision making when selecting AFTs to stack.
The project has submitted applications for proposed fiscal incentives on modern clean cooking appliances and fuels to the Ministry of Finance, including tax exemptions on LPG cylinders.

SNV

Bio-energy Diagnostic Survey

Looking at opportunities for sustainable use of biomass – focus on electricity generation, and reduction of unsustainable charcoal.

CIG

Integrated Resource Plan

CIG is currently developing the 30-year IRP for Ministry of Energy (MoE) which strongly focuses on energy generation/demand & supply. Early findings of the IRP that have been informally communicated with MECS show that an enhanced uptake of ecooking will not result in a critical rise in demand of electricity – mainly due to the efficiency of modern ecooking devices but MECS has no specific insights in the IRP yet and how it integrates a mecs transition.

Nefco

The Modern Cooking Facility for Africa programme, financed initially by Sweden and managed by Nefco, aims to accelerate innovation in the clean cooking space by incentivising companies offering innovative cooking solutions. The programme supports access to higher tier cooking applications including electric, biogas, bioethanol and solar thermal stoves, with strong emphasis on the sales of fuels associated with higher tier clean cooking technologies. The programme's First Call for Proposals closed on June 21, 2022.

World Bank

The World Bank Group is working to support the Government of the Republic of Zambia towards achieving its nationally determined commitment (NDC) that, among others, seeks to reduce forest degradation by promoting more efficient, cleaner cooking services. They commissioned two studies in 2021/22 which are almost complete. The studies were (1) Assessment of the clean cooking market, and (2) Assessment of stove testing facility. The priority interventions are stoves from Tiers 3 and above.

EU-Zambia Pamodzi 4 Energy

This project recognises that due to lack of an alternative, households use charcoal for cooking which has a negative impact on the environment and health. The last mile of the Lusaka Transmission Distribution Rehabilitation Project (LTDRP)'s aim is to upgrade eight low-income high-density neighbourhoods such as: Mtendere, Chainda, Kamanga/Nkoloma, Ngwerere, and Chawama to the electricity network. The project, which is grant funded by the EU, will provide subsidised electricity connections to pre-selected low-income households and eligible medium scale enterprises (MSEs). Households will not have to share connections that can lead to dangerous conditions and breakdowns **[9]**

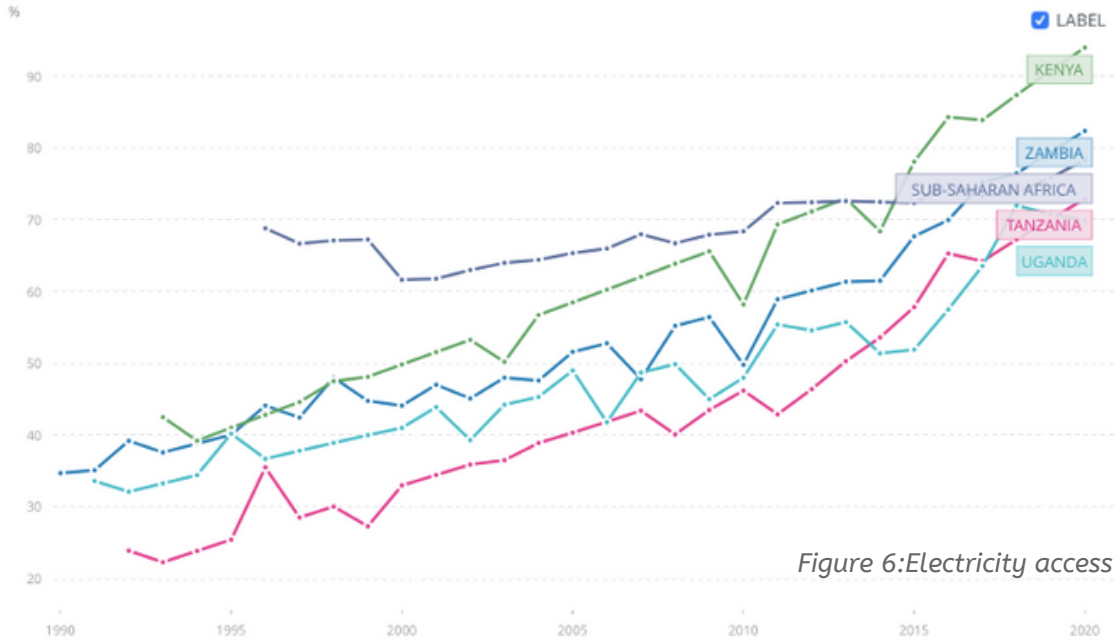


Figure 6:Electricity access level urban area

IAEREP;

Gender Equality Strategy and Action Plan

Strategy MECS is particularly concerned with Objective 1, which aims to increase access to and use of clean energy for domestic and productive purposes **[10]**.

The strategic programme has allocated 10 million ZMW for the Clean Cooking Programme (national), which will operate until 2025. It is unclear which programmes are being funded with this money. According to the GESAP, roughly 21% of Zambian homes own electric cookstoves, with an equal number of male and female-headed families.

21% of households own electric stoves

Energy Efficiency Strategy and Action Plan

5.1.2 investigates Energy Efficiency in the Residential Sector **[11]**. There is a strong emphasis on LPG and biomass cooking systems, as well as analysing the feasibility of biogas through technology assessments. Although eCooking is not covered as extensively as the preceding, the MoE is attempting to distribute energy-efficient cooking equipment through a pilot project with 2,000 Energy-Efficiency setups for end-users. While this does not provide clarification on the equipment, it could be an opportunity to promote electric devices. Furthermore, the MoE has launched a consumer awareness campaign for households to highlight the benefits of energy-efficiency.

MoE is also looking to develop Energy Labelling Codes for Home Appliances which can help end-users evaluate energy performance. However, this will only focus initially on household devices not relating to eCooking.

Renewable Energy Strategy

Activity 5: The Clean Cooking Strategy is mentioned in the RE strategy and is expected to launch circa 2023 given a series of feasibility studies conducted and there is considerable investment interest by then **[12]**.

Although the RE strategy notes that ecooking has decreased from 35% to 18% due to increased tariffs, they note that MECS studies show that ecooking is still a cost-competitive fuel to charcoal. The strategy is also looking to revise both on-grid and mini-grid regulations, including tariffs. The Cost of Service Study will provide the foundation for the strategy.

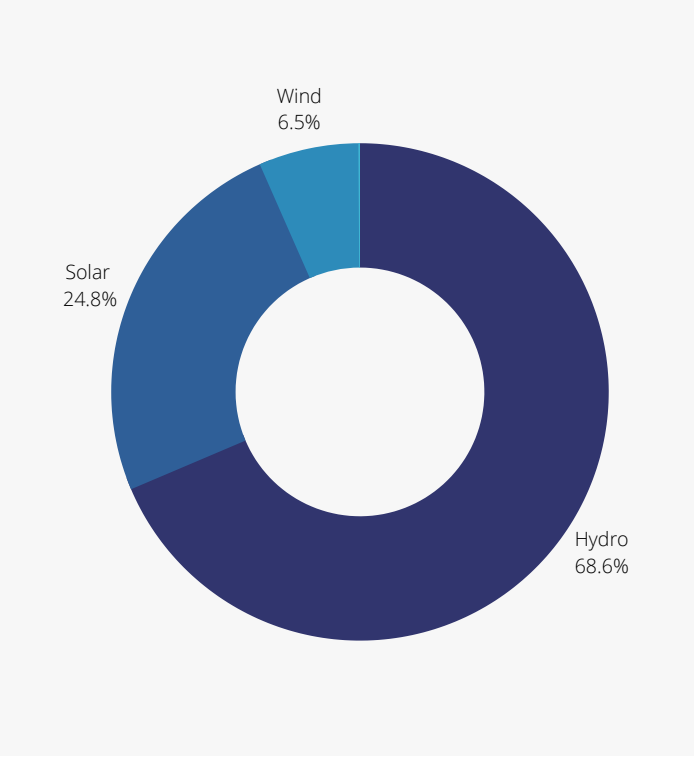


Figure 7: Renewable Energy Strategy Plan 2030 targets

What is missing?

Energy Efficiency Campaign

Although the Energy Efficiency Strategy plan is a step in the right direction for reaching SDG goals, eCooking is barely mentioned. As previously stated, eCooking is popular in Zambia; nevertheless, many consumers employ inefficient devices such as hotplates, which add to the grid load. An important component of the Energy Efficiency Strategy should be an energy-efficient campaign that encourages people to buy energy-efficient electric equipment. As eCooking champions, the MECS Programme could take the lead on this effort.

Grid Involvement in eCooking

ZESCO has little involvement in the clean cooking strategy. Their energy plans have shifted from domestic to industrial use of electricity. The Utility can be involved in the eCooking strategy by developing infrastructure that considers cooking load and energy-efficiency campaigns.

Moreover, MoE in their Renewable Energy Strategy grid strategies is set for the end of 2022, which can be an opportunity to advocate for cooking loads to be considered. MoE are also looking to restructure ZESCO in the next three years to attract investment and create growth in Renewable Energy capacity in Zambia.

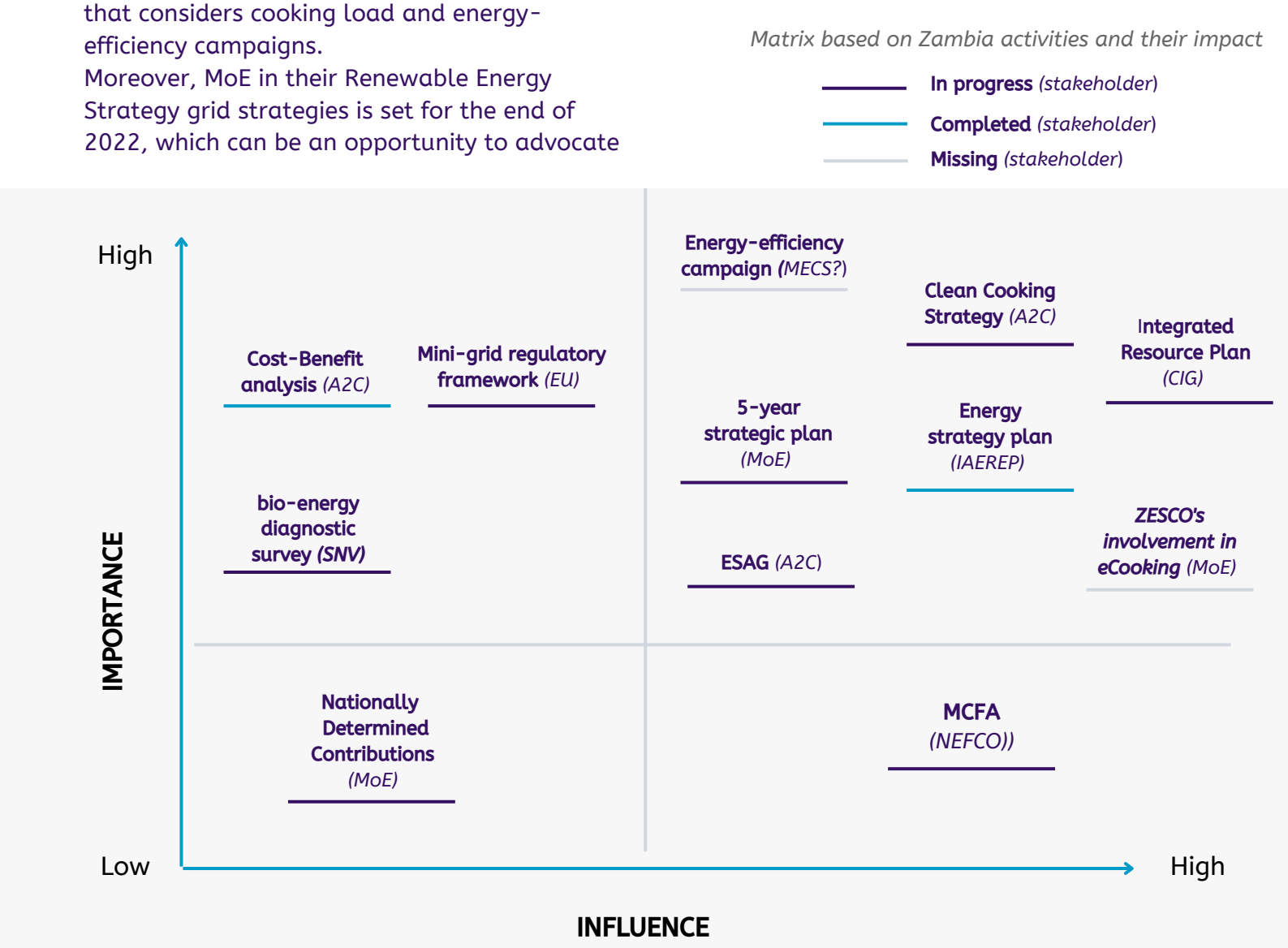


Figure 8: stakeholders activities

Supply Chain

Supply Chain and Standards

There is already a supply chain for eCooking equipment, which are available in both mainstream stores and small sellers. The challenge is that inefficient devices, such as hotplates, are more widely available and accessible than efficient ones. Some retailers even have EPCs, but they can be unaffordable for the typical consumer. Consumer finance options that help bridge the gap for efficient device purchases are required in this situation. Furthermore, an effective device supply chain is required to reduce the availability of inefficient, energy-consuming devices.

Strengthening standards should also be considered to ensure that appliances/devices satisfy the requirements. Although this is related to the policy-enabling environment, it is also directly related to the supply chain.

Supply Chain Stakeholder Activities

Gasbes Energy;

Clean Cooking Solutions

Small company looking to collaborate on supplying clean cooking solutions. Supply EPCs, Induction stoves and biodigesters equipment.

Off-Grid Task-Force

The agenda for 2022/23 is strongly focusing on the development of standards for clean cooking devices & there are knowledge gaps which MECS could help to close based on the previous work

MoE

Through the EE strategy Plan, the MoE has a target of deploying 100,000 of clean cookstoves by 2027. The type of cookstoves is unclear.

USAID;

South Africa Programme

Southern Africa Energy Programme (SAEP) conducted a Consumer Affordability study for solar products. The report is still under review and will be finalized soon.

What is missing?

Strong Supply of EE devices/appliances
While energy-efficient appliances are available in Zambia, they are not accessible to the consumer in terms of cost, and there is a lack of awareness of their value.

Product Testing Facility
There are no facilities that test/approve electric appliances. Although the MoE and ERB have an interest in developing standards for energy-efficient devices, there are no clear steps.

Consumer Finance Mechanisms
MoE's Strategy Plan has intentions of rolling out PAYG systems for energy-efficient cookstoves **[11]**, however, there aren't many existing mechanisms to support its deployment. There is also no clear definition of what cookstoves will be deployed and it can be an opportunity for MECS to lobby for eCooking appliances.

Barriers and Drivers for Supply chain in Zambia

In Zambia, wholesale and retail chain store operators are already selling clean cooking gadgets such as gas stoves with cylinders (sold as a set or individually), hotplates, electric pressure cookers, induction stoves, microwaves, air fryers, thermopots, rice cookers, etc. These stores include Game stores, Shoprite, Fidelity, Radian stores, Builders' hardware, and Pick N' Pay. These are usually carefully placed in shopping malls/centres throughout the country where potential customers reside.

There are also limited after-sales services available, such as eCooking device repair and maintenance. It is advised that capacity building in repairing be carried out, as well as the provision of spare parts to facilitate component replacement, and, if and/or where practical, local fabrication of the spare parts.

Access to funding alternatives such as carbon finance has been identified as a challenge for SMEs, as the requirements might be burdensome to meet. The SMEs have suggested that the standards be relaxed so that they can use the funding to expand their reach.

Potential Drivers for eCooking	Barriers for eCooking
Value Added Tax (VAT) Zero rating of solar products like solar cookers/oven is a great opportunity for promotion of clean cooking using solar from a micro or mini grid.	challenging for suppliers to access funding from Green Climate Fund
eCooking appliances already availalable on the market	After-sales service is limited; in most cases due to lack of capacity by the retailer to fix or replace broken components since the appliances are imported.
	Lack of standards of eCooking appliances

Consumer Demand

Consumer Demand of eCooking

In Zambia, eCooking is relatively popular; nonetheless, the usage of inefficient devices may discourage users, particularly considering the load-shedding issue. By encouraging energy-efficient gadgets and a short-term solution of LPG to be used in load-shedding or black/brownouts, eCooking can become an aspirational offer. The idea of ease, modernity, and cost-effective solutions entices the populace, particularly in urban environments where cooking should be simple and economical.

According to the Gender Strategy Plan, eCooking dropped from 34% to 18% in 2018. This is explained by the rising cost of energy, which deepens the perception that eCooking is expensive.

Electricity is used more through Lighting (31%) than in cooking (16%). Other studies demonstrate that male-headed households are more likely to utilise electricity for cooking. Electric cooking is usually not an option in houses who receive their electricity from a Solar Home System (SHS) or a solar mini-grid since the electric load of a stove or oven is too high.

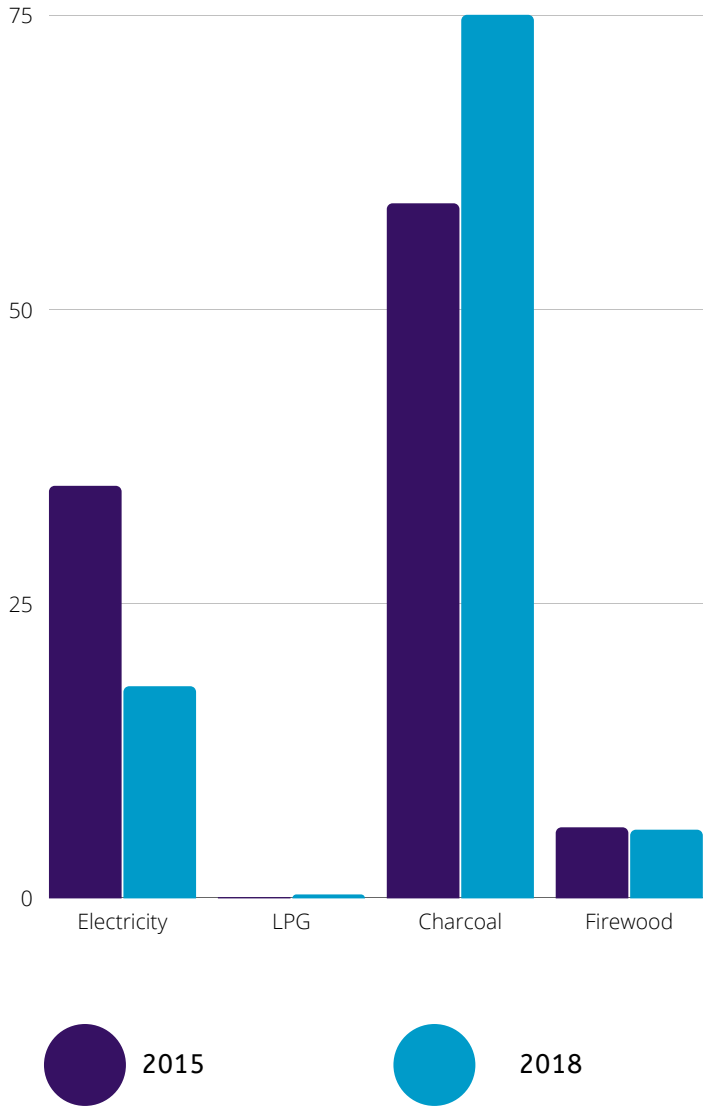


Figure 9: cooking fuel demand in urban populations

Consumer Demand Stakeholder Activities

UNHCR;

Baseline Study

UNHCR are working with MECS to conduct a baseline survey in urban displacement settings. They are first looking to conduct an extensive baseline study around cooking and lighting as it is considered important for RBM (Results Based Management Systems) indicators.

MoE

Energy-efficiency Pilot Implementation (see above)

What is Missing?

Consumer Awareness

While energy-efficient appliances are available in Zambia, they are not accessible to consumer in terms of cost, and there is lack of awareness of their efficiency value.

Holistic Market Study

There are various studies conducted on consumer preferences by MECS and the ERB have conducted similar work for LPG. However, there is no a market study that observes both fuels and how they can potentially interact with one another in a household setting.

The Ministry of Environment is interested in undertaking a market analysis that considers a variety of criteria such as types, technologies, manufacturing, import status, customs, and laws. The report in the EE Strategy Plan indicates there is no data available for residential appliances, which is not entirely correct because MECS has collected data on fuel use. Introducing the data to the MoE can serve as a springboard for developing rapport as research collaborators.

Barriers and Drivers for consumer demand in Zambia

There is usually no initial or adequate training given to end-users to be able to use the appliances.

There is also a lack of awareness of clean cooking appliances and the notion of energy efficiency when choosing eCooking products. The targeted households (i.e. low and medium income) cannot afford to pay cash up-front for appliances. The introduction of flexible payment terms could resolve this. Also, leveraging existing structures like village banking, help companies that wish to make sales since members know each other.

Opportunities	Barriers
Despite the drop in eCooking in urban areas, eCooking is still among the highest in SSA	Affordability is an issue for higher-tier cookstoves
number of eCooking users is among the highest in SSA	Lack of training on using energy-efficient appliances
Existing market for eCooking products, and a slow increase in energy-efficient appliances into the market	Lack of awareness of clean cooking appliances available and the benefits of using them,
applicability of ecooking (EPCs) compatible with Zambian cuisine (Zambia ecookbook)	electricity tariff may deter households from eCooking. Lack of awarreness of the true cosrt of cooking as tarrifs are among lowest in SSA ($0.03Kw)
	Loadshedding and unreliable grid connections deter people from cooking with electricity.

Conclusion

The clean cooking industry has gained a lot of attention in recent years. Until recently, most efforts were focused on increasing the use of cookstove tiers lower than 3, namely biomass (charcoal and firewood). The ongoing reliance on biomass cookstoves has become a subject of concern because it contributes to vices like deforestation, which is predicted to occur at a rate of 300,000 ha of forest cover each year in Zambia **[13]**. Charcoal manufacturing has been acknowledged as a contributor to deforestation.

As a result, stakeholders have escalated their efforts to shift the focus and promote the use of higher-tier stoves (Tier 4 and 5), which contain electricity and LPG. Electric stoves have a long history of use in Zambia, and the SE4ALL AA reports that approximately 34% of urban areas already use them for cooking **[14]**. MECS and USAID's A2C projects have performed studies to analyse the efficiency of cooking with electricity in terms of energy used, cost, and time. According to the MECS program's research, the EPC is considerably more energy efficient, less expensive, and saves time. Cooking with the EPC has also demonstrated that cooking is still inexpensive under any of the three tariff schemes. The hotplate is second and LPG is third against the three parameters tested. The results of the USAID A2C are yet to be publicized.

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This study reveals a potential to promote the widespread use of electricity for efficient cooking. If the stated constraints are removed, households will be able to cook in a healthier environment, at a lower cost, and in a shorter amount of time. This has numerous advantages. (I) at the home level, as physical well-being improves, productivity will rise; (II) the negative effects of climate change will be alleviated; and (III) at the national level, the current burden on the grid will be reduced, allowing for more energy to be used in industry and even exports.