Ministry of Energy and Petroleum
State Department for Energy

REPUBLIC OF KENYA

Kenya National electric Cooking Strategy (KNeCS) 2024

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2024

FOREWORD

Electric cooking, or eCooking, holds immense potential for Kenya. Not only as a pathway towards cleaner and more sustainable cooking methods but also as an avenue to address broader developmental challenges such as public health, environmental conservation, and economic development. By bridging the gap between the clean cooking and electrification sectors, the electrification of cooking will make an invaluable contribution towards the Ministry of Energy and Petroleum's twin goals of universal access to clean cooking by 2028 and universal access to electricity by 2030.

The foundation laid by the success of Kenya's national electrification and renewable energy generation programmes over the last decade has opened the door to a transformative new solution for both the power sector and the cooking sector. 68% of Kenyans continue to rely on traditional cooking fuels such as firewood, charcoal and kerosene, leading to severe health and environmental consequences. Yet over 75% of Kenyans are now connected to electricity, approximately 90% of which is generated from renewable sources. What is more, innovative solar home systems sized for cooking are beginning to enter the marketplace. As a result, electric cooking now offers Kenya an equitable and sustainable pathway for meeting our cooking needs, as well as acting as a critical driver of demand for our rapidly expanding electricity infrastructure.

This strategy outlines a pathway to unlock this potential and realise an array of positive development outcomes, from creating jobs through local manufacturing to improving health outcomes and economic opportunities for women and girls. This is in line with Kenya's commitment to improving the livelihoods and welfare of its citizens, as outlined in the Bottom-Up Economic Transformation Agenda and Kenya's Vision 2030. It also underscores our international commitments, in particular Sustainable Development Goal 7, the Paris Agreement and Africa Agenda 2063. Financial support for the KNeCS was provided by UK PACT and managed on behalf of MoEP by MECS.

Hon. J. Opiyo Wandayi, EGH
Cabinet Secretary
Ministry of Energy and Petroleum

PREFACE

Kenya is at the forefront of the new wave of electric cooking (or eCooking) that is sweeping across the globe. This new wave leverages advances in energy-efficient appliances, renewable energy generation and electricity access to deliver an innovative solution to a critical development challenge: access to clean cooking. This inaugural National eCooking Strategy, the first of its kind on the African continent, lays out a pathway for Kenya to accelerate the electrification of cooking. This transition is expected to yield positive outcomes for public health, gender equity and the environment, as well as strengthen the power sector's financial sustainability.

The strategy provides a roadmap for building the foundation for a sustainable eCooking marketplace in the next five years, which can then enable an accelerated scale-up over the next two decades to facilitate the Net Zero transition. The strategy describes a pathway to support 10% of households to transition to eCooking by 2028, enabling electricity to become the cooking fuel of choice for Kenyans by 2050.

The document outlines systemic enablers to address bottlenecks in the enabling environment. Key strategic interventions include the establishment of a coordinating mechanism for eCooking initiatives, capacity building programmes and R&D on emerging technologies such as institutional eCooking, solar eCooking and digitalisation of appliances.

The strategy also elaborates market development activities that lower barriers for households to adopt eCooking. Proposed activities include Behaviour Change Communication (BCC) campaigns and fiscal incentives, such as VAT exemptions on energy-efficient eCooking appliances, targeted subsidies and a credit financing programme targeted at low-income households.

Embedding eCooking within broader national strategies and related policy instruments is crucial for achieving integrated energy planning. The strategy outlines synergies with existing policies on energy, environment and climate action, health, and industrialisation and innovation. By setting clear, ambitious, and time-bound targets, while continuously refining the interventions based on evolving market realities, Kenya can ensure the successful growth of its emerging eCooking marketplace. By extension, this will unlock broader development outcomes by lowering emissions, enhancing public health, reducing deforestation and forest degradation, and creating new opportunities for women and girls by reducing domestic labour and saving time.

Alex K Wachira, CBS
Principal Secretary
State Department for Energy

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

AC	Alternating current
AEOs	Agricultural Extension Officers
AFD	Agence Française de Développement
ATL	Above-The-Line campaigns
BCC	Behaviour Change Communication
BLEENS	Biogas, Liquified petroleum gas, Electricity, Ethanol, Natural gas and Solar
BTL	Below-The-Line campaigns
CAPI	Computer Assisted Personal Interviews
CCA	Clean Cooking Alliance
CCT	Controlled Cooking Test
CCG	Climate Compatible Growth
CFAs	Community Forest Associations
DALYS	Disability-Adjusted Life Years
DC	Direct Current
EnDev	Energising Development
EPC	Electric pressure Cooker
EPR	Extended Producer Responsibility
ESCOs	Energy Service Companies
ESMAP	Energy Sector Management Assistance Program
FDI	Foreign direct investment
FGD	Focus Group Discussion
fNRB	fraction of Non-Renewable Biomass
GeCCo	Global Electric Cooking Coalition
GESIP	Green Economy Strategy and Implementation Plan
GHG	Green House Gas
ICS	Improved cooking solutions
ICT	Information and Communication Technology
INEP	Integrated National Energy Plan
IoT	Internet of Things
ITMO	internationally transferred mitigation outcomes
IVAs	Independent Verification Agents
KES	Kenya Shillings
KIRDI	Kenya Industrial Research and Development institute
KNeCS	Kenya National electric Cooking Strategy
KNES	Kenya National Electrification Strategy
KNCTS	Kenya National Cooking Transition Strategy
KOSAP	Kenya Off-Grid Solar Access Project

KPLC	Kenya Power & Lighting Company
KWh	Kilowatt Hour
LCPDP	Least Cost Power Development Plan
LMCP	Last Mile Connectivity Programme
LPG	Liquified Petroleum Gas
MECS	Modern Energy Cooking Services
MFI	Micro-Finance Institutions
MoEP	Ministry of Energy and Petroleum
MTF	Multi-Tier Framework
NEMA	National Environment Management Authority
NEFCO	Nordic Green Bank
NCCAP	National Climate Change Action Plan
NDCs	Nationally Determined Contributions
NGOs	Non-Governmental Organisations
OBF	On Bill Financing
OBR	On Bill Repayment
PAYC.	Pay-As-You-Cook
PAYGO	Pay-As-You-Go
PJ	Petajoules
PV	Photo Voltaic
R&D	Research and Development
RBF	Results Based Financing
RIAT	Ramogi Institute of Advanced Technology
ROSCA	Rotating Savings and Credit Association
SCODE	Sustainable Community Development Services
SDG	Sustainable Development Goals
SEforAll	Sustainable Energy for All
SEI	Stockholm Environment Institute
SEZ	Special Economic Zones
SHS	Solar Home System
SPA	Special Planning Area
STI	Science, Technology, and Innovation
TCS	Traditional cooking solutions
ToU	Time-of-Use
TVET	Technical and Vocational Education and Training
UN	United Nations
USD	United Stated Dollar
VAT	Value Added Tax
WUAs	Water Users Associations
YLD	years lived with disability
YLL	years of life lost

EXECUTIVE SUMMARY

Introduction

The Kenya National eCooking Strategy (KNeCS) lays out a roadmap to transition 10% of Kenyan households from polluting fuels to eCooking by 2028. This inaugural eCooking strategy provides a roadmap for building the foundation for a sustainable eCooking marketplace in the next five years, which will then enable an accelerated scale up over the next two decades to facilitate the 2050 Net Zero transition. Transitioning to eCooking could bring a host of positive changes—reducing emissions, improving public health, alleviating domestic drudgery, enabling time savings especially for women and girls, and sustainability of the power sector through demand stimulation.

The KNeCS makes a strong contribution towards the achievement of Sustainable Development Goal (SDG) 7. The KNeCS complements the Kenya National Cooking Transitions Strategy (KNCTS) 2024, which lays out a pathway for achieving the ambitious target of universal access to clean cooking solutions by 2028. In addition, the KNeCS also supports the Kenya National Electrification Strategy (KNES), by ensuring the financial viability of the power sector through demand stimulation.

Status of eCooking in Kenya

75% of Kenyans have access to electricity, but less than 1% primarily cook with it.

- Over the past decade, Kenya's electrification rate has grown from 25% in 2010 to 75% in 2022, with almost 90% of grid electricity coming from renewable sources. Despite advancements in electrification, most Kenyans still use polluting fuels such as firewood, charcoal, and kerosene for cooking. In 2023, only 0.58% of the population used electricity as their primary cooking fuel.

- Traditional cooking methods contribute significantly to household air pollution and greenhouse gas emissions, accounting for approximately 40% of Kenya's total GHG emissions. They are linked to thousands of premature deaths annually and contribute to deforestation and land degradation.

75% of Kenyans now have access to electricity

<1% cook primarily with electricity

eCooking Potential based on Tier 3+ Electricity Access

69% of Kenyan households are ready to transition to eCooking immediately, given their current Tier 3+ electricity access. There is a significant opportunity for interventions aimed at scaling up eCooking solutions among populations that currently depend on firewood, LPG and charcoal for cooking .

Transitions to eCooking based on Electricity Access Tiers 3+

The potential to transition to eCooking based on Tier 3+ electricity access in 2023

Firewood 50.43%

LPG 32.39%

Charcoal 13.10%

Kerosene 1.92%

Electricity 0.58%

Ethanol 0.62%

Others 0.96%

Current primary fuel

Electricity 69.09%

Firewood 13.88%

LPG 8.87%

Charcoal 7.31%

Kerosene 0.52%

Ethanol 0.16%

Others 0.17%

Target Fuel

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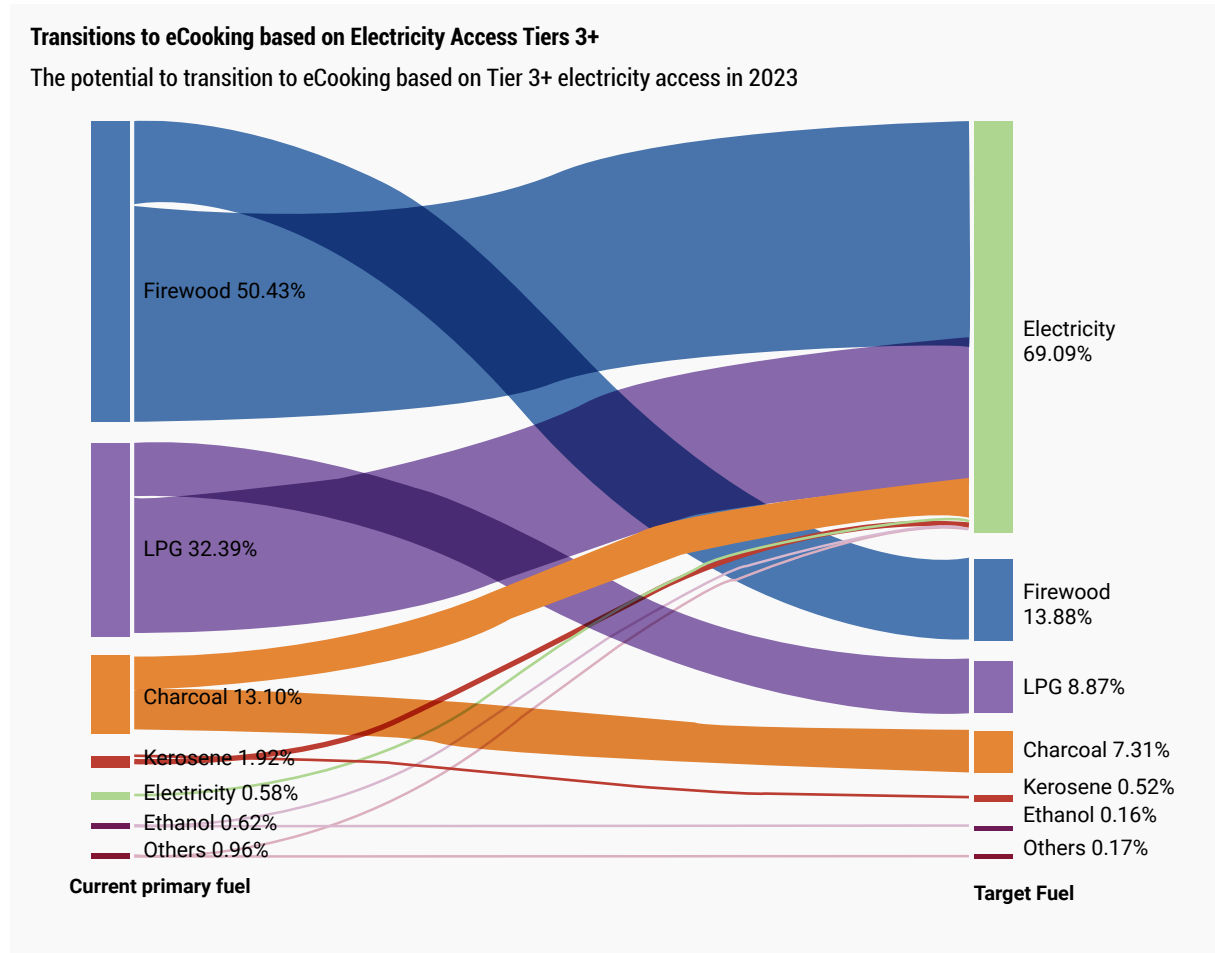
eCooking plays an important role in task-specific cooking activities

25% of Kenyan households own at least one eCooking appliance. Of these,

- 4% own complete cooking solutions that can cook the majority of popular dishes, e.g. electric pressure cookers, induction cookers, rice cookers and electric hobs.

- 22% own task-specific appliances mainly used to boil water or reheat food, e.g. electric kettles, water heaters and microwave ovens.

eCooking appliances ownership in Kenyan households

Appliance	% of households
Water heater	12.7
Electric Kettle	12.7
Microwave	6.7
Electric-Oven	1.9
Electric Pressure Cooker	1.3
Rice Cooker	0.9
Hot Plate	0.8
Thermo-Pot	0.6
Electric Frying Pan	0.4
Air Fryer	0.2
Induction Stoves	0.1
Electric Hob	0.1
Slow Cooker	0.1
Infra-red Stoves	0.1
Halogen Oven	0.05
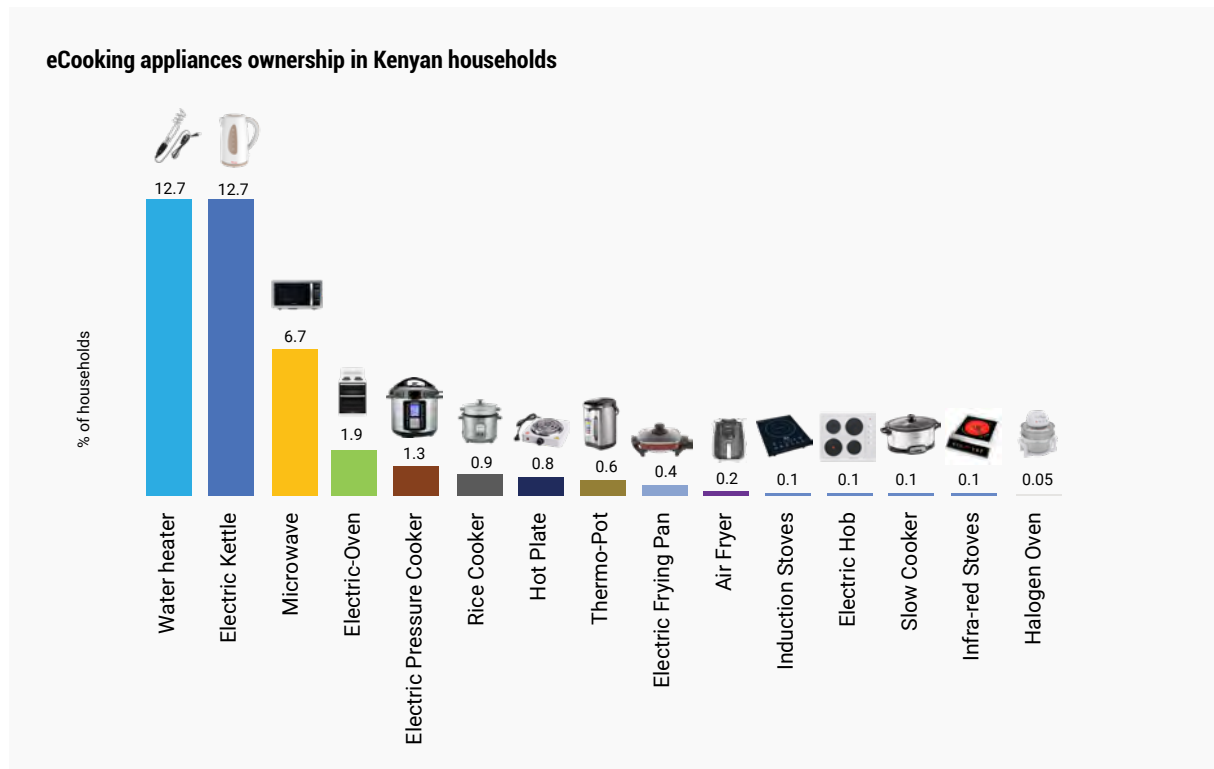
Owning an appliance does not necessarily mean it is used. Only 0.58% of households rely upon electricity as their primary cooking fuel.

Prevalence of primary cooking solutions in Kenya. This graphic excludes reheating foods and boiling water to prepare beverages.

Firewood 50.4%
LPG 37.4%
Charcoal 13.1%
Kerosene 1.9%
Ethanol 0.6%
None 0.5%
Other 0.4%
Electricity 0.58%
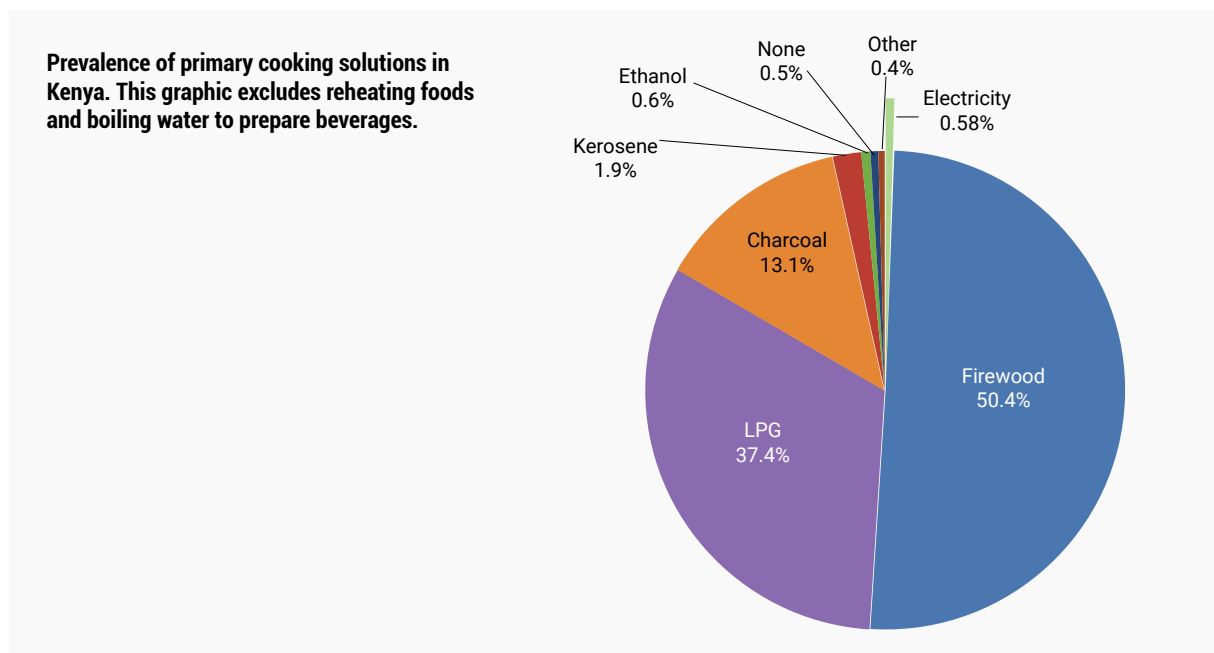
Modern eCooking appliances are largely compatible with Kenyan cooking techniques and dishes

- Two-thirds of households practice stove and fuel stacking. A typical household "stack" includes a three-stone open fire, an LPG stove, and an improved charcoal stove. However, in urban areas, LPG stoves dominate, followed by improved charcoal stoves and three-stone open fires while in rural areas, three-stone open fires are most common, followed by LPG stoves and improved charcoal stoves.

- There is potential to substitute one of more of these cooking solutions, particularly the polluting fuels/technologies, with eCooking.

- Kenyan household menus are narrow and include rice, ugali, vegetables, cereals, meat stews, and roots. Induction stoves and EPCs are particularly promising as they balance upfront cost, versatility and energy-efficiency.

- However, a matrix of cultural, economic, and social factors significantly shapes the adoption of modern cooking appliances, with many households harbouring cost, taste, safety and compatibility concerns against eCooking.

There is immense potential to transition institutions to eCooking

- There is a heavy reliance on firewood and charcoal-based cooking solutions in social institutions like schools, health facilities, and correctional facilities.

- Most social institutions already have access to electricity, whether on-grid or via mini-grids, which provides a solid foundation for transitioning to eCooking.

- However, large eCooking appliances, which typically range from 100 to 300 litres, are still not widely available and are costly. Intermittent power outages also discourage institutions from primary reliance on eCooking.

The supply chain for eCooking appliances

- eCooking appliances are imported from various countries, key among them, China, India, Vietnam and Taiwan in Asia, France, The Netherlands, Germany, Turkey, Czech Republic, United Kingdom and Italy in Europe, United Arab Emirates and the United States.

- Challenges in the international supply chain for eCooking appliances include high upfront costs, fluctuating prices, rapidly changing appliance models, the risk of importing poor quality appliances, and the lack of customisation for local cuisines and languages.

- The manufacturing of eCooking appliances in Kenya is still nascent, but recent developments have shown that there is potential to develop local manufacturing further, beginning with local assembly of appliances and manufacture of cookware.

- Delivery models for eCooking appliances include physical retail outlets, authorised dealers and distributors, online shops, door-to-door sales, agency models, and revolving-fund groups. Brick-and-mortar outlets remain the most popular point of purchase.

- Marketing and awareness efforts have evolved to include traditional advertising media such as radio, TV, print, and innovative approaches such as social media campaigns, influencer marketing, and reality TV shows such as *Shamba ShapeUp.* Of these, traditional media are king in marketing of appliances, however regional eCooking hubs present a new opportunity.

Stages in the supply chain for imported eCooking appliances

Component manufacturing
Raw materials sourced globally, processed into components.

Assembly, quality control, and testing
Components assembled onto appliances, undergo rigorous quality checks.

Packaging and shipping
Appliances packaged for shipment, shipping methods include full container load (FCL), less than container load (LOL), and air freight

Import and customs clearance
Appliances undergo customs clearance, import duties and taxes applied, compliance with import regulations ensured.

Distribution and warehousing
Appliances transported to distribution centers or warehouses in Kenya.

Retail
Appliances purchased by retailers from distributors or wholesalers and sold to end consumers.

Cost considerations are critical barriers to eCooking adoption

Relative cost of eCooking:

Upfront and operational costs are highlighted in two of the three binding constraints identified by the KNCTS.

- *On upfront costs:* Households are willing to pay between KES 3,000 and KES 15,500 for a complete eCooking appliance such as an EPC or induction cooker, which aligns with current market prices for entry-level appliances.

Typical retail prices for selected eCooking appliances in Kenya.

Cooking Appliance	Approximate Min Price		Approximate Max Price	
	KES	USD[1]	KES	USD
Microwave	6,499	50	222,600	1,712
Air fryer	5,999	46	42,219	325
EPC	5,663	44	25,995	200
Induction cooker	4,469	34	162,300	1,248
Rice Cooker	2,999	23	19,500	150

- *On operational costs:* Although cooking heavy foods in an EPC remains the cheapest option, higher electricity tariffs make cooking all foods with electricity more expensive than fuels like LPG and firewood, indicating the need for a tariff reduction to make electricity competitive as a primary cooking fuel.

The cost of eCooking relative to other fuels across various studies. Currency in Kenya Shillings

Legend:
- Old Domestic Tariff (<100kWh/ month)
- New Domestic Ordinary 1 tariff (31-100kWh/ month)
- LPG
- Charcoal
- Firewood

Innovative financing models for eCooking facilitate market development.

Financing eCooking comprises two key related components: demand-side or consumer financing, and supply-side financing.

Consumer financing:

- To address the affordability constraints related to the upfront costs of eCooking appliances and costs of appliance ownership, innovative consumer financing models are being introduced into the market, building upon Kenya's advanced mobile money payments infrastructure. These include asset financing loans, layaway savings, group liability mechanisms and PayGo models implemented with smart-metered appliances.

Supply-side financing

- Mechanisms that have been tested in the Kenyan eCooking sector include equity investments, grants, results-based financing and carbon credits. Utility-enabled financing offers the potential to scale access to energy-efficient appliances amongst utility customers rapidly.

Comprehensive standards, testing and certification are needed to boost consumer confidence.

- The ecosystem for efficiency and quality assessment for eCooking appliances in Kenya is still in its infancy. Kenya currently has safety and performance standards for eCooking appliances. Both are adapted from international standards, but only safety testing is implemented in practice.

In conclusion, given the current eCooking landscape, there is a need for proactivity: setting clear, ambitious targets for eCooking initiatives in Kenya. Until now, these developments in the eCooking subsector have been driven by the private sector and development partners. The eCooking strategy signifies a pivotal shift; it will enable more robust sectoral development through a combination of both policy support and market forces.

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1   The exchange rate applied is 1 USD = KES 127.29. This is the average exchange rate for the period between February 6th and March 22nd, 2023 as provided by the Central Bank of Kenya, and it corresponds to the data collection period for the KNeCS Baseline Study (2023).

The Strategic Roadmap

An eCooking Transition Scenario was developed as a pragmatic roadmap for Kenya's cooking sector transformation, given the current opportunities and constraints of the sector.

eCooking Transition Scenario model results

NATIONAL
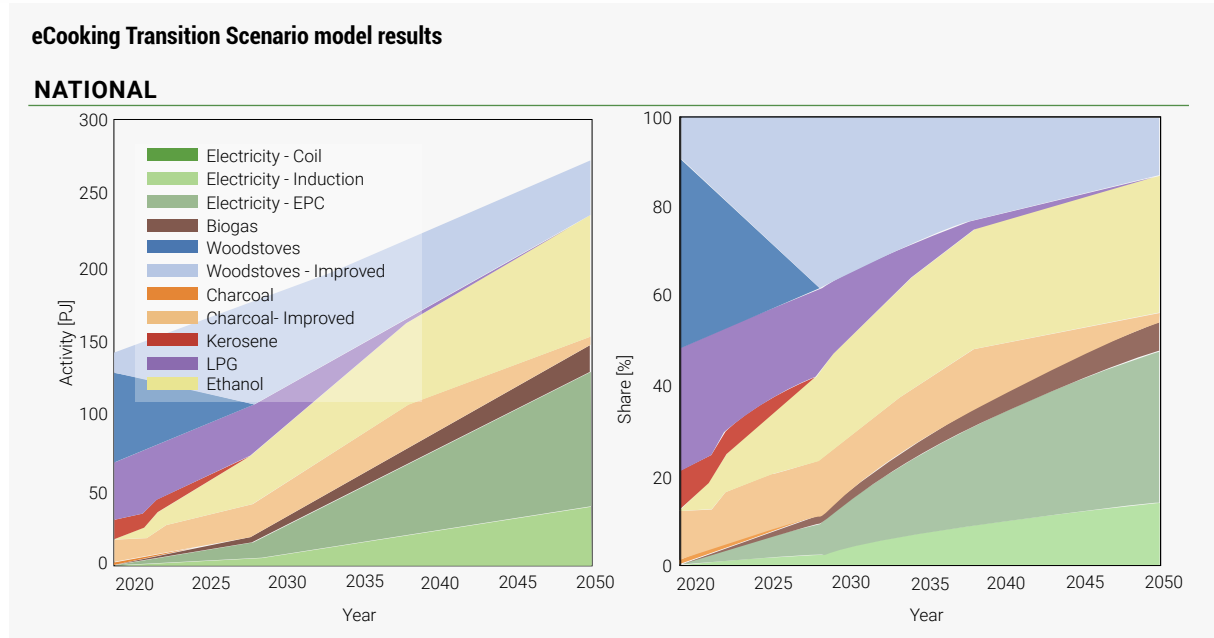
In the eCooking Transition Scenario, eCooking solutions such as EPCs and induction cookers witness steady growth, in particular in urban areas, accounting for approximately 10% in 2028 and increasing to 50% by 2050.

Impact of new eCooking Demand on the Grid

- Based on the Medium-Term Plan 2022-2027 and the Least Cost Power Development Plan (LCPDP) (2022-2041) reference scenario, additional eCooking demand in 2030 under the eCooking Transition Scenario will require about 1 GW of planned capacity, rising to 6 GW in 2050.

- Although it starts from a low base, eCooking demand grows significantly to become the second-largest component of the total energy demand by 2050, surpassing current projections of the residential, commercial and industrial sectors.

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Electricity demand growth for the Whole Energy System Model under the eCooking Transition scenario from 2024 to 2050, including new eCooking demand, and demand for the residential, industrial, and commercial sectors.

E-cooking transition-Annual power demand
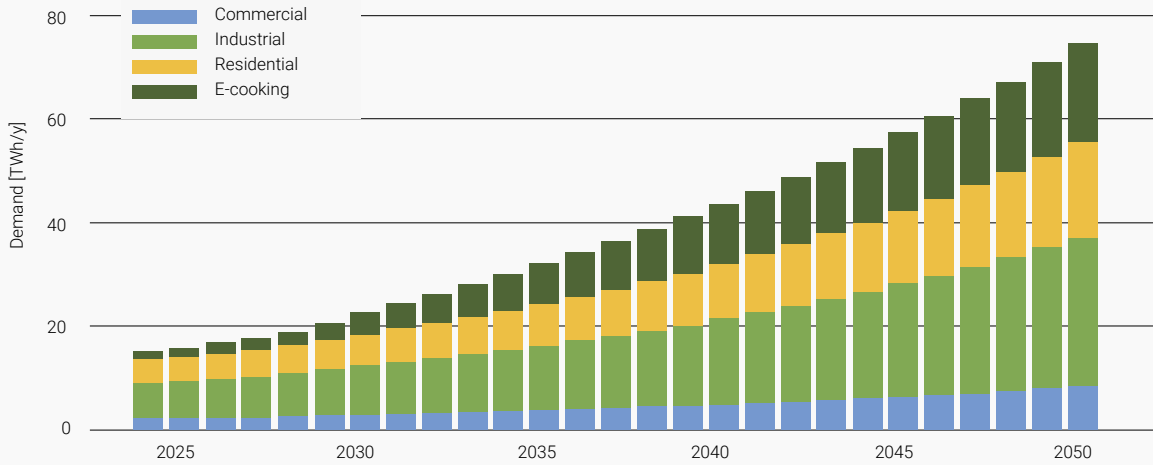
- The additional revenue from eCooking demand is projected to yield an estimated 110 billion shillings in additional revenue for Kenya Power by 2028. For comparison, the utility's total revenue for the 2022/2023 financial year was 191 billion shillings, offering a potential increase of 60% by 2028.

The evolution in the energy mix (in terms of installed capacity) needed to meet new eCooking demand in the eCooking Transition scenario, building on the LCPDP (2022-2041), specifically the LCPDP's reference scenario
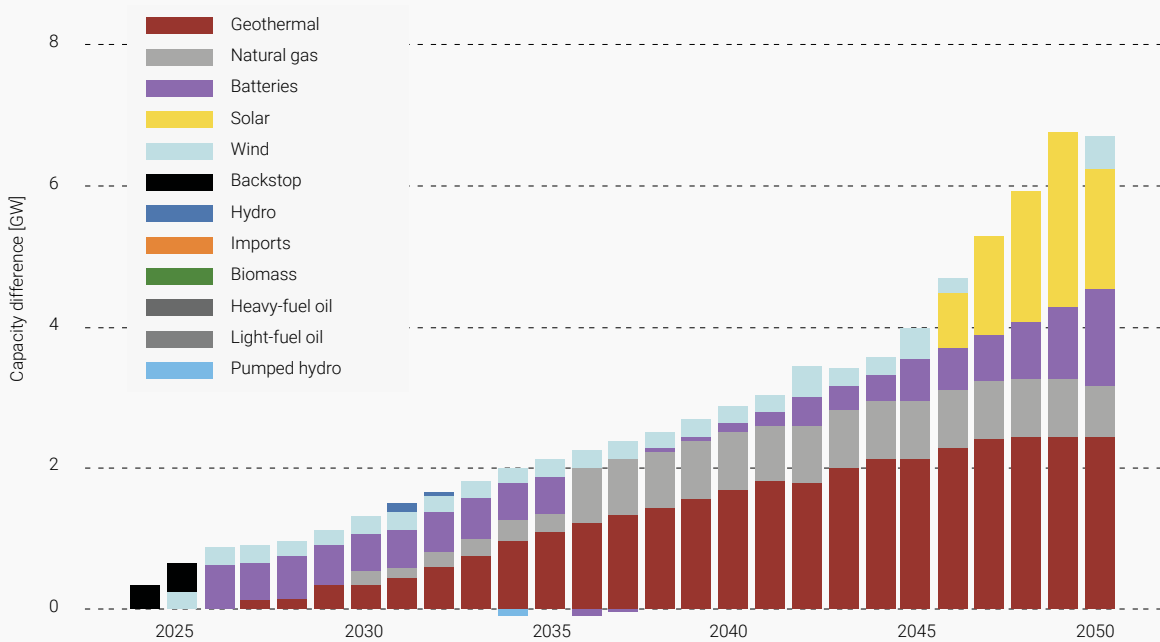
The strategic interventions proposed below are designed based on this eCooking Transition Scenario.

The Strategic Approach

Vision: Improving health, creating jobs, promoting gender equity, and reducing CO2 emissions by transforming the cooking and electrification landscape in Kenya through adoption and sustained use of energy-efficient eCooking solutions.

Mission: To build a sustainable eCooking marketplace over the next 5 years by enhancing access, affordability, and innovation to achieve widespread electrification of cooking by 2050.

The following three broad objectives will help achieve the mission and vision outlined above, as well as the strategic roadmap:

- Strengthen the enabling environment for eCooking by addressing policy, infrastructure and capacity gaps.

- Validate innovative eCooking solutions for broader market adoption through demonstration projects.

- Bridge affordability and access gaps for eCooking solutions through market development activities.

These broad objectives are elaborated into specific targeted initiatives, as outlined below.

eCooking Strategy Agenda

S1- Strengthen the enabling environment for eCooking

S1.1 Establish KNeCS Steering Committee

S1.2 Boost R&D and local manufacturing

S1.3 Training and capacity building

S1.4 eCooking appliance quality standards

S1.5 End-of-Life (EoL) management

S1.6 Grid and off-grid investments

S2-Validate innovative eCooking solutions

S2.1 Carbon finance in eCooking

S2.2 eCooking tariff study

S2.3 Institutional eCooking pilots

S2.4 Tax waiver study

S2.5 Solar and battery-supported eCooking

S3-Bridge affordability and access gaps for eCooking solutions

S3.1 Behaviour Change Communication

S3.2 Credit financing programme

S3.3 Subsidy programmes

These interventions will be systematically phased over a five-year period from 2024 to 2028.

Cross cutting strategic interventions for scaling eCooking in Kenya

KNeCS Strategic Interventions	2024	2025	2026	2027	2028
S1. Systemic enablers					
S1.1 Establish KNeCS Steering Committee					
S1.2 Boost R&D and local manufacturing					
S1.3 Training and capacity building					
S1.4 eCooking appliance quality standards					
S1.5 End-of-Life (EoL) management					
S1.6 Grid and off-grid investments					
S2. eCooking demonstration projects					
S2.1 Carbon finance in eCooking					
S2.2 eCooking tariff study					
S2.3 Institutional eCooking pilots					
S2.4 Tax waiver study					
S2.5 Solar and battery-supported eCooking					
S3. Market development activities					
S3.1 Behaviour Change Communication					
S3.2 Credit financing programme					
S3.3 Subsidy programmes					

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Strategic Initiatives

Kenya must first lay a solid foundation to enable widespread adoption of eCooking. This involves leveraging recent advancements in the enabling environment and tackling existing challenges that could hinder the adoption of eCooking by:

Deploying "systemic enablers" that holistically support the entire eCooking value chain, fostering market growth.

These include creating an implementation structure, boosting local manufacturing, enhancing appliance quality standards, and investing in training and capacity building, developing an end of Life (EoL) framework for eCooking appliances, and grid and off-grid investments.

Establish KNeCS Steering Committee	**Boost R&D and local manufacturing of appliances**	**Develop Training and capacity building programmes building**
• Domiciled at and chaired by the MoEP • Coordinate and align stakeholder initiatives in the subsector to the strategy • Composed of KNeCS Technical Working Group organisations and civil society	• Create an 'eCooking Innovators Platform' to further catalyse and support R&D • Develop local assembly and manufacturing capabilities, within Special Economic Zones	Training activities: • TVETs • Women's programmes Institutional capacity building • Testing facilities, Kenya Power, KEBS, eCooking Hubs
Cost: USD 2.8 million (KES 361 Million)	**Cost:** • Innovation platform: USD 1.2 million (KES 149 million) • Manufacturing/ assembly plants USD 11.5 million (KES 1.46 billion	**Cost:** USD 2.3 million (KES 292Million)

Strengthen appliance quality standards	**Establish an End-of-Life (EoL) Management Framework**	**Electrification**
• Adopt voluntary standards • Establish standardized national test methods, and mandatory testing and labelling	• Implement Extended Producer Responsibility (EPR) schemes • Partner with certified eWaste recyclers and eCooking Hubs to recycle, repair or repurpose appliances. • Educate consumers on the importance of proper EoL practices	• Strengthen the grid: capacity, reliability and availability • Expand off-grid electrification through mini-grids and high-capacity standalone Solar Home Systems (SHS) • Address informal electricity connections • Explore price signalling mechanisms like Time-of Use tariffs
Cost: USD 0.44 million (KES 56 Million)	Cost: USD 0.1 million (KES 13 million)	Costs to be determined under the KNES and subsequent strategy activities

© BURN Manufacturing

Demonstration projects to support further innovation.

The projects will demonstrate the feasibility, benefits, and scalability of nascent but promising market development activities, among them, the development of a carbon financing framework for eCooking, institutional eCooking pilots, and studies to support the development of a tax waiver for eCooking, an eCooking tariff, and solar and battery-supported eCooking programmes.

Facilitating Carbon Financing in eCooking

- Develop a Carbon Developers' eCooking Toolkit
- Stakeholder engagement and capacity building for govt agencies on carbon markets
- Enable a diverse marketplace
- Explore innovative electricity pricing
- Develop a framework for eCooking carbon projects in Kenya

Cost: USD 450,000
(KES 67 Million)

eCooking Tariff Development

- Test the viability and impact of a specialized eCooking tariff for Tier 3+ connected households in Kenya

Cost: USD 450,000
(KES 57 million)

Institutional eCooking Programme

- Support R&D into large-capacity appliances
- Conduct studies e.g CCTs and cooking diaries in institutions, explore suitable tariffs
- Explore potential for solarising institutional kitchens
- Develop tailored financing solutions for institutions

Cost: USD 2.3 million
(KES 292Million)

Tax waivers on eCooking

- A dedicated study to define a suitable tax waiver regime to reduce upfront appliances costs to locally manufactured appliances, components and/or accessories, which will increase demand.
- Determine the economic and financial impact of these waivers on government revenues and household affordability.

Cost: USD 125,000
(KES 16 Million)

Solar and battery-supported eCooking

- Develop a business case for scaling solar and battery-supported eCooking in off-grid areas
- A scooping study on financing options within the electrification landscape.
- Through the eCooking innovation platform, support design, manufacture and develop viable business models

Cost: USD 0.44 million
(KES 56 Million)

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Market Development Activities to facilitate widespread adoption of eCooking

As these interventions are being implemented, market development activities will subsequently be implemented to facilitate widespread adoption and safe usage of eCooking, with a focus on Behaviour Change Communication, and financial relief measures, specifically, appliance subsidies and dedicated credit financing programmes to be rolled out for specific groups.

Behaviour Change Communication (BCC)	Appliance subsidies	Credit Financing Programme
• **Build on existing BCC strategy:** integrating eCooking into Phase 2 • Emphasize unique eCooking components e.g. automating cooking, time-shifting cooking, cost savings etc. Example targeted messaging: Pika Githeri na Ksh. 20	• **80% subsidy on upfront appliance costs** • Forms: RBFs, discounted pricing, rebates on purchase cost, etc. • Layer appliance subsidy with tariff subsidy (needs further study)	• **Appliance purchase in installments** • Preferential interest rates based on various criteria. • Capitalize on the existing PayGo infrastructure and foster **collaborations with banks and MFIs.**
Targeted beneficiaries: • Households with Tier 3+ electricity access • Unwilling to transition Targets 2,897,862 household, projected to be 10% effective	**Targeted beneficiaries:** • Low-income household with Tier 3+ electricity access • Willing to transition Targets 1,049,833 household	**Targeted beneficiaries:** • Household with Tier 3+ electricity access • Lower- and middle-income households, willing to transition Targets 2,471,754 households, projected to be 60% effective
Cost: USD 3.9 million (KES 500 million) for programme implementation	**Cost:** USD 12.3 million (KES1.57 billion) for programmes implementation and appliance subsidies	**Cost:** USD 18.8 million (KES 2.4 billion) for programme implementaiion and appliance financing

© Kenya Power

These interventions are designed to work synergistically, and are rolled out in a logical sequence for maximum efficiency and impact.

Outcomes of market development activities

- The Benefit of Action to Reduce Household Air Pollution (BAR-HAP) tool was used to compute the costs, benefits and outcomes of the interventions. The expected impact of each market development intervention is as follows.

Outcomes of market development activities

Interventions	Total outcome of interventions in terms of transitioning households
Behaviour Change Communication (BCC)	1.6%
Appliance subsidy	0.8%
Financing program	3.5%
Tax waiver	3.6%
Baseline prevalence (primary and secondary eCooking)	1.3%
Total prevalence	10.8%

- Market development interventions have the potential to transition a total of 10.8 % of households from other cooking solutions to primary and secondary eCooking.

- The expected number of eCooking households in 2028 will therefore be approximately 1.5 million.

Creating a Coordinated Policy Approach to eCooking in Kenya

Embedding eCooking within broader national strategies and related policy instruments is crucial for achieving integrated energy planning. This approach creates synergies across sectors, maximises resource utilisation, and fosters a coherent and comprehensive framework for energy planning that can better attract investment and facilitate easier monitoring and evaluation.

Clean cooking and electrification goals need to be better aligned within existing energy policy and planning frameworks by:

- **Developing a coherent policy framework** that connects between cooking and electrification policy and links eCooking with broader objectives such as public health, deforestation reduction, and climate change targets in all energy policies.

- **Fostering coordination and collaboration among stakeholders through** information sharing, joint planning, and resource mobilisation using established mechanisms, and strengthening capacity through technical assistance and training.

- **Integrating eCooking goals into County Energy Plans.**

- **Leveraging existing monitoring and evaluation systems in energy policy processes** to track progress towards eCooking goals and inform future policy decisions.

In sum, a coordinated approach that fosters collaboration between relevant government agencies and stakeholders, leverages resources and expertise, supports the development of the innovation system, and raises public awareness will be instrumental in driving the widespread adoption of eCooking in Kenya.

Costs and benefits of implementing the strategy

Implementation of the KNeCS is predicted to yield over four times the cost of its implementation in net social benefits to the nation. Assuming stable economic conditions, effective implementation of the interventions, and sustained use of proposed eCooking solutions, the strategy will incur costs amounting to approximately USD 55.7 million (KES 7.1 billion). The health benefits are substantial, with 40,096 Disability-Adjusted Life Years (DALYs) avoided, 1,438 premature deaths avoided, 23,875 Years of Life Lost (YLL) saved due to reduced mortality from diseases and conditions caused by household air pollution, and 53,449 illness cases prevented annually.

This highlights the potential for significant public health improvements, which can reduce healthcare costs and improve the overall well-being of the population. Significant time savings are expected, with an average of 3,607 hours saved per adopting household, which can translate into increased productivity and improved quality of life, particularly for women and girls. Environmental benefits include a reduction of 12 MtCO2e and the avoidance of 1.6 million tonnes of unsustainable wood harvest. The net present value of the social benefits for the entire program is estimated at approximately USD 241.7 million (KES 30.8 billion), indicating that the societal gains from implementing the strategy far outweigh the costs. Thus, investment in eCooking is economically justified by its potential to generate long-term benefits.

A comparison of monetised costs and benefits for the eCooking Transition Scenario
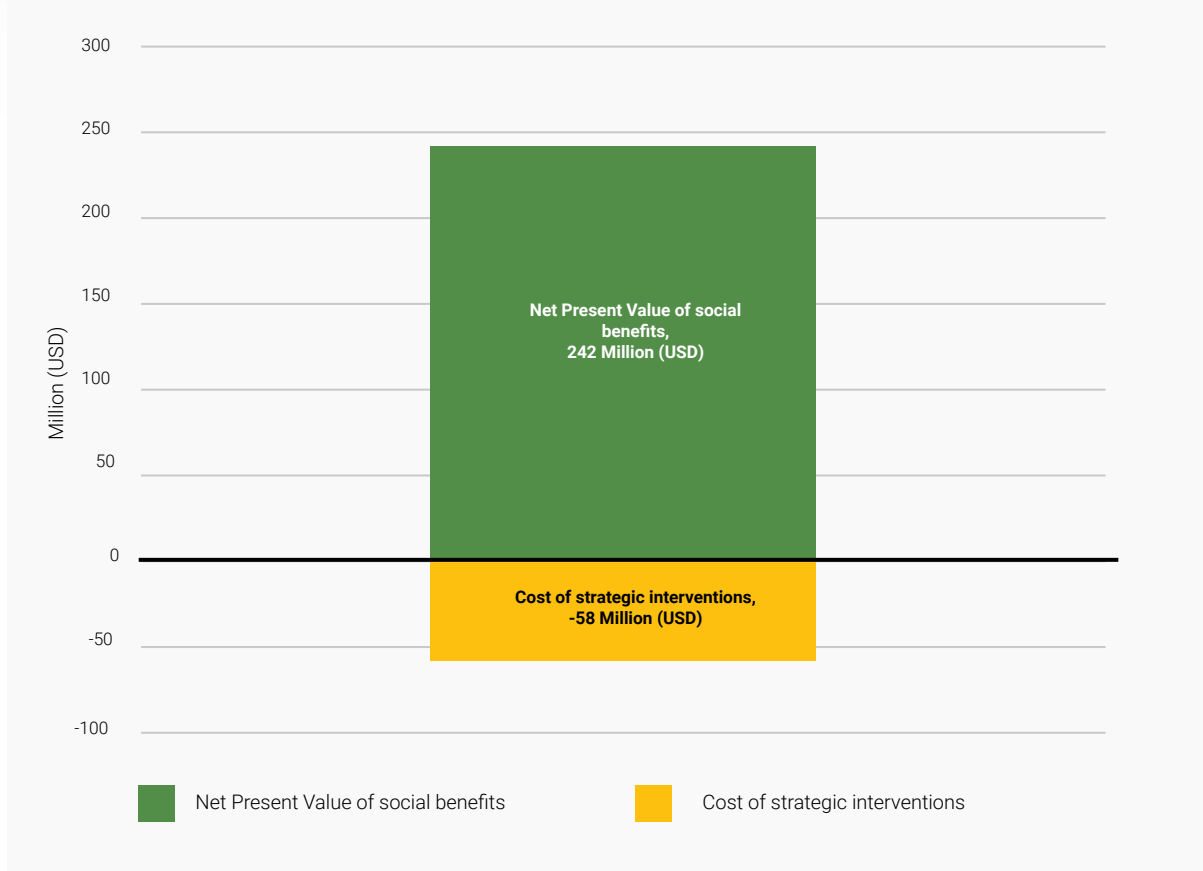
The net benefits value refers to the cumulative benefits over the strategy implementation period (2024-2028).

Note to the Reader

Structure of the document

This strategy is organised as follows:

- **Chapter 1** – Background, problem statement and rationale for the eCooking strategy.
- **Chapter 2** - The situational analysis of eCooking in Kenya, incorporating insights from the KNeCS Baseline Study conducted in early 2023 and a subsequent SWOT analysis.
- **Chapter 3** – The strategic approach, including the mission and vision, a strategic roadmap with scenario analysis to determine the most viable path for eCooking scale-up.
- **Chapter 4** - Strategic interventions for scaling eCooking by strengthening the enabling environment, eCooking demonstration projects, and market development activities.
- **Chapter 5** – Aligning the policy framework to eCooking.
- **Chapter 6** – Conclusion

Complementary documents

This Strategy should be read alongside the KNeCS Baseline Study, KNeCS Modelling Report and the KNeCS Action Plan.

- The KNeCS Baseline Study involved carrying out both primary and secondary research to understand the current state of the eCooking sector and identify the key opportunities and challenges that will shape the way forward.

- The KNeCS Modelling Report provides an in-depth look at the methodologies and findings. It utilises data collected during the KNeCS Baseline Study, and is designed to explore key research questions that have emerged during the strategy development process. The report explores different eCooking scenarios, the impact of scaling eCooking on the electricity grid, and modelling of stacking and eCooking transitions.

- The KNeCS Action Plan offers a detailed roadmap for scaling eCooking. It identifies key activities aligned to the objectives of the strategy, establishes a

robust Monitoring and Evaluation (M&E) framework, outlines an inclusive stakeholder engagement plan, the investment overview and the resource mobilisation strategy.

Synergies with the Kenya National Cooking Transition Strategy (KNCTS)

This strategy was developed in parallel with the Kenya National Cooking Transition Strategy (KNCTS) which articulates how households across Kenya can transition towards universal access to clean cooking. The figure below illustrates the synergies between them. The KNeCS sits alongside the other fuel specific strategies, such as the LPG Growth Strategy and the Bioethanol Masterplan. Meanwhile the KNCTS cuts across and charts a multi-fuel pathway towards universal access to clean cooking by 2028.

Synergies between the Kenya National Cooking Transition Strategy (KNCTS) and the Kenya National eCooking Strategy (KNeCS).

KNCTS Action Agendas		KNeCS Strategic Objectives
1: Bridge the supply gap	Institutional eCooking	1: Build an enabling environment for eCooking
2: Bridge the affordability gap	Local appliance manufacturing	
3: Promote local manufacturing & fuel production	Carbon finance, eCooking tariff, tax waiver	2: Validate innovative eCooking solutions
4: Reframe & raise awareness of clean cooking	Training & capacity building	3: Bridge affordability & access gaps
5: Institute accountability, planning & tracking	Credit financing & subsidies	
	BCC	
	KNeCS Steering Committee	

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1. INTRODUCTION

1.1 Background

Over the past decade, Kenya has made remarkable strides in electrification, with coverage surging from a mere 25% in 2010 to an impressive 75% in 2022 (IEA, IRENA,UNSD, World Bank, WHO, 2023). Almost 90% of the nation's grid electricity now comes from renewable sources, primarily geothermal and hydro (Energy and Petroleum Regulatory Authority, 2023). However, despite these achievements, most Kenyans still rely on polluting fuels such as firewood, charcoal, and kerosene for cooking. With 0.58% of the population using electricity as their primary cooking fuel, a vast untapped potential lies dormant, waiting to be harnessed (KNeCS Baseline Study, 2023).

The clean cooking challenge in Kenya is immense. The latest estimates show that 61% of the population continues to depend on polluting fuels such as firewood (42%) and charcoal (17%) for their cooking needs (KNeCS Baseline Study, 2023) leading to a range of interconnected development challenges[1]. Similarly, assessments of cooking energy access in social

> The clean cooking challenge in Kenya is immense. The latest estimates show that **61% of the population** continues to depend on polluting fuels such as **firewood (42%)** and **charcoal (17%)** for their cooking needs

institutions like schools, health facilities, and correctional facilities reveal a heavy reliance on firewood and charcoal-based cooking solutions (Clean Cooking Alliance, 2018). Biomass cooking solutions significantly contribute to Household Air Pollution (HAP) and major sources of Greenhouse Gas (GHG) emissions, and previous studies show that they account for approximately 40% of Kenya's total GHG emissions (Dalberg Advisors, 2018)[2]. The Ministry of Health linked indoor air pollution to 21,500 premature deaths annually (Ministry of Energy and Petroleum, 2019). Further, fuel wood stocks are declining rapidly due to the expansion of agricultural land and population growth, leading to illegal practices for fuel wood and high rates of deforestation, droughts, desertification, famine and land degradation (Ministry of Energy and Petroleum, 2019; Namaswa, Githiomi, Oduor, & Kitheka, 2022; Schreiber, Waceke, Blair, Grant, & Ireri, 2020). Women and girls are disproportionately impacted, facing higher exposure to cooking smoke and the burden of collecting fuel—sacrificing educational and economic opportunities in the process. The government and non-governmental organisations have strongly advocated for improved cookstoves as a solution to the clean cooking crisis in both households and institutions. However, achieving long-term adoption has proven challenging, as many users abandon the cookstoves soon after initially accepting them (Ministry of Energy and Petroleum, 2019). Moreover, recent studies indicate that the health advantages of improved cookstoves are not as significant as once believed (Ministry of Energy and Petroleum, 2019)

75% of Kenyans now have access to electricity

<1% cook primarily with electricity

---

1 This report uses statistics from the KNeCS baseline study (2023), which differ slightly from those in the KNCTS based on the Kenya Demographic and Health Survey (2022), showing 52% of households use firewood and 12% use charcoal. These variances arise from the time lapse between surveys, differing survey question framing particularly in relation to stacking, and methodologies used to compute fuel prevalences.

2 This report estimates that annual emissions from household biomass fuel use in Kenya's residential cooking sector range from 22 to 35 MtCO2e, with the upper limit including emissions from fuel production.

In light of the environmental, social, economic and health impacts of traditional cooking practices, there is need for a paradigm shift in the approach to clean cooking. As a result, Kenya is now taking an integrated approach to energy planning which can enable the rapid progress in electrification to offer a new solution to this challenge, one that simultaneously addresses issues in the power sector itself. The increased electricity generation capacity in the country makes electricity a gamechanger in the clean cooking sector to transition Kenya to universal access to clean cooking solutions by 2028 as elaborated in the Kenya Clean Cooking Compact, 2021, thereby accelerating the achievement of Sustainable Development Goal (SDG) 7. Transitioning to eCooking could bring a host of positive changes— reducing emissions, improving public health, alleviating domestic drudgery and enabling time savings especially for women and girls. With falling appliance costs and growing awareness, Kenya is not just ready for this change; it is primed for a cooking revolution that promises wider benefits for society, the economy, and the environment.

It is against this background that the Ministry of Energy and Petroleum (MoEP) has developed the Kenya National eCooking Strategy (KNeCS). This initiative has been made possible through the technical and financial support from the Rapid Response Facility (RRF) Consortium, which includes Modern Energy Cooking Services (MECS), Climate Compatible Growth (CCG), and UK Partnerships for Accelerating Climate Transitions (UK PACT) programs. This strategy contributes to the overarching Kenya National Cooking Transition Strategy (KNCTS) designed to guide Kenya's transition from reliance on wood fuel to modern and clean forms of cooking energy by 2028. The strategy sets clear, ambitious, and time-bound targets, as well as provisions for periodic review of the proposed interventions based on the dynamics in the ever-evolving subsector to ensure the success of eCooking initiatives.

1.2 Problem Statement

Despite achieving an impressive electrification rate of 75% as of 2022, and with generation fuelled largely by renewable sources, Kenya faces a glaring disconnect between electrification and the adoption of eCooking. As the KNeCS Baseline Study (2023) revealed, only 0.58% of households primarily rely on electricity for cooking. Despite this uptick, the prevalence of eCooking does not align with the high rate of electrification. The study attributed this low adoption of eCooking to high appliance acquisition costs, high cost of domestic electricity, lack of awareness of eCooking practices and

benefits, and challenges in the eCooking supply chain, among others. Conversely, 61% of households still depend on polluting fuels like firewood and charcoal while for social institutions the prevalence is estimated as 91.3% and 18.3% for firewood and charcoal respectively (Ipaid Africa Consultants Ltd, 2024). These traditional cooking methods not only pose severe health risks but also contribute significantly to environmental degradation.

Additionally, despite the increase in connections, the new customers often have low electricity demand. Despite doubled connections between 2014 and 2018, electricity consumption rose by only 16%, with many households consuming below the lifeline tariff threshold. Low electricity demand limits revenue for the utility. Other challenges include high connection costs in rural areas and difficulties in revenue collection. As Kenya aims to increase its power generation capacity, stimulating electricity demand and the financial sustainability of the national utility is crucial.

While the recently developed Kenya National Cooking Transition Strategy (KNCTS) sets out a roadmap for achieving Kenya's 2028 clean cooking targets, as outlined in the Kenya Clean Cooking Compact, the absence of a national eCooking strategy hampers the country's potential to accelerate its shift towards eCooking. Therefore, this strategy is timely in addressing the challenges outlined here.

1.3 The Rationale for a National eCooking Strategy

The mandate for a national strategy to guide the transition from biomass to eCooking aligns closely with international and national policies focused on sustainable development, climate change, and public health. Internationally, the United Nations Sustainable Development Goals (SDGs), particularly SDG7, advocates for universal access to affordable, clean energy by 2030. eCooking advances not only SDG7 but also has cross-cutting benefits for SDG 3 (Health), SDG 5 (Gender Equality), SDG 13 (Climate Action), and SDG 1 (No Poverty). The global initiative Sustainable Energy for All (SE4All) furthers this cause by targeting universal access to modern energy services by 2030 and doubling the global rate of improvement in energy efficiency. Kenya's national targets are aligned with SE4All, aiming to provide electricity and clean cooking solutions to 100% of its population while achieving 80% renewable energy. Kenya also set an energy efficiency goal to reduce total energy intensity by 2.78% annually.
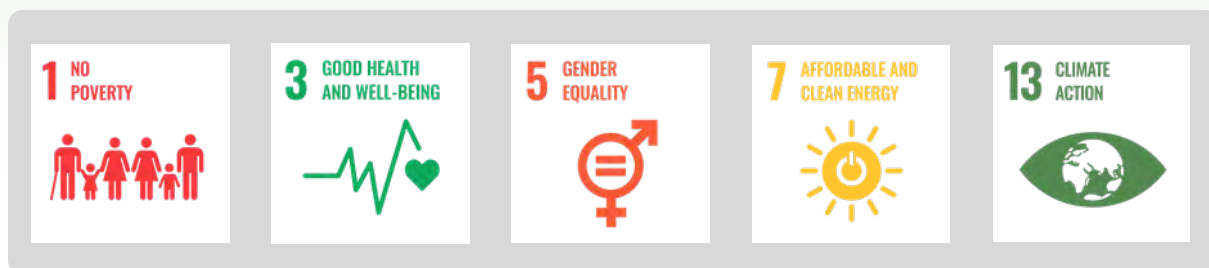
The Paris Agreement, to which Kenya is a signatory, further underscores the urgency. Kenya's updated Nationally Determined Contributions (NDCs) targets are to reduce greenhouse gas emissions by 32% by 2030 compared to a business-as-usual scenario (Government of Kenya, 2020a) Scaling up eCooking can contribute to this goal. Similarly, eCooking can help reduce the health risks associated with household air pollution from cooking as per the guidelines of the World Health Organization (WHO) on indoor air quality. On the African front, scaling eCooking aligns to the World Bank and African Development Bank's (AfDB) New Deal on Energy for Africa that aims to achieve universal access to electricity in Africa by 2025, and increase access to clean cooking energy for around 130 million households across Africa. African Union's Agenda 2063 supports the expansion of renewable energy generation and grid infrastructure.

As overarching national policies, the 2010 Kenyan Constitution and Vision 2030 offer a supportive backdrop for eCooking. Although existing energy-related policies do not explicitly mention eCooking, they create an enabling environment for its adoption, among them, the Energy Act No. 1 of 2019, the National Energy Policy of 2018 (2024 update under development), and the National Electrification Strategy (2018-2022). Newer energy sector policy documents specifically recognise the potential for clean cooking, and actively promote eCooking specifically, among them the Integrated National Energy Plan (INEP), the Least Cost Power Development Plan (LCPDP) and County Energy Plans, and the Energy Transitions Investment Plan (ETIP) (2023).

In the clean cooking energy sub-sector, policy documents such as SDG7 Energy Compact of Kenya on Clean Cooking Energy, and subsequent strategies such as the Bioenergy strategy, and more recently, the Kenya National Cooking Transitions Strategy (KNCTS) have been developed to further galvanise efforts to achieve universal access to clean cooking by 2028. The Kenya National eCooking Strategy, developed in parallel with KNCTS, is a crucial component in advancing its objectives.

Beyond the energy sector, other policy frameworks intersect to support clean cooking and electrification, among them, National Climate Change Action Plan (NCCAP) (2023) and the Forest Conservation and Management Act. The Climate Change (Amendment) Act (2023) provides a framework to engage carbon markets in clean cooking. Table 1.1 outlines these national policies and their relevance for eCooking.

Table 1.1 National-Level Policies and Strategies and their relevance to eCooking

Policy/Strategy	Relevance to eCooking
Kenyan Constitution (2010)	Provides for environmental rights, adequate housing, sustainable development, and climate change.
Kenya's Vision 2030	Supports energy access, renewable energy, infrastructure development, climate change, and gender equality that can foster an environment conducive for eCooking. The Fourth Medium Term Plan promotes household and institutional clean cooking.
Sessional Paper No. 4 (2004)	Outlines the energy policy framework for the country.
Kenya National Climate Change Response Strategy (2010)	Endorses improved cookstoves and suggests subsidies and tax waivers to assist impoverished households in acquiring energy-efficient stoves.
Environmental Management and Co-ordination Act, 1999	Regulates the handling, transportation, and disposal of eCooking appliances and related components.
Environmental Management and Co-ordination (Amendment) Act, 2015 (No. 5 of 2015)	
Climate Act (2016)	Paves the way for the inclusion of Cooking in Kenya's energy planning strategy, integrating it into both the Article 6 and Voluntary Carbon Markets for enhanced sustainability.
Forest Conservation and Management Act (2016)	Regulates logging and charcoal production, indirectly encouraging the use of cleaner cooking fuels and technologies to reduce deforestation.

SEforALL Action Agenda 2016	Identifies the promotion of clean cooking as a high impact initiative
National Energy Policy (2018)	Emphasises clean cooking, energy efficiency, and renewable energy adoption. This indirectly promotes the adoption of energy-efficient eCooking appliances.
Kenya's National Electrification Strategy (2018-2022)	Aims for universal access to electricity, which is a key foundation for universal eCooking.
Kenya Gender Policy in Energy (2019)	Aims to ensure equal access to clean and efficient energy services, including eCooking, for both men and women.
Energy Act No. 1 (2019)	Provides a legal framework for energy development and regulation covering renewable energy, energy efficiency, and rural electrification, which can be leveraged for eCooking.
National E-Waste Management Strategy (2019-2024)	Guides interventions, including policy development, baseline surveys, and establishing necessary infrastructure for e-waste management that could be used in the eCooking sub sector
SDG7 Energy Compact of Kenya on clean cooking energy (2021)	Aims to ensure universal access to affordable, reliable and modern energy services both at the household level and in social institutions
Sustainable Waste Management Act (2022)	Requires every producer to bear mandatory extended producer obligations to minimise environmental impacts of production and waste arising therefrom, which affects eCooking manufacturers
Least Cost Power Development Plan (LCPDP) (2022-2041)	Supports strategic energy planning that incorporates eCooking
County Energy Plans	Supports county-level strategic energy planning that is increasingly incorporating eCooking
Bioenergy Strategy Action Plan (2023)	Projects eCooking prevalence in 2028 at 4% based on Business-as-Usual trends
Integrated National Energy Planning Framework (2023)	Provides a coherent and coordinated approach to energy planning that encompasses all aspects of the energy sector, including for scaling electrification and clean cooking
National Climate Change Action Plan (NCCAP) (2023)	Projects potential annual savings of up to 5.6 million tonnes of CO_2 equivalent by adopting improved cookstoves and alternative cooking fuels. Includes the target of >10% use of electricity as a primary cooking fuel by 2030 Supports the establishment of a program to raise awareness and promote clean cooking. Advocates decarbonisation of the electricity supply and clean cooking transitions
Climate Change (Amendment) Act (2023)	Provides a legal framework for leveraging carbon markets, paving the way for innovative financing and development strategies for scaling eCooking.
Energy Transitions Investment Plan (ETIP) (2023)	Prioritises a transition to eCooking to decarbonise the sector, reaching 50% of the energy mix by 2050
Kenya National Cooking Transition Strategy (2024)	Further galvanises efforts to achieve universal access to clean cooking by 2028. Aims for a 10% adoption of eCooking in 2028

In summary, Kenya's policy landscape, provides a fertile ground for its scaling, aligning with broader objectives of sustainable development, energy security, and climate action. It is worth noting that the eCooking strategy development process in 2022-24 has already directly influenced the development of an array policy documents that now explicitly mention eCooking, including the National Climate Change Action Plan (NCCAP), the Least Cost Power Development Plan (LCPDP), the Kenya National Cooking Transitions Strategy (KNCTS) and the Energy Transitions Investment Plan (ETIP). This Strategy will play a vital role in driving the widespread adoption of eCooking solutions in the country, leading to various economic, social, and environmental benefits.

2. SITUATIONAL ANALYSIS

This situational analysis aims to provide a comprehensive understanding of the opportunities, challenges, and critical factors associated with the integration of eCooking in efforts toward meeting Kenya's 2028 clean cooking targets.

2.1 Methodology

The situational analysis draws from the findings of the KNeCS Baseline Study (2023), conducted between December 2022 and June 2023, which analysed the status of eCooking in Kenya. Specifically, the study examined the state of household electrification and access to clean cooking, in particular eCooking appliance adoption and usage, household cooking practices, the supply chain for eCooking appliances, and the enabling policy environment for eCooking in Kenya.

The study used a mixed-method approach to investigate eCooking in Kenya. A desk review analysed previous national survey reports, academic literature, industry reports, and policy documents to understand the status quo of eCooking in Kenya and to identify data gaps. It also informed the survey design. The study followed a nationally representative sampling approach, whereby cluster analysis divided Kenya's 47 counties into 8 archetypal groups based on variables like population density, household size, grid connectivity, and regional attributes. Two outlier counties were also included, making it a total of 10 clusters for the study. A total of 2432 households were sampled. Post-stratification was implemented to achieve unbiased statistical estimates and enable the generalisation of survey results nationally, and adjustments to the weights were made accordingly.

The survey was complemented by Focus Group Discussions in four counties representing different market segments: Bungoma, Kilifi, Nairobi and Garissa. The FGDs elucidated rich insights particularly on communities' attitudes, belief systems, norms and values about cooking in general, and eCooking. Expert knowledge was obtained through in-depth semi-structured interviews with relevant individuals and organisations active in eCooking or the broader electrification or clean cooking sectors. Interviews were done with policy actors, retailers of eCooking appliances, energy technology companies, development partners, parastatals, research institutes, energy sector utilities and the regulator.

2.2 Status of eCooking in Kenya

Household access to electricity

The survey of households revealed that 76.5% of Kenyan households primarily use grid electricity, with 93.7% in urban areas and 66.3% in rural areas. Solar Home Systems (SHSs) are the leading off-grid source at 13.3%, while private mini-grids serve 2.6%, and rechargeable batteries account for 0.3% of households, as illustrated in Figure 2.1. No household reported using the generator as the main source of electricity, though 0.7% used them for back-up. Grid electricity is predominantly used by urban households while SHSs are dominant in rural areas.

> 🔍 The **situational analysis** draws from the findings of the KNeCS Baseline Study (2023), conducted between December 2022 and June 2023, which **analysed the status of eCooking** in Kenya.

© AfDB

Figure 2.1 Descriptive statistics of the KNeCS baseline survey, showing the regional distribution of the sample between urban and rural areas, distribution of households across electricity systems, and prevalence of cooking fuels within the sample. Source: KNECS Baseline Study (2023)
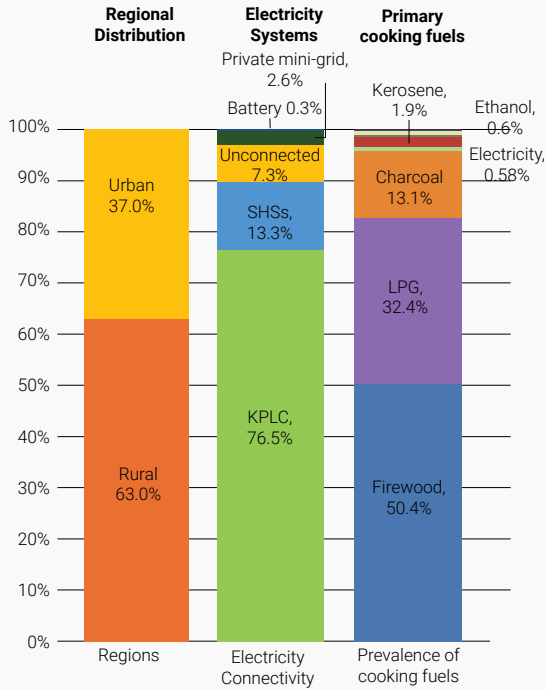
The analysis of household electricity using the Multi-Tier Framework for electricity access (Bhatia & Angelou, 2015) finds considerable potential for eCooking adoption as illustrated in Table 2.1. Table 2.1. Under the Muti-Tier Frame, Tier 3 is the lowest capacity tier capable of powering an eCooking appliance, making it the threshold for eCooking. Based on this rationale, of those connected to the grid, 69% of households have a connection suitable for eCooking and interestingly, rural households fare better (70.9%) than their urban counterparts (66.6%).. 68.36% of households connected to mini-grids have electricity that can support eCooking. At present, negligible 0.15% of households have SHS that can support eCooking, since the capacity of most SHS lies within Tier 2 or below. Most of the households on SHSs will thus need to upgrade to higher capacity tiers prior to transitioning to eCooking.

> Under the Multi-Tier Framework, **69% of households** have a connection suitable for **eCooking** and interestingly, rural households fare better (70.9%) than their **urban counterparts (66.6%).**

Table 2.1 Household access tiers across the grid, mini grids and SHSs and eCooking capacity. Source: KNECS Baseline Study (2023)

Household access (%)		Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Total eCooking Capacity (%)
The grid	National	0.5	2.3	28.3	27.9	22.2	18.8	69
	Urban	0.1	2.1	31.2	25.6	21.5	19.5	66.6
	Rural	0.8	2.4	26.0	29.9	22.7	18.2	70.9
Mini grids	Rural	1.7	8.4	21.6	15.0	11.0	42.4	68.4
SHSs	Rural	34.5	58.1	7.2	0.13	0.02	0.00	0.15

The red and blue cells show where, respectively, Tier 2 and below, and Tier 3+ households are concentrated across the electricity connectivity types and region.

eCooking Appliances Ownership

In Kenya, a variety of eCooking appliances are gaining traction due to the country's drive for cleaner and more efficient energy. These appliances include Electric Pressure Cookers (EPCs), Induction Cookers, Rice Cookers, Air Fryers, Mixed LPG-Electric Standalone Cookers, Microwave Ovens, Electric Solid Plate or Coil Hobs, and Electric Kettles and Immersion Coil Water Heaters. Each appliance offers distinct advantages and challenges for Kenyan cooking styles and energy efficiency.

Ownership patterns from the KNeCS baseline survey data reveal that 25% of Kenyan households own at least one eCooking appliance. Of these, about 4% can be considered complete cooking solutions, i.e. an appliance that can cook the majority of popular household dishes. These include electric pressure cookers, induction cookers, rice cookers and electric hobs. On the other hand, 21.5% are task specific, e.g. electric kettles, water heaters and microwave ovens. Figure 2.2 provides a breakdown of appliance ownership. The survey showed that households revert to Firewood, LPG, Charcoal, Ethanol, and Kerosene to meet their complete cooking needs. However, when considering eCooking alone,

households shift to energy-inefficient appliances when they broaden their usage beyond task-specific activities, as shown by Controlled Cooking Tests (CCTs).

Rural households surprisingly reported higher ownership of eCooking appliances. Gender and wealth also play a significant role in eCooking, with male-headed households being more likely to own eCooking appliances, and ownership skewed towards higher wealth quintiles, with some exceptions like the high prevalence of inefficient electric coil stoves among lower-income households. Households connected to the main grid own more eCooking appliances.

> **25% of Kenyan households** own at least one eCooking appliance. Of these, about **4%** can be considered **complete cooking solutions**, and **22%** are **task specific**

Figure 2.2 eCooking appliances ownership in Kenyan households. Source: KNECS Baseline Study (2023)

Appliance	% of households
Water heater	12.7
Electric Kettle	12.7
Microwave	6.7
Electric-Oven	1.9
Electric Pressure Cooker	1.3
Rice Cooker	0.9
Hot Plate	0.8
Thermo-Pot	0.6
Electric Frying Pan	0.4
Air Fryer	0.2
Induction Stoves	0.1
Electric Hob	0.1
Slow Cooker	0.1
Infra-red Stoves	0.1
Halogen Oven	0.05
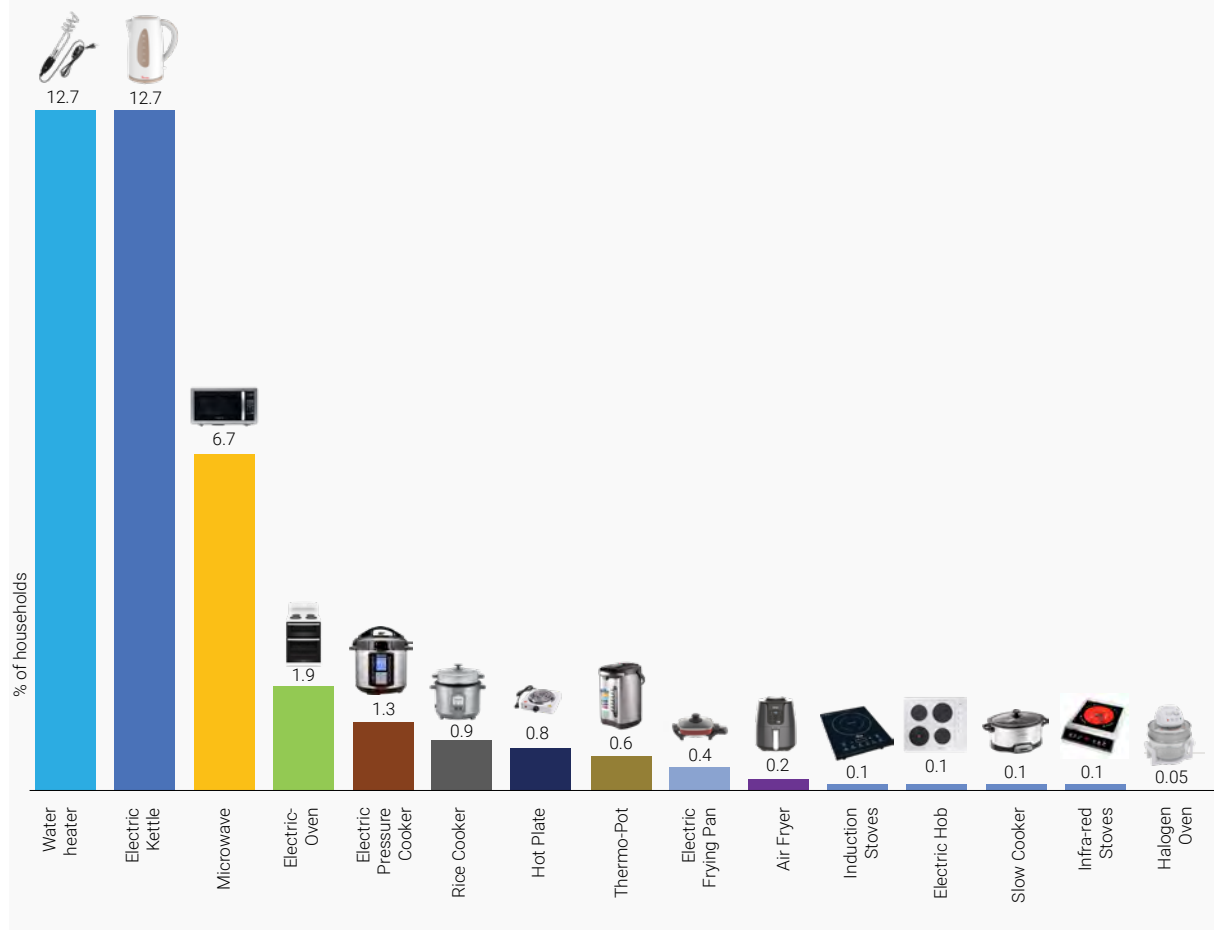
Appliance Usage and Cooking Practices

The KNeCS baseline survey provides a more nuanced understanding of eCooking prevalence in Kenya by incorporating comprehensive definitions and accounting for stacking practices in households. This study found that 0.58% of households use eCooking appliances for conventional cooking (see Figure 2.3). Thus, strong appliance ownership does not necessarily translate into strong use. The findings also imply that eCooking plays an important role in task-specific cooking activities.

0.58% of households use eCooking appliances for **conventional cooking**

Despite the increase in appliance ownership, the data shows that owning an appliance does not necessarily mean it is used. This implies the need for educational initiatives alongside financial incentives like subsidies to encourage the adoption and effective utilisation of eCooking appliances.

The study also analysed appliance usage, cooking practices, and typical cuisines in Kenyan households. Most households use electric appliances mainly for boiling water (63.2%) and reheating food (12.7%) as shown in Figure 2.4. The study further explores typical meals in Kenyan households, finding that supper is the most frequently prepared meal, and fewer households prepare lunch regularly compared to breakfast and supper. Breakfast primarily consists of hot beverages and porridge, with the former being consumed by nearly twice as many households as the latter. Lunch and supper have similar constituent dishes. Generally, Kenyan household menus are narrow and include rice, ugali, vegetables, cereals, meat stews, and roots. Further, common meals vary by wealth and gender, with upper-class households showing a greater variety in dishes. Taste preferences are deeply influenced by a matrix of cultural, economic, and social factors.

Figure 2.3 Prevalence of primary cooking solutions in Kenya. This graphic excludes reheating foods and boiling water for preparing beverages. Source: KNECS Baseline Study (2023)

Figure 2.4 How the most popular appliances are used in households. Source: KNECS Baseline Study (2023)
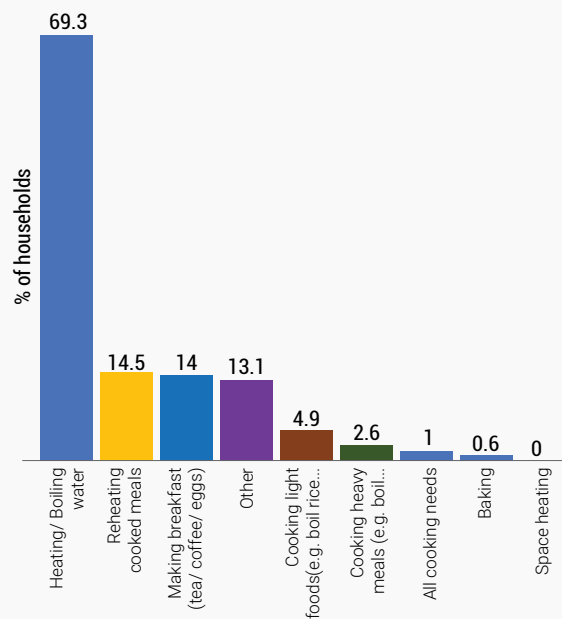
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Cooking techniques vary across dishes, with boiling and frying being dominant. Baking is least popular and mainly used for preparing snacks. Overall, modern eCooking appliances like Electric Pressure Cookers, induction cookers, rice cookers, air fryers and electric kettles are largely compatible with Kenyan cooking techniques and dishes, as shown in Table 2.2.

Table 2.2 Cooking techniques for typical cuisines in Kenyan households and compatible appliances

| TYPICAL DISHES	COOKING TECHNIQUES					COMPATIBLE eCOOKING APPLIANCES				
	Deep fry	Shallow/ stir fry	Bake	Roast	Boil/ simmer/ steam	EPC/ Rice Cooker	Induction/ Infrared/ Hotplate	Kettle	Air Fryer/ Oven/Grill	Microwave
Porridge					X	X	X	X[3]		X[4]
Hot Beverages					X	X	X	X[4]		X[4]
Snacks		X	X				X		X	
Cakes And Breads	X		X	X					X	
Eggs		X			X		X			
Sausages/Bacon	X	X					X		X	
Chapati	X		X	X			X			
Roots	X	X			X	X	X	X[4]		
Rice		X			X	X	X	X[4]		X[4]
Cereals		X			X	X	X			
Ugali					X	X	X	X[4]		
Vegetables		X			X	X	X			
Meat/ Fish Stew	X	X		X	X	X	X			
Soups	X	X			X	X	X	X[4]		
Deep Fried Meat/ Fish	X	X			X		X		X	
Roast Meat/ Fish				X					X	
Shallow Fried Meat/ Fish		X			X	X	X			

To scale the adoption of eCooking as a primary cooking fuel, increased availability of appliances that can cook a wider range of popular foods are needed. Induction stoves and EPCs stand out as particularly promising as they balance upfront cost, versatility and energy-efficiency, as illustrated in Figure 2.5 and Table 2.3

Figure 2.5 Comparing cooking appliances based on versatility (the number of dishes they can cook) and energy efficiency (energy consumption per meal). Source: eCAP Appliance Comparison project (2024).

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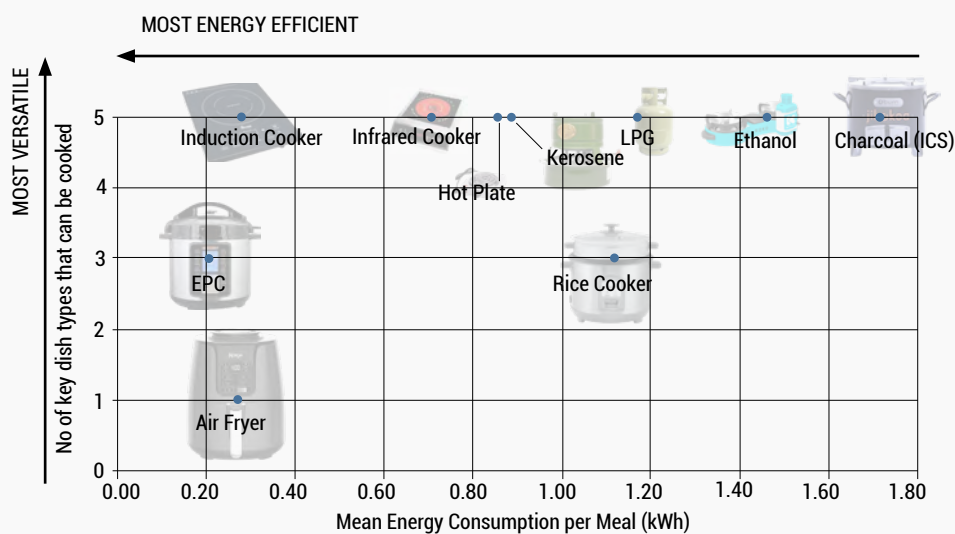
3 To pre-boil water

Table 2.3 Characteristics of induction stoves and EPCs in terms of versatility and energy efficiency

Induction stoves - Greater versatility	Electric Pressure Cookers (EPCs) - Greater energy-efficiency
+ Can accommodate any shape and size of utensil, so can cook almost all popular dish types. + Highly responsive manual heat control. + Heats cookware directly, so more efficient than a hotplate, but less efficient than the EPC. - However, induction stoves require steel cookware to function.	+ Combines three key energy-efficiency mechanisms: pressurisation, automation and insulation. + Significant cost and time savings for cooking 'heavy foods'. - Difficult to cook foods that require a shallow pan or manual heat control (e.g. chapati).

Off-grid eCooking

Solar-based electricity systems are the dominant primary off-grid electricity systems in rural Kenya. The country has the highest PV-eCook viability score globally, particularly when assessed in the context of commercialised polluting fuels (Batchelor, et al., 2018). Battery-supported direct current (DC) devices that can enable cooking on weak grids, mini-grids, and stand-alone systems are emerging in the sector (ESMAP, 2020). Further, Kenyan mini-grids are now adapting their business models to ensure sustainability by venturing into the eCooking subsector (Batchelor et al., 2018). Consequently, off-grid eCooking presents an additional avenue to support Kenya's transition to clean cooking. To accelerate off-grid eCooking, efforts should focus on upgrading households to higher-capacity solutions, incentivising R&D and local manufacturing of affordable higher-capacity options, leveraging mobile money such as 'pay-as-you-solar' for cost alleviation, and expanding last-mile distribution through existing networks of SHS entrepreneurs.

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Willingness to Pay for eCooking Appliances

Households are asked to price a hypothetical eCooking appliance that can be used to prepare all the foods they currently cook. Households expressed a willingness to pay between KES. 3,000 and KES. 15,500 for that appliance as illustrated in Figure 2.6. This aligns with current market prices for entry-level appliances as shown in Table 2.4. This analysis can further guide the pricing of versatile and energy-efficient appliances in Kenya.

Figure 2.6 Households' willingness to pay for an eCooking appliance price range. Source: KNECS Baseline Study (2023)
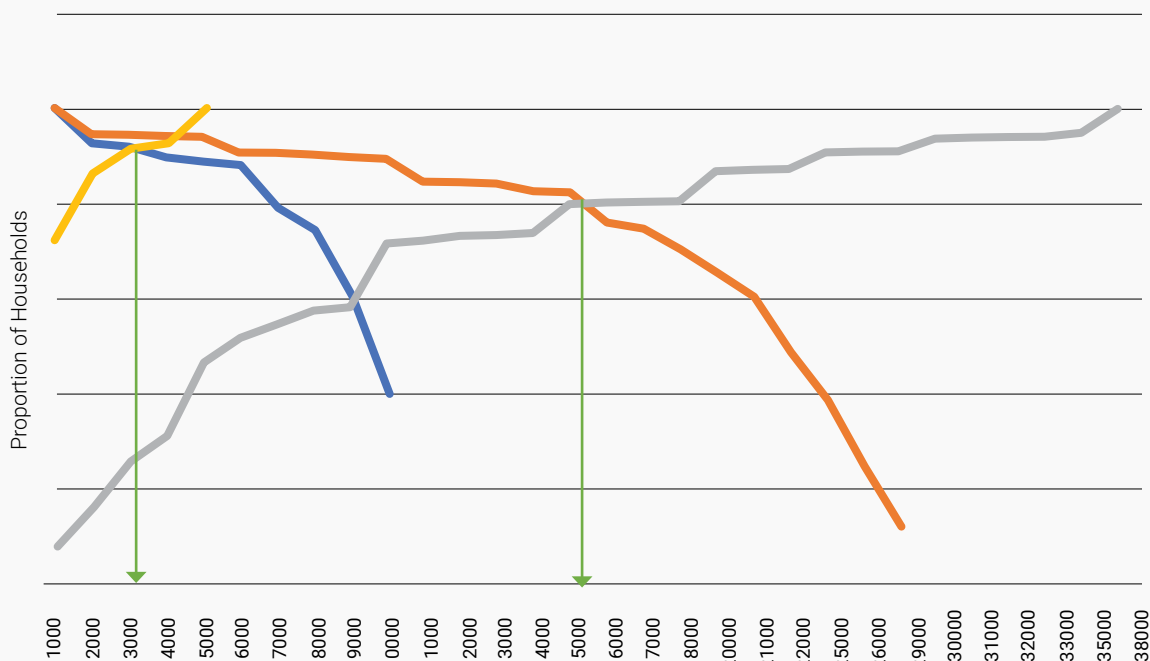

Proportion of Households

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 20000 21000 22000 25000 26000 29000 30000 31000 32000 33000 35000 38000

Table 2.4 Typical retail prices for selected eCooking appliances in Kenya. Source: KNECS Baseline Study (2023).

Cooking Appliance	Approximate Min Price[4]		Approximate Max Price	
	KES	USD	KES	USD
Microwave	6,499	50	222,600	1,712
Air fryer	5,999	46	42,219	325
EPC	5,663	44	25,995	200
Induction cooker	4,469	34	162,300	1,248
Rice Cooker	2,999	23	19,500	150

The study further found that the decision to purchase eCooking appliances is influenced by a variety of factors including recommendations from friends and family, affordability, and cooking speed. Urban and rural households, as well as male and female-headed households, prioritise different factors when choosing to purchase these appliances. Rural households seemed to rely more on recommendations from trusted parties such as friends and SACCOs. Urban households were more inclined to purchase an eCooking appliance due to their affordability, availability, less electricity consumption, access to appliance financing options and versatility in food preparation compared to households in rural areas. Rural households were mainly influenced by the convenience of the appliance(s), lower pollution, aesthetic appeal, faster cooking times and lower electricity consumption compared to urban households.

Knowledge, Attitudes, and Beliefs about eCooking

Social cultural beliefs significantly shape the adoption of modern cooking appliances. Many view using these appliances as foreign and believe that food cooked traditionally tastes better. 74.6% of households believe there is a difference in taste between food cooked on electric appliances and those prepared using traditional methods. The major perceived differences between electric and traditional cooking are due to speed (77.9%), taste (66.3%), and cost (24.5%). Focus group participants deemed foods like chapati, pilau and ugali to be better tasting when cooked traditionally. The findings emphasise the importance of knowledge and cultural beliefs in the adoption of new technologies, and the role of behaviour

74.6% of households believe there is a difference in **taste between food cooked** on **electric appliances** and those prepared using **traditional methods.**

change campaigns and consumer education on the benefits of eCooking.

Profiling household cooking – A Multi-Tier Approach

A Multi-Tier Framework (MTF) analysis uncovers complex trends in cooking practices across urban and rural areas and among various wealth quintiles. While traditional cooking solutions (TCS) are notably more prevalent in rural areas (87%), urban regions are more open to improved cooking solutions (ICS) and modern energy cooking services (MECS), with 42% and 9% adoption rates respectively (see Figure 2.7). Interestingly, poorer households tend to use ICS more frequently, whereas middle to wealthy households not only rely more on TCS but also have higher adoption rates for MECS. The MTF data also reveal that over 70% of households with grid connections capable of supporting eCooking are currently using TCS or ICS, suggesting a ripe market for promoting eCooking adoption with minimal intervention costs.

Figure 2.7 Household adoption of cooking services: a rural/urban comparison. Source: KNECS Baseline Study (2023)

URBAN

Traditional Cooking 50% | Improved Cooking 42% | Modern Energy Cooking Services 9%

RURAL

Traditional Cooking 87% | Improved Cooking 11% | Modern Energy Cooking Services 2%

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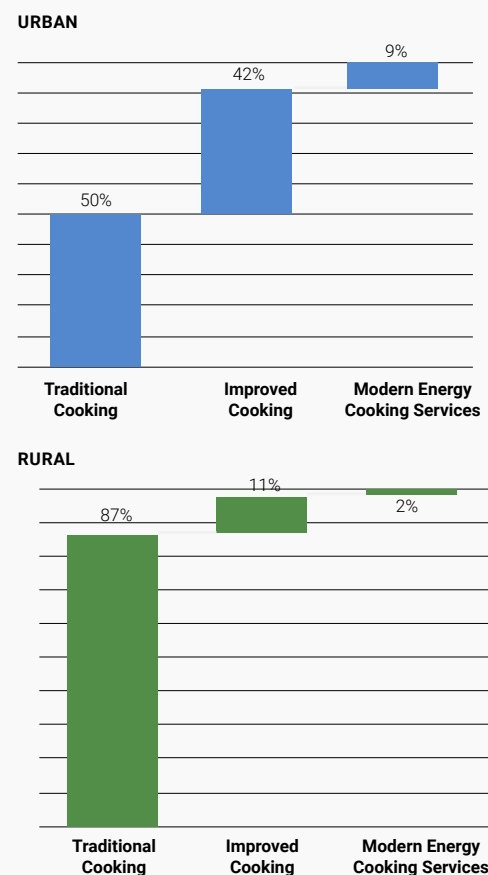
4   Most prices are sourced from online retailers such as Kilimall, Jumia, ZuriCart and Quest, and from websites of distributors such as Hotpoint

Stacking of cookstoves

Stacking refers to the use of multiple fuels and technologies in a household to meet their energy needs. A typical household "stack" includes a three-stone open fire, an LPG stove, and an improved charcoal stove. Around two-thirds of households use more than one type of stove, a practice common in both urban and rural areas (see Table 2.5). Further, wealthier households are more likely to own multiple stoves, with the wealthiest quintile showing the highest ownership of three stoves. Notably, as households transition from using a single stove to multiple stoves, LPG stoves become increasingly significant. Among households with three stoves, the LPG stove is the most commonly owned.

Table 2.5 Household stacking of cookstoves across regions and wealth. Source: KNECS Baseline Study (2023)

Categories		Zero Cookstoves[5] (%)	One Cookstove (%)	Two Cookstoves (%)	Three Cookstoves (%)
Region	National	0.07	36.6	42.6	20.7
	Urban	0.2	36.1	42.5	21.3
	Rural	0.0	36.9	42.7	20.3
Wealth Quintiles	Poor Quintile	0.0	53.2	33.3	13.5
	Lower Middle Quintile	0.0	52.1	33.6	14.3
	Middle Quintile	0.0	36.1	47.3	16.6
	Upper Middle-Class Quintile	0.4	28.2	52.4	19.1
	Wealthy	0.0	16.5	45.9	37.6

While we have extensive knowledge about eCooking practices at the household level based on the KNeCS baseline study and previous studies done by the MECS programme and other stakeholders, evidence about cooking practices in institutions is relatively limited. Box 2.1 below highlights some of what we know so far.

BOX 2.1
BEYOND HOUSEHOLDS: FOCUS ON INSTITUTIONS AND FOOD BUSINESSES

Institutional access to eCooking

Transitioning to eCooking in institutions in Kenya holds significant potential for contributing to the efforts to reduce greenhouse gas emissions as outlined in the Nationally Determined Contributions (NDCs), which targets a 32% reduction by 2030 compared to business-as-usual scenarios. An assessments of cooking energy access in social institutions like schools, health facilities, and correctional facilities reveal a heavy reliance on firewood and charcoal-based cooking solutions (Ipaid Africa Consultants Ltd, 2024). The predominant cooking solutions include the three-stone open fire, *Kartech* Improved Cooking Stoves (ICS), traditional metallic cookstoves without chimneys, brick rocket stoves, and Liquefied Petroleum Gas (LPG), with LPG being more prevalent in health institutions.

Examining the types of foods typically prepared in these institutions, such as beverages and staple foods like Githeri, Rice, Ugali, and Chapati, reveals that they are well-suited for eCooking. A recent study on the energy consumption, costs, and efficiency of eCooking in institutional settings has shown that not only can these foods be prepared using eCooking appliances, but they can also be done at a lower cost and in less time compared to traditional cooking solutions (IESR, 2023). Furthermore, most social institutions already have access to electricity, whether on-grid or via minigrids, which provides a solid foundation for transitioning to eCooking. However, this transition must address several challenges identified in institutional studies. First, it is essential to ensure availability of eCooking appliances that match the typical capacities of institutions, which range from 100 to 300 litres. Additionally, addressing the cost barrier through financing options tailored for institutions is crucial. Finally, concerns about intermittent power outages can be mitigated by combining eCooking solutions with alternative sources like LPG,

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5   This category refers to households that indicated that they do not cook at home but instead eat out at hotels or purchase pre-cooked meals.

ensuring uninterrupted cooking experience. By addressing these challenges, transitioning to eCooking in institutions presents a viable pathway towards achieving Kenya's emissions reduction targets while improving cooking efficiency and reducing costs in social institutions.

Business and food industry access to eCooking

The structure of the food industry, coupled with the emerging evidence on the potential for eCooking in the food vending business in Kenya, paints a promising picture for the adoption of eCooking. Specifically, the food industry has formal and informal segments, with micro and small enterprises accounting for over 80% of both segments (Kenya National Bureau of Statistics, 2017, 2020). Women entrepreneurs play a pivotal role in the informal segment, constituting 67.4% of ownership (Kenya National Bureau of Statistics, 2020). Emerging evidence from cooking diaries in urban informal settlements and displacement settings show that foods prepared by food businesses are compatible with eCooking appliances, and that significant cost savings on fuel expenses would accrue to the businesses (Groen, et al., 2023; Nayema et al, 2023) . Further, although there is limited evidence on the eCooking transition among large food enterprises in Kenya, insights from comparable contexts, such as Nepal, suggest that larger businesses like hotels and restaurants may find transitioning relatively easier due to existing familiarity with eCooking technologies.

Despite these promising prospects, several barriers must be addressed to facilitate widespread adoption of eCooking: affordability and availability of higher-volume eCooking solutions, affordability of tariffs, simultaneous preparation of multiple dishes, a shift in knowledge, beliefs and attitudes in institutional kitchens, access to financing for both manufacturers, distributors and last mile entrepreneurs on the supply side and institutions on the demand side.
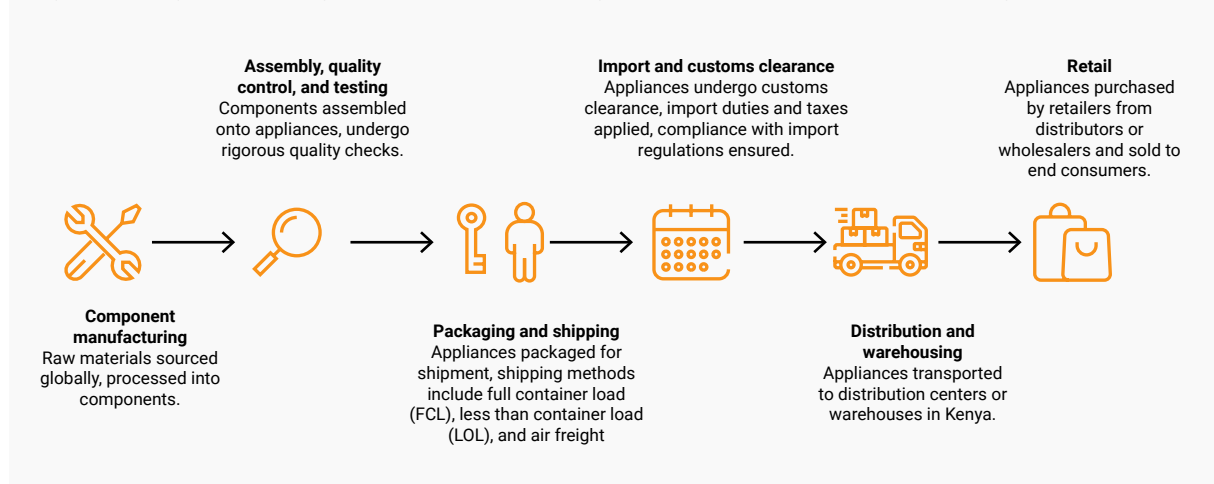

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The supply chain for eCooking appliances

eCooking appliances are imported from various countries. Key source countries include China, India, Vietnam and Taiwan in Asia, France, The Netherlands, Germany, Turkey, Czech Republic, United Kingdom and Italy in Europe, United Arab Emirates and the United States. The supply chain for electric appliance imports is complex and involves multiple stages, from raw material extraction to the end consumer as illustrated in Figure 2.8. Lead times for importing eCooking appliances can range from a few weeks to several months, depending on factors such as the source country, shipping method, and customs clearance. Retailers highlights some challenges in the international supply chain for eCooking appliances, among them, high upfront costs, fluctuating prices, rapidly changing appliance models, the risk of importing poor quality appliances, and the lack of customisation for local cuisines and languages.

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Figure 2.8. Stages in the supply chain for imported eCooking appliances. Source: KNECS Baseline Study (2023)

Assembly, quality control, and testing
Components assembled onto appliances, undergo rigorous quality checks.

Import and customs clearance
Appliances undergo customs clearance, import duties and taxes applied, compliance with import regulations ensured.

Retail
Appliances purchased by retailers from distributors or wholesalers and sold to end consumers.

Component manufacturing
Raw materials sourced globally, processed into components.

Packaging and shipping
Appliances packaged for shipment, shipping methods include full container load (FCL), less than container load (LOL), and air freight

Distribution and warehousing
Appliances transported to distribution centers or warehouses in Kenya.

Manufacturing of eCooking appliances in Kenya is still nascent, but Kenyan companies have now begun assembling eCooking appliances/systems and manufacturing cookware. Key among them are BURN Manufacturing's production line for manufacture of cookware and assembly of smart induction stoves, informal sector manufacturing of electric coils, and solar PV eCooking system assembly capabilities. However, to fully realise this potential, targeted investments in infrastructure, human capital, policy framework, and logistics will be necessary.

With regard to delivery models for eCooking, retailers and distributors have adapted their business models to cater to the emerging market segments. They offer a variety of eCooking appliances through physical retail outlets, authorised dealers and distributors, online shops, door-to-door sales, agency models, and revolving-fund groups (locally known as chamas). Brick-and-mortar outlets remain the most popular point of purchase, with

42.1% of households purchased eCooking appliances from supermarkets, followed by wholesale/retail shops (18.5%), and small retail stores and specialist shops (9.3%), as shown in Figure 2.9.

Marketing efforts have evolved to include both traditional advertising methods such as radio, TV, print media, and innovative approaches such as social media campaigns, influencer marketing, and reality TV shows such as *Shamba Shape-up* which reaches upwards of 12 million people across Kenya. Of the 92% of the population that knew about e-cooking in the household survey, traditional media like radio, television and print media is still king in marketing of appliances (31.2%), followed by social media such as Facebook, YouTube and Instagram (24.8%), given the high level of internet connectivity and smartphone access in Kenya. These strategies are achieving some success in increased awareness and demand for eCooking appliances.

> **Traditional media** like radio, television and print media is still king in marketing of appliances **(31.2%),** followed by social media such as **Facebook, YouTube and Instagram (24.8%)**

Regional eCooking hubs in Kakamega, Kisumu, Kitui, Makueni, and Nakuru, and clean cooking hubs established in Jamhuri and Mtwapa Energy Centres established and managed through collaborative efforts between various stakeholders such as MECS, KPLC, MoEP, CCAK, REREC, faith-based institutions, county governments and last mile entrepreneurs, can further support retailers by promoting the eCooking agenda locally and fostering the development of context-relevant business models, financing mechanisms, and favourable local policies. In this regard, Kenya Power has demo centres in Kisumu, Nakuru and Mombasa, and has developed of a mobile demonstration kitchen to showcase the benefits and practicality of eCooking (Wanjohi, 2023) .

Figure 2.9 Point of purchase for most recent eCooking appliances by households. Source: KNECS Baseline Study (2023)
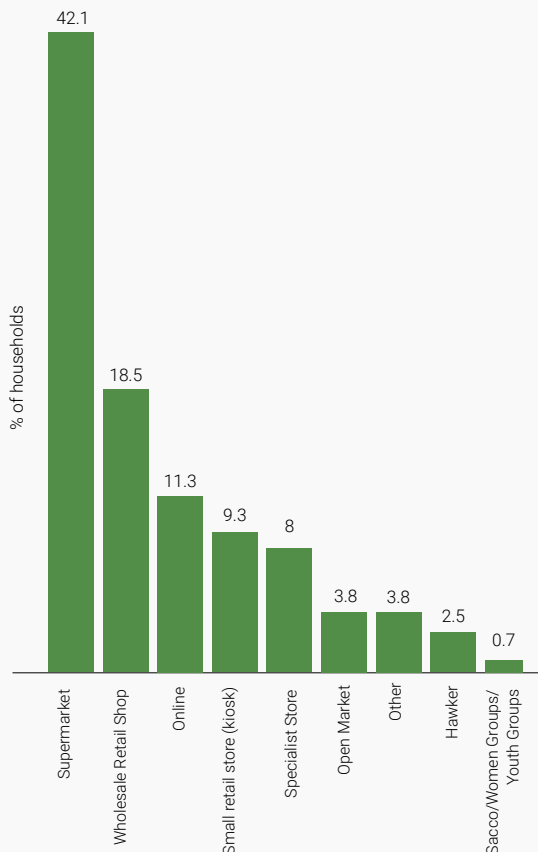
After sales service

The after-sales service landscape for eCooking appliances in Kenya is multifaceted, with authorised service centres, independent repair shops, and appliance retailers providing various services. The growing demand for these services in rural areas highlights the importance of expanding access and raising awareness about warranties. Figure 2.10 shows that majority of households seek appliance repair services from a local technician, trained or untrained. Continuous skill development and training for technicians are essential to keep pace with technological advancements and customer needs.

Figure 2.10 Source of support for eCooking appliance repair (urban/rural). Source: KNECS Baseline Study (2023)
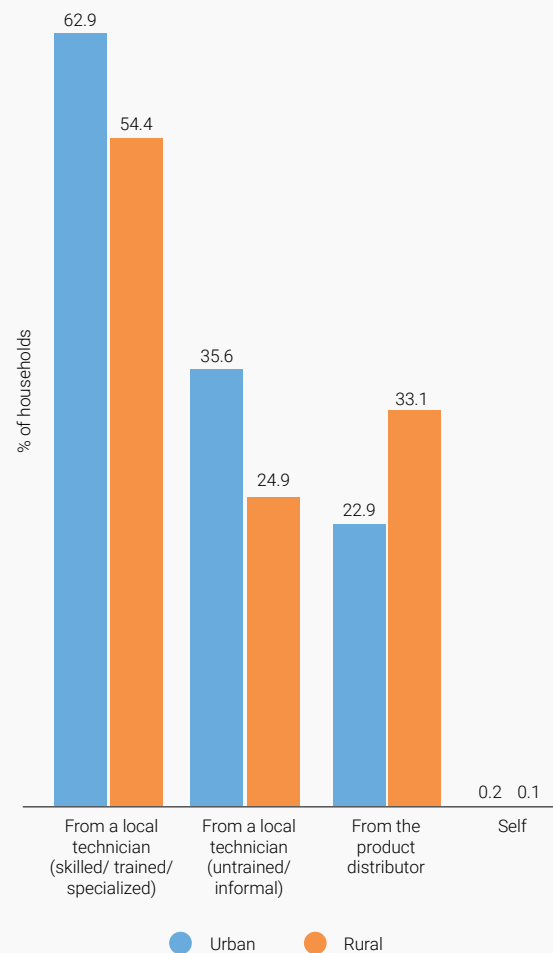
> Majority of households seek appliance **repair services** from a **local technician, trained or untrained**

Financing eCooking

Financing eCooking comprises two key related components: demand-side or consumer financing, and supply-side financing.

Relative cost of eCooking: Transitioning to energy-efficient eCooking appliances such as EPCs and induction cookers could result in significant savings in fuel expenditures (Banda, et al., 2024; Ministry of Energy and Petroleum, 2023) , however, energy efficiency often has an inverse relation to upfront costs (Nayema et al, 2023). Cost considerations, both upfront and operational, are highlighted in two of the three binding constraints identified by the Kenya National Cooking Transition Strategy. Consequently, the evidence on energy efficiency-cost nexus suggests that innovative financing solutions and awareness creation, particularly regarding long-term operational cost savings, could play an important role in unlocking the transition to eCooking.

The Kenyan eCooking appliance market is diverse and highly competitive, with a variety of products catering to different income levels and preferences. Consumers have numerous options to choose from, with brands ranging from expensive (>100k KES) to more affordable (<5k KES) alternatives (see Table 2.6). As the market continues to evolve, it is expected that more innovative and cost-effective solutions will emerge, further promoting the adoption of eCooking appliances.

Table 2.6 Typical retail prices for selected eCooking appliances in Kenya. Source: KNECS Baseline Study (2023)

Cooking Appliance	Approximate Min Price		Approximate Max Price	
	KES	USD	KES	USD
Mixed LPG/electric standalone cooker	22,995	177	204,995	1577
Microwave	6,499	50	222,600	1712
Air fryer	5,999	46	42,219	325
EPC	5,663	44	25,995	200
Induction/infrared cooker	4,469	34	162,300	1248
Rice Cooker	2,999	23	19,500	150
Electric Hotplate	945	7	11,850	91
Electric Kettle	759	6	7,995	62

In early 2023, after public consultation on the electricity tariff review, EPRA introduced an intermediate tariff band (Domestic Ordinary 1) to balance the costs. However, this intermediate tariff was still higher than the 2022 tariffs. Multiple studies that explored the relative costs of cooking with electricity versus other fuels like LPG, charcoal, and kerosene were analysed, as illustrated in Figure 2.11.

> **Cost considerations**, both upfront and operational, are highlighted in two of the three binding constraints identified by the Kenya National Cooking Transition Strategy.

These studies used different methodologies and came up with varied energy consumption figures, ranging from 19.2 to 85 kWh/month for different appliances and cooking habits, thus their findings are indicative. On applying the intermediate tariff, eCooking was found to be cost-effective before new tariffs were introduced. However, the revised tariffs made eCooking more expensive than some other options like LPG and firewood. The implication is that cooking entirely with electricity is relatively expensive. However, eCooking remains more affordable for foods that require long boiling times, like beans.

For eCooking to be a competitive option, a tariff reduction in line with pre-review levels is necessary, particularly to make it cost-effective compared to LPG.

> For cooking exclusively with electricity to be a competitive option, **a tarrif reduction** is necessary, particularly to make it cost-effective compared to LPG

Figure 2.11 The cost of eCooking relative to other fuels across various studies. Currency in Kenya Shillings. Source: KNECS Baseline Study (2023)

Legend:
- Old Domestic Tariff (<100kWh/ month)
- New Domestic Ordinary 1 tariff (31-100kWh/ month)
- LPG
- Firewood
- Charcoal
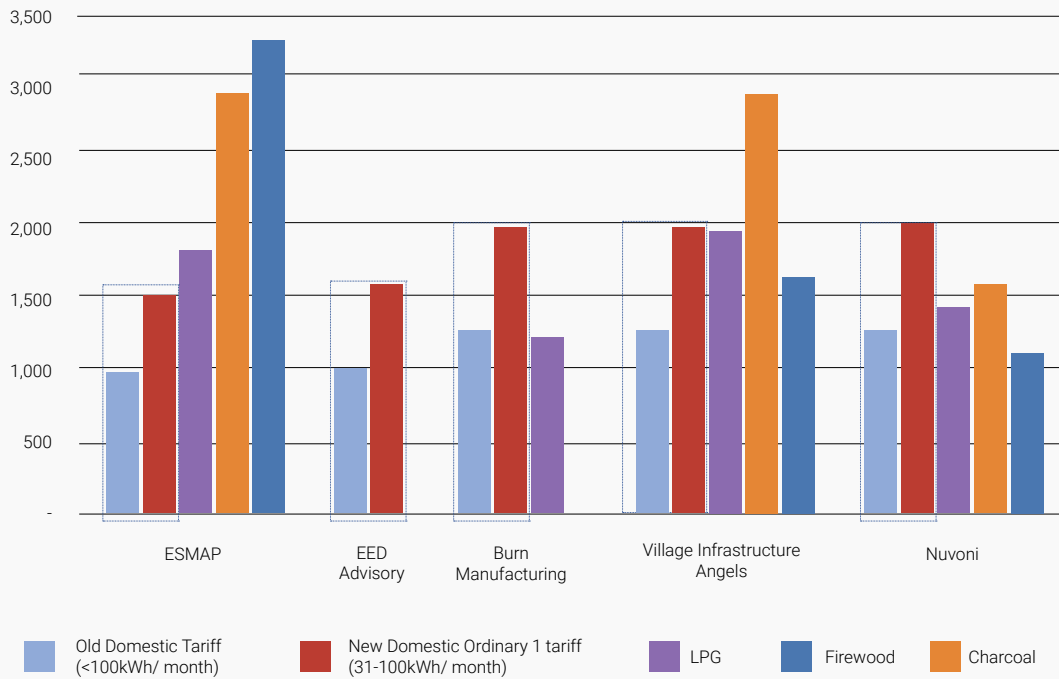
Consumer (demand-side) financing: To address the affordability constraints related to the upfront costs of eCooking appliances and costs of appliance ownership, innovative consumer financing models are being introduced into the market. Models include cash and carry, asset financing loans, PayGo, layaway savings, chamas and microfinance, summarized in Table 2.7. 96.1% of appliance owners in the survey reported that they paid full upfront cash when purchasing their electric appliances. 5.8% of the households indicate to have secured the loan to purchase a big household item. Many asset financing loans came from self-help groups such as chamas or rotating savings and credit associations (ROSCAs) at 32%.

Whilst still in its infancy in Kenya, utility-enabled financing offers new opportunities for consumer financing of clean cooking devices, capitalising the unique position of energy service companies to facilitate the sale of eCooking appliances to their customers. Mini-grid developers such as PowerHive and the national utility, Kenya Power, are already offering financed appliances to their customers under ongoing pilot projects, with the potential to scale these activities in the future. Kenya Power, which plans to convert 500,000 of their over nine million customers to eCooking, is drawing upon its expertise from initiatives such as the Stima Loan and Last Mile Connectivity projects (LMCP) (Kimiti & Kibe, 2023). To overcome financial barriers posed by

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96.1% of appliance owners in the survey reported that they paid full upfront cash when purchasing their electric appliances

upfront costs, Kenya Power piloted PAYGO loan product inspired by its Stima Loan model and enhanced with PowerPay's IoT technology, enabling precise monitoring and management of electricity usage for cooking (Mburu, et al., 2023)

Table 2.7 Consumer financing models for eCooking appliances in Kenya

Consumer financing mechanism	Description
Cash and Carry Model:	• Upfront cash payments are the most common method for purchasing electric appliances. • Many households save up or use existing cash reserves to make one-time payments. • This is a preferred payment method across income levels.
Asset Financing Loans	• Kenya's finance sector offers formal and informal institutions for loans. • Savings and Credit Cooperatives (SACCOs) provide savings and borrowing options. There is limited adoption of loans for household electric appliances. In this regard, check-off loans for salaried employees have been piloted by KPLC and could be expanded to other large corporations. • Rural households are more reliant on microfinance institutions and commercial banks for asset financing.
PayGo Models	• Pay-as-you-go models allow consumers to pay for appliances in instalments. • The initial deposit is followed by regular payments until the full cost is covered. • Mobile money payments, like M-Pesa, support these models. • Entities like Powerhive, PowerPay and BURN Manufacturing have successfully used these models to extend access to eCooking appliances.
Layaway Savings	• Customers make a deposit and regular instalments over a fixed period. • Once full payment is made, the customer owns the appliance. • This is offered by supermarkets like Naivas and Carrefour. • However, it has limited adoption, as it is preferred by middle-class households.
Self-help groups: Chamas/ ROSCAs	• Social networks like chamas and merry-go-rounds facilitate appliance ownership. • Group liability eliminates the need for individual credit checks. • Members finance each other and support acquiring appliances. • This is dominant source of borrowing for both rural and urban households.
Utility-Led Financing	• This mechanism allows consumers to spread appliance costs over time through monthly instalments. • It may involve partnership between utility companies and third-party financiers. • Viability in Kenya needs stakeholder engagement and potential donor support.

Many of these consumer financing mechanisms leverage Kenya's advanced mobile money payments infrastructure. There is great potential in models such as Pay-As-You-Go (PAYGO), Pay-As-You-Cook (PAYC), and Carbon Cashbacks in driving the adoption of eCooking appliances by making them more affordable. PAYGO and PAYC models offer flexible payment terms and address affordability, reducing default risks through remote appliance control (Kumaraswamy et al., 2020). Carbon cashbacks, which can also leverage Kenya's mobile money system, directly incentivize eCooking use by offering micro-payments linked to cooking activity as shown in pilot projects in Bangladesh and Cambodia (ATEC and MECS, 2023), making eCooking more cost-effective and appealing. Additionally, carbon cashbacks can serve as a subsidy on electricity costs, rendering eCooking cost-competitive. These benefits are particularly empowering for women who are often responsible for cooking, and thus, will stimulate eCooking adoption.

> Many consumer financing mechanisms leverage Kenya's advanced **mobile money payments infrastructure.**

Kenya's microfinance sector stands as one of the most developed globally, serving over six million customers (AMFI-K, 2021). Leveraging microfinance could address the financial barriers associated with the upfront appliance costs by spreading the cost over time. However, recent financial instability of institutions in the sector suggests exploring more viable microfinance-based business models. Nevertheless, there is a stronger business case for microfinance institutions to finance food businesses, supported by the potential for savings in fuel expenditure, the willingness of businesses to make instalment payments, and microfinance institutions' preference for financing productive use ventures (Groen et al., 2023; Nayema et al., 2023).

Supply side financing helps to address the financial and operational challenges faced by businesses in the sector. Mechanisms that have been tested in the Kenyan eCooking sector include equity investments, grants, subsidy programmes using results-based financing mechanisms, and carbon credits, as seen in Table 2.8. Carbon financing is already a strong driver for the clean cooking sector in Kenya, as discussed in Box 2.1 below. The increasing adoption of smart meters and PayGo business models in eCooking offers considerable potential to simplify the process of securing carbon finance for the sector.

This is further supported by the Gold Standard's recent endorsement of a new methodology that makes verifying carbon finance data more efficient by utilizing smart meter data (ClimateCare and MECS, 2022). Utility-led financing, as discussed above, could also address some of the supply-side financing challenges by drawing upon the much more substantial investment going into the electricity access sector through programmes such as LMCP.

Table 2.8 Supplier financing models for eCooking appliances in Kenya

Supply-side financing models	Description
Grants	• These are funding mechanisms provided by development partners for research, development, and market expansion. • Grants support pilot projects and risky ventures with potential for significant impact. • Grants are disbursed through competitive processes or partnerships with local organizations. • Examples include MECS, EnDev, and Efficiency for Access Coalition.
Equity and Impact Investments:	• These are investments made by private investors, venture capitalists, and development finance institutions. • They provide patient capital for scaling operations and expanding reach. • Active investors in clean cooking enterprises include Acumen, Engie, Circle Gas, and FMO.
Results-Based Financing (RBF):	• RBFs link fund disbursement to predefined performance outcomes. • They lower market entry barriers and incentivize clean cooking adoption. • Usage data from pay-as-you-go (PAYGO) or Pay-as-You-Cook (PAYC) models can inform impact metrics. • Examples include EnDev RBF, NEFCO, Kenya Higher Tier Cookstoves Market Acceleration project, and ABPP.
Smart-Meter-Enabled Carbon Financing	• Smart meters monitor energy consumption and calculate carbon emissions reductions. Carbon credits generated can then be used for various mitigation purposes such as to meet the NDCs and/or sold to offset third party carbon emissions. • KOKO Networks and BURN Manufacturing have implemented this model. • There is untapped potential for accessing global carbon finance and promoting energy-efficient appliances.
Utility-Led Financing	• Options include on-bill financing, on-bill repayment, and co-marketing/data-sharing. • This mechanism could draw upon the much more substantial investment going into the electricity access sector through programmes such as LMCP

BOX 2.
THE EVOLUTION OF CARBON MARKETS IN KENYA

Carbon markets have played a critical role in accelerating low-carbon energy transitions in Kenya over the past decade, particularly in the clean cooking, renewable energy, and energy-efficiency sectors. eCooking integrates all three areas but has only recently started to tap into carbon markets.

In the clean cooking sector, carbon revenue has traditionally been used to reduce the upfront cost of new cooking devices, facilitating transitions to less carbon-intensive fuels and technologies. eCooking can enable a switch from biomass and fossil fuels to energy-efficient electric appliances powered by renewable electricity, resulting in significant carbon emission reductions. Opinions are divided over the role of carbon finance in the eCooking transition. Many stakeholders view carbon finance as the key to unlocking exponential growth within the sector, while others are wary of risks such as price volatility, over-crediting, and market distortion. Establishing carbon projects is a lengthy and costly process that favours larger market players, leaving many small players afraid of being priced out as their larger competitors offer discounted products. Therefore, carbon finance must be utilized responsibly to build a sustainable and equitable marketplace that can thrive even when carbon revenues diminish. In 2023, the first eCooking carbon projects were registered in Kenya. However, the collapse of prices in the voluntary markets due to systemic over-crediting has led many players to look towards Article 6 of the Paris Agreement. Specifically, Article 6.2 enables bilateral trading of carbon mitigation outcomes, allowing countries in the Global South to tap into lucrative compliance markets in the Global North. Article 6.2 requires bilateral agreements between governments, and at the time of writing, Kenya is about to finalize its first such agreement, likely with Switzerland, but with deals involving Sweden and Singapore also in the pipeline. Kenya's Climate Change (Carbon Markets) Regulations were gazetted in May 2024. The regulations follow the Climate Change (Amendment) Act 2023 (the Act), which amended the Climate Change Act 2016 to introduce provisions regulating participation in carbon markets.

While many traditional improved cookstove (ICS) projects have been hit hard by the over-crediting crisis, the development of Gold Standard's Methodology for Metered and Measured Energy Cooking Devices has provided a relative safe haven for eCooking. This methodology enables the generation of high-integrity carbon credits by providing clear evidence of the real usage of IoT-enabled appliances. In 2023, new smart-metered eCooking appliances were launched in the Kenyan market, primarily to enable PayGo sales. This digital monitoring and verification of usage has streamlined reporting for carbon projects and enabled carbon revenues to be channelled directly back to users as mobile money payments or electricity tokens. This creates a virtuous cycle: giving cashback to users encourages greater use of the eCooking appliances, leading to the generation of more carbon credits, which in turn provides more carbon revenue for both the appliance distributor and the end user.

In conclusion, Kenya's strategic integration of carbon markets and innovative technologies like IoT-enabled appliances offers a promising pathway for scaling eCooking. The responsible utilization of carbon finance can foster further development of a sustainable, equitable marketplace for eCooking.

Appliance Standards and Testing

The ecosystem for efficiency and quality assessment for eCooking appliances in Kenya is still at its infancy. Kenya currently has a safety and performance standard for eCooking appliances, both adapted from international standard, with a larger focus on safety. There is still no national test method requirement for eCooking appliances in Kenya. Thus, tests are done voluntarily at Kijani Testing Lab, Strathmore University and University of Nairobi. There is a need for support and capacity building for eCooking testing in these facilities, including KIRDI which is currently focused on improved cookstoves testing.

Only one kitchen appliance—refrigerators—has the Kenya Energy Label which is specific to Kenyan national standards issued by EPRA (See Figure 2.12). Other appliances may have labels from other jurisdictions, but there's no requirement for labels on these products. KEBS also has mandatory standardization marks for all manufactured products, whether local or imported, which are also applied to eCooking appliances.

The growth of the Kenyan ecosystem for eCooking appliances brings to the fore the urgent need for comprehensive standards, testing, and certification protocols. With a broad consumer base increasingly relying on these appliances, ensuring their quality, safety, and efficiency has become paramount. This not only boosts consumer confidence but also paves the way for a more robust and standardized market, fostering local industry growth.

Figure 2.12 The Kenya Energy Label used on refrigerators. The more stars on the label, the more energy efficient an appliance is. Source: Energy Petroleum Regulatory Authority.
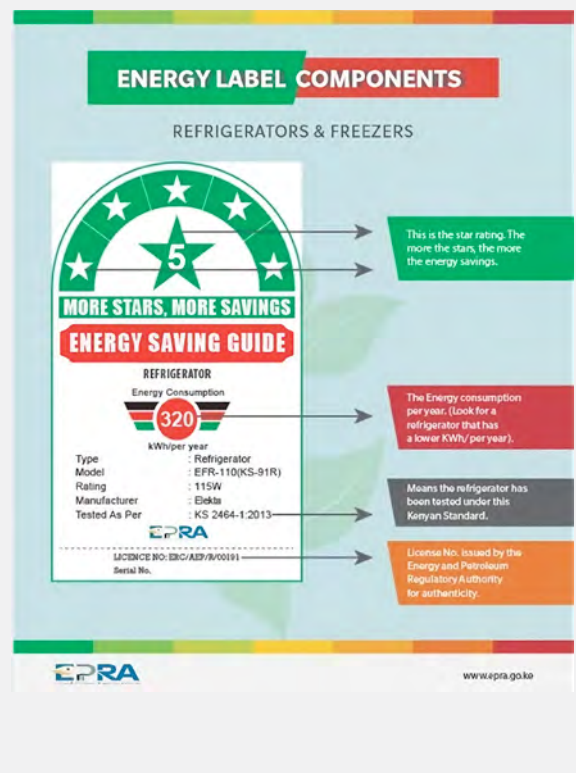
Kenya currently has both **safety and performance standards** for eCooking appliances adapted from international standards, however testing is currently only carried out for safety

In conclusion, the eCooking sector in Kenya has significant potential to address not just cleaner cooking and electrification, but broader issues like public health, environmental conservation, and economic development. However, this potential can only be realized by tackling various challenges, including electricity access, socio-cultural factors, and economic constraints. A multi-faceted approach is needed that goes beyond just technology adoption and includes addressing cultural and socio-economic nuances, streamlining supply chains, introducing innovative financing models, and implementing robust standards and certifications. A supportive and adaptive policy environment is crucial for scaling eCooking and must align with broader objectives like public health and environmental conservation. Emphasizing the needs and roles of women in this transition is also vital. The key takeaway is the need for proactivity; setting clear, ambitious targets and revisiting policies and strategies as the market evolves will be crucial for the success of eCooking initiatives in Kenya, with broader implications for the country's sustainable development goals.

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2.3 eCooking sector SWOT analysis

The eCooking sector in Kenya offers substantial opportunities to impact the nation's energy, health, and environmental landscapes. However, it also faces unique challenges that need to be navigated carefully. Below is a SWOT analysis – examining the sector's Strengths, Weaknesses, Opportunities, and Threats – that provides a comprehensive overview of the current state of eCooking in Kenya.

Table 2.9 eCooking sector SWOT analysis

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Electrification	• There is significant potential for eCooking adoption, with 69% of grid-connected households having Tier 3+ electricity access. • A diverse range of eCooking appliances is available in the market, catering to various cooking styles and energy efficiency needs.	• Inadequate grid capacity in some regions could hinder the adoption of eCooking solutions. • There is limited access to higher-tier off-grid solutions for rural households. • High electricity tariffs make eCooking less affordable particularly for poor and low-income households. • Informal electricity connections undermine the reliability and safety of the electricity supply, particularly in informal settlements. • Lack of electricity safety awareness can hinder the safe adoption of eCooking.	• Government plans for grid intensification, densification, and expansion will enable more households to access and adopt eCooking. • Integrating eCooking into broader electrification programs, like the Last Mile Connectivity Programme could lower barriers to eCooking access. • To manage increased electricity demand from eCooking, households could adopt Time-of-Use Tariffs that encourage cooking during off-peak hours. • Expanding access to off-grid solutions (solar eCooking, battery-supported eCooking) can open up new markets for eCooking. • Residential smart energy meters and integrated meters in appliances can lead to more tailored electricity tariffs and efficient usage tracking.	• Grid instability from widespread eCooking Adoption, especially during peak hours, can challenge electricity supply system. • Continuing informality in electricity connections poses risks to the stability and safety of power supply for eCooking. • High energy costs could deter potential users from switching to or continuing to use eCooking appliances. • If new eCooking energy demand is met through non-renewable sources, the environmental benefits of eCooking could be undermined.
Cooking practices and appliance use	• There is already a pronounced ownership of eCooking appliances, indicating a foundation for further expansion. • Mass eCooking adoption offers significant potential for revenue growth for Kenya Power and other sector utilities, and mini-grid companies. • Many Kenyan cooking techniques and dishes are compatible with modern eCooking appliances. • There is a latent willingness among households to pay for eCooking appliances within the KES 3,000 – 15,500 price range, and the market currently offers appliances within that price range.	• There is low usage of eCooking appliances despite high ownership rates. • Some eCooking appliances lack compatibility with Kenyan cooking practices and languages, posing challenges in adoption. • There is a gap in knowledge and attitudes about using eCooking appliances effectively among the general population.	• There is potential to integrate eCooking into existing cooking practices, tapping into the market for households currently using traditional or improved cooking solutions. • Promotion of energy-efficient cooking appliances can enhance the adoption of eCooking in households with lower-capacity electricity systems. • Offering eCooking appliances within affordable price ranges can accelerate adoption. • Behaviour change communication focusing on the benefits of eCooking can improve knowledge and familiarity among the population. • Development of localized eCooking Solutions, e.g., by including preset cooking programs for local dishes and instructions in local languages can boost acceptance and usage, of appliance features. • Focusing on urban areas for initial eCooking promotion can leverage existing infrastructure and consumer readiness.	• Despite efforts, the cost of appliances may still be prohibitive for many households. • Deeply ingrained cooking habits and preferences for traditional methods can persist as a significant barrier, especially if eCooking is perceived as less suitable for preparing certain dishes.

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Financing	Availability of diverse consumer financing mechanisms like asset financing loans, PayGo, and layaway savings offer consumers flexibility and choice.	• There is a lack of awareness and accessibility to diverse consumer financing options for eCooking appliances. • Financial and operational constraints for businesses limit their capacity to offer eCooking appliances on favourable terms. • Current monitoring systems for some results-based financing (RBF) and carbon financing schemes lack transparency and effectiveness.	• Strengthening the role of microfinance, especially in rural areas, can enhance access to eCooking appliances. • Empowering women through self-help groups could help overcome credit access challenges. • Increasing the range of digitally-enabled consumer financing mechanisms, including smart appliances with PayGo functionality could lower financing barriers. • Flexible financing programs adapted to market realities (e.g., inflation, currency fluctuations) will build resilience and sustained progress in scaling eCooking. • There is potential for carbon markets to address financing challenges on the supply side and demand side in the eCooking sector. Metered methodology and ITMO framework offer potential for higher-integrity and higher value carbon credits	• Existing eCooking financing programs may be too rigid to adapt to changing market conditions, such as economic shocks or currency devaluation. • Persistent difficulties faced by women, youth, poor and remote households in accessing credit can hinder their participation in adopting eCooking solutions. • Price volatility and integrity challenges in voluntary carbon markets • There is a threat of not securing sufficient investment to drive the eCooking market in Kenya in light of the competitive market for clean cooking investments in sub-Saharan Africa
Supply chain	• There is significant potential for local appliance assembly, which can lead to more affordable and customized eCooking appliances suitable for local needs. • There are exemplars of energy service companies marketing and distributing of eCooking appliances, offering bundled packages and financing plans. • Current marketing efforts, including traditional and social media, are increasing awareness and demand for eCooking appliances. • A variety of delivery models are available in cities and large towns, including physical retail outlets and online shops, that cater to different market segments. • There is an existing after-sales service infrastructure serving cities and large towns that could be expanded.	• Currently, there is limited local manufacturing capacity for eCooking appliances in Kenya. • Some importers and distributors face difficulties in procuring high-quality eCooking appliances at affordable prices from international markets. • There is still limited engagement of energy service companies in appliance distribution. • Distribution channels in rural areas are underdeveloped. • Concerns about the durability, repair needs, and maintenance costs of eCooking appliances could also deter potential users. • Inefficient warranty claims processes could lead to customer dissatisfaction and hinder the adoption of eCooking appliances. • The existing skill gap among technicians in keeping up with the latest technological advancements and evolving customer needs is a significant threat.	• There is potential for further development of local manufacturing, reducing reliance on appliance imports. • Expansion of innovative consumer financing models will make eCooking appliances more affordable. • Utility-led financing, especially on-bill repayment and data sharing/co-marketing schemes could be explored further to lower barriers for grid-connected households. • There are opportunities for investments in education, technical training, and capacity building to support the eCooking supply chain. • There is an opportunity to expand service centres, especially in rural and semi-urban areas, to cater to the growing demand for eCooking appliances.	• There is a risk that over-reliance on appliance importation may stifle the development of local manufacturing capabilities. • There is a threat of reliance on counterfeit or substandard components due to the inaccessibility or unavailability of quality spare parts. • A lack of consumer awareness regarding the importance of warranties and after-sales services could negatively impact the adoption and satisfaction with eCooking appliances. • Global and local supply chain issues can affect the availability and cost of eCooking appliances, making them less accessible or more expensive. • The availability and promotion of alternative cooking energy sources, such as LPG, which might be subsidized or marketed more aggressively, could compete directly with eCooking.

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Standards	The current policy and industry focus on standards and testing protocols paves the way for more robust and standardized market development, fostering local industry growth.	• Lack of national testing standards for eCooking appliances leads to inconsistent product quality. Current testing practices are voluntary and based on retailer demand, not mandatory, which can compromise appliance safety and quality. • Limited testing capacity in existing testing facilities hinders comprehensive standardization and quality assurance processes. • Difficulty in defining and contextualizing performance requirements for eCooking appliances affects the standardization process.	• Establishing a standardized national test method, and implementing mandatory testing and labelling for eCooking appliances can ensure consistent product quality across the board, improved safety standards and informed consumer choices. • Investing in infrastructure, equipment, and training for testing facilities could enhance their capabilities. • Working with industry experts to set clear efficiency parameters and benchmarks can improve the quality of eCooking products in the market.	• There may be resistance or slow adaptation to new standards and mandatory testing within the industry. • Consumers might perceive labelled and more efficient products as more expensive, which could hinder market growth. • Limited resources for standardization bodies like KEBS could impede the development and enforcement of new standards and labels.
Policy	There is political will to scale up clean cooking efforts, with growing interest in eCooking as an important clean cooking option.	• Targets and objectives related to clean cooking and electrification are not harmoniously integrated and aligned across different frameworks, hindering cohesive policy implementation. • eCooking is not adequately aligned with policies related to climate change, environment, health, and innovation, resulting in missed opportunities. • County governments lack capacity to effectively drive or support eCooking strategies at the county level	• The possibility of aligning eCooking with key national policies related to climate change, environment, health, and innovation, enhancing cross-sectoral benefits. • Developing and implementing a comprehensive policy framework that effectively connects eCooking with broader national goals. • Aligning eCooking with other critical areas like climate change, health, and innovation to leverage multiple benefits.	• Possible resistance or slow adaptation to new, integrated policy frameworks from existing bureaucratic structures could impede the enabling environment. • Failure to align eCooking with broader policies might result in missed opportunities to optimize benefits across multiple sectors. • Persistent economic challenges, among them, inflation and currency devaluation, can limit the ability of households to invest in eCooking appliances or pay for electricity.

This SWOT analysis facilitated the development of the proposed strategic roadmap, objectives and specific interventions that build upon the strengths and opportunities, while addressing and mitigating the weaknesses in the subsector, as outlined in subsequent sections.

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3. THE STRATEGIC ROADMAP

3.1 Scenario analysis

According to the KNeCS Baseline Study (2023), 69% of Kenyan households have the potential to transition to eCooking immediately, given their current Tier 3+ electricity access. As illustrated in Figure 3.1, there is a significant opportunity for interventions aimed at scaling up eCooking solutions among populations of firewood, LPG, charcoal, kerosene and ethanol users, with firewood and LPG users accounting for the majority of the households with the potential for eCooking transition.

69% of Kenyan households have the potential to **transition to eCooking** immediately, given their current Tier 3+ electricity access

Figure 3.1 The potential to transition to eCooking based on Tier 3+ electricity access in 2023

Current primary fuel:
- Firewood 50.43%
- LPG 32.39%
- Charcoal 13.10%
- Kerosene 1.92%
- Electricity 0.58%
- Ethanol 0.62%
- Others 0.96%

Target Fuel:
- Electricity 69.09%
- Firewood 13.88%
- LPG 8.87%
- Charcoal 7.31%
- Kerosene 0.52%
- Ethanol 0.16%
- Others 0.17%
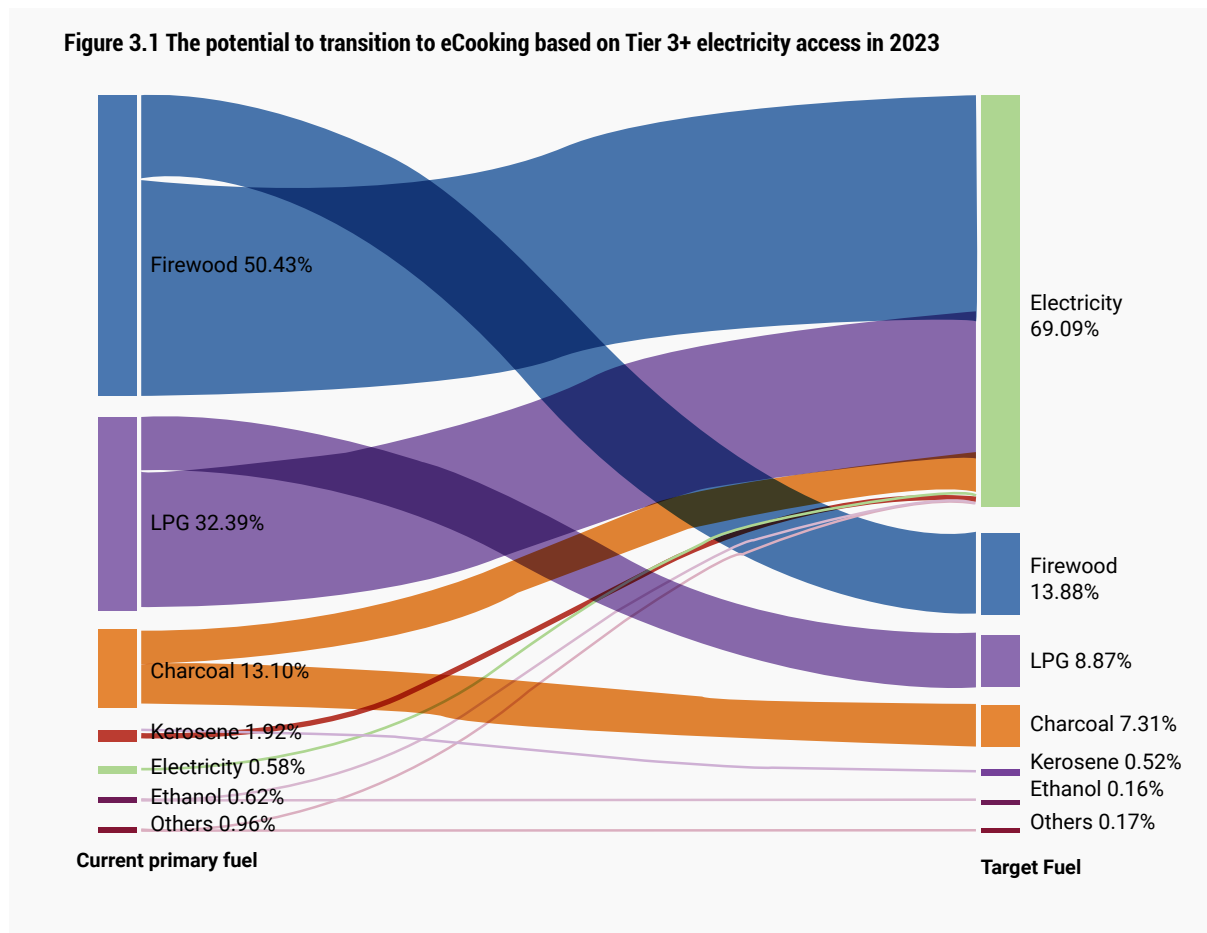
However, an immediate transition of this magnitude is not feasible due to risks of grid overload, supply chain disruption, and inequality in access, potentially causing frequent power outages, quality compromises, and customer dissatisfaction. In addition, factors such as affordability of appliances, electricity tariffs and cultural acceptance of eCooking must also be addressed.

To explore feasible transition options, four initial scenarios were analysed: a Business-as-Usual Scenario, a Stated Policies Scenario, and two Net Zero Scenarios: a simulated and an optimised version of the Net Zero scenario. In all cases, the modelling exercise focused on induction cookers and EPCs. As seen in the situational analysis, these two appliances are particularly promising as they balance upfront cost, versatility and energy-efficiency.

The hypotheses and findings of these scenarios are presented in detail in the KNeCS Modelling Report. An 'eCooking Transition Scenario' was then developed based on insights from the four scenarios, and in particular, harmonising the Stated Policies scenario and the simulated Net Zero Scenario. It is the eCooking transition scenario that forms the basis for the interventions outlined in KNeCS. The eCooking Transition Scenario creates a pragmatic roadmap for Kenya's cooking sector transformation given the current opportunities and constraints of the sector.Figure 3.2 below visualises the eCooking Transition Scenario, showing the national, urban and rural trajectories.

Figure 3.2 eCooking Transition Scenario model results

URBAN
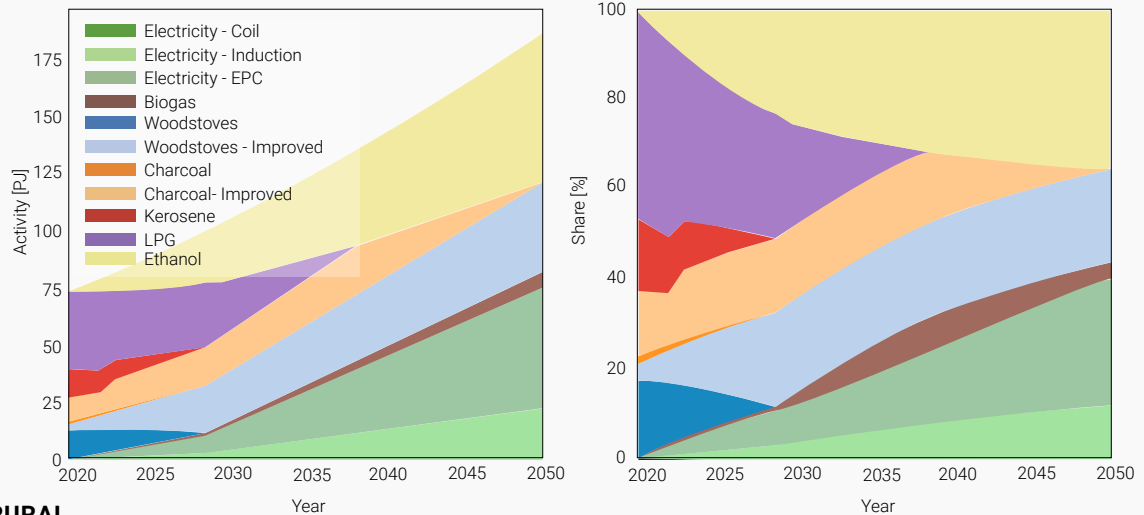
RURAL
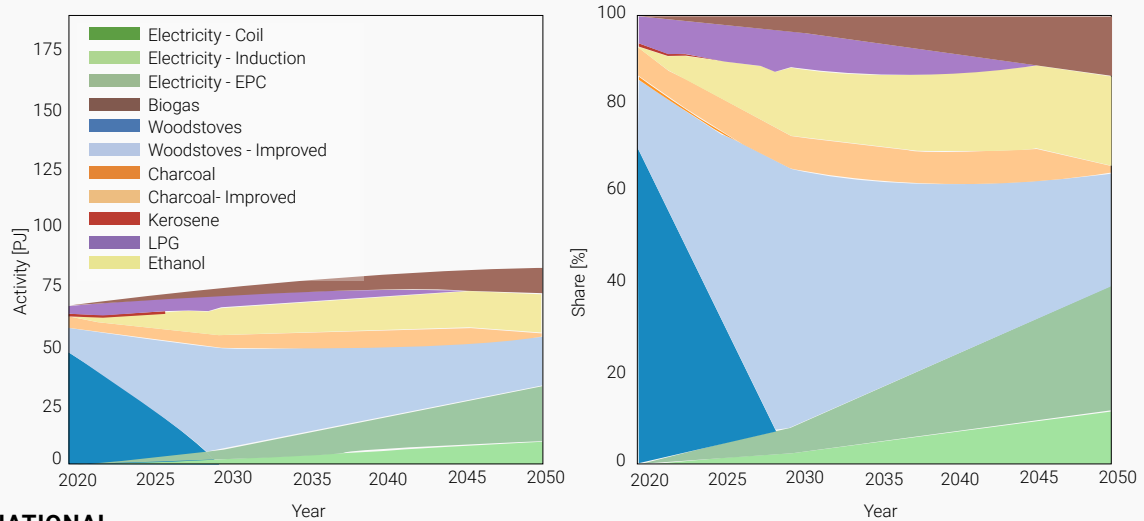
NATIONAL
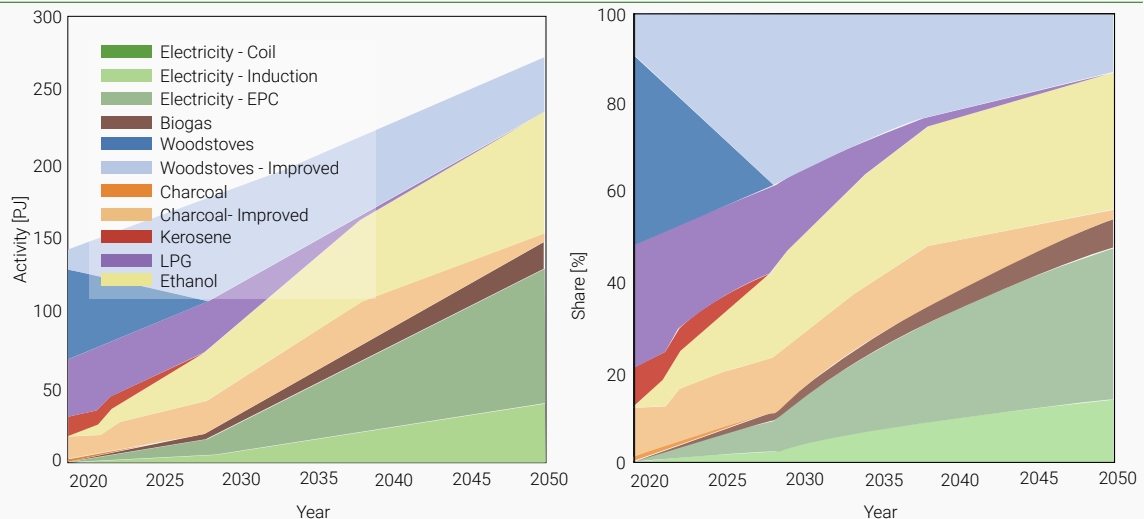
In the eCooking Transition Scenario, *eCooking solutions such as EPC and induction cookers witness a steady growth as primary cooking solutions, more so in urban areas, accounting for approximately 9.5% in 2028 and increasing to 47.9% by 2050. With secondary eCooking incorporated, the expected prevalence rate of eCooking in 2028 rises to 10.8%.* Ethanol rises significantly, also in urban areas, while biogas makes notable inroads in rural settings. Conversely, traditional fuels (firewood and charcoal) and LPG see a marked decline, with LPG acting as a transitional fuel in urban areas. By 2028, kerosene, traditional firewood and charcoal are phased out.

The eCooking Transition Scenario presented here was an input into the composite scenario presented in the Kenya National Cooking Transition Strategy (KNCTS), which indicates that the 2028 eCooking target will be 10%..

3.2 Impact of new eCooking Demand on the Grid

This modelling endeavour aimed to understand whether and how Kenya has, or has planned, for the capacity to meet the new electricity demand for eCooking as illustrated in the proposed eCooking Transition scenario

model, while continuing to prioritize a renewable energy mix. The scenario analysis builds upon both the Medium-Term Plan 2022-2027 and the most recent version of the LCPDP (2022-2041), specifically the LCPDP's reference scenario (Kihara, et al., 2024). In the reference scenario, additional renewable energy potential starts to be available after 2025, and nuclear energy is available from 2036.

In the proposed eCooking Transition scenario, electricity demand from eCooking will reach 2.54TWh/year in 2028. In the long-term, there is a dramatic increase in electricity demand in the residential sector based on new eCooking demand of 18.89TWh/year, as illustrated in Figure 3.3. Starting from a low base, the eCooking demand grows significantly and becomes the second largest component of the total energy demand by 2050, surpassing other sectors. Commercial demand remains the smallest component of overall demand in 2050.

Electricity demand from eCooking is predicted to reach **2.54TWh/year** in 2028

Figure 3.3. Electricity demand growth for the Whole Energy System Model under the eCooking Transition scenario from 2024 to 2050, including new eCooking demand, and demand for the residential, industrial, and commercial sectors.

E-COOKING TRANSITION-ANNUAL POWER DEMAND
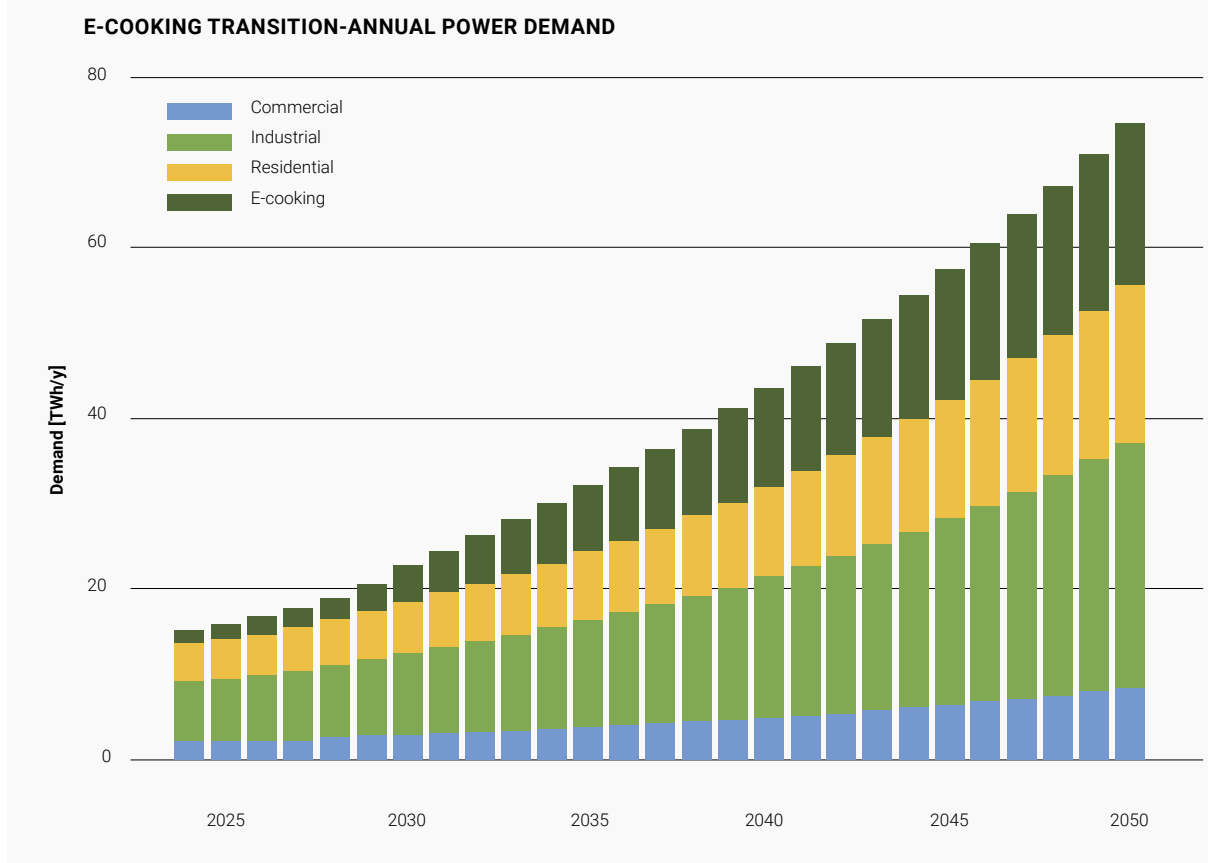
Current installed generation capacity for commercial, industrial and residential use is roughly 3.6 GW, and the LCPDP projects an installed capacity of 4.2 GW by 2028. According to this power sector model, additional eCooking demand in 2030 under theeCooking Transition Scenario will require about 1 GW of that planned capacity, and rising to almost 7 GW in 2050, as shown in Figure 3.4. However, in the short term, the existing and planned renewable energy capacity falls short, necessitating reliance on diesel generators or imports[8,9]. Nevertheless, projections indicate that starting from 2025-26, there will be an increase in geothermal, hydro, electricity imports, and more significantly, wind capacities, which will be able to accommodate the new eCooking demand. For more details on the grid impact, **see the Modelling Report.**

> Additional **eCooking demand** will require about **1GW of the 4.2 GW** of planned capacity in 2028

Figure 3.4 Projected additional revenue from the power sector on implementing the eCooking transition scenario
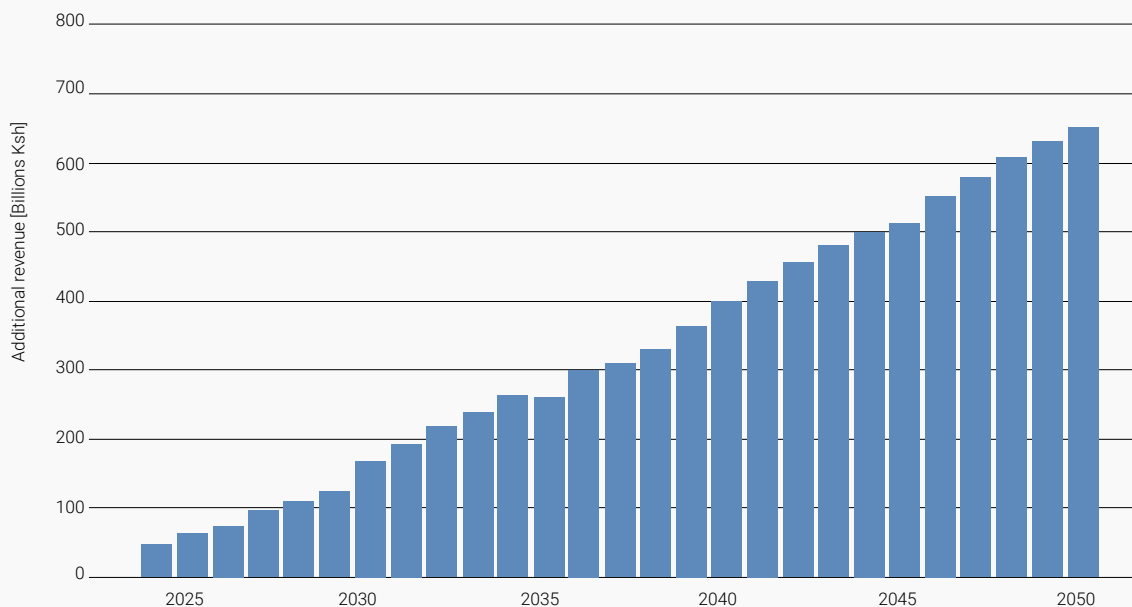
Building on the increased electricity demand anticipated from the eCooking Transition Scenario, the model forecasts additional revenue through 2050, using the average tariffs of the past year[10], for the domestic 30-100 kWh band[11]. The outcomes are illustrated in Figure 3.5 presented.

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8   This is indicated as 'backstop' in Figure 2.2. Backstop capacity is added when the capacity to meet demand is not enough, or if the reserve margin is not met. The reserve margin is the extra capacity needed to handle unexpected increases in demand, or sudden loss of generation capacity. The model requires a 9% reserve margin (excluding solar or wind). In practical terms, this shortfall could result in loss of load, blackouts, load shedding.

9   Diesel capacities are not shown in the plot in Figure 3.4, as they are not planned for deployment in the LCPCP. Further, as this analysis is based on LCPDP (2022-2041), announced pledges are not taken into consideration, among them, increasing imports from Ethiopia from 200MW to 400MW by 2026, and potential imports from Tanzania once the 400-kilovolt transmission line with the capacity of 2,000 MW is completed.

10   This analysis has not factored inflationary effects, thus further studies could better establish projected tariff rates.

11   It is assumed that households cooking primarily with electricity will be categorized in the "Domestic Customer Category 2' tariff band introduced in April 2023 by the Energy and Petroleum Regulatory Authority to promote the uptake of eCooking.

Figure 3.5 The evolution in the energy mix in the power sector both in terms of installed capacity for the eCooking Transition scenario

© KENGEN
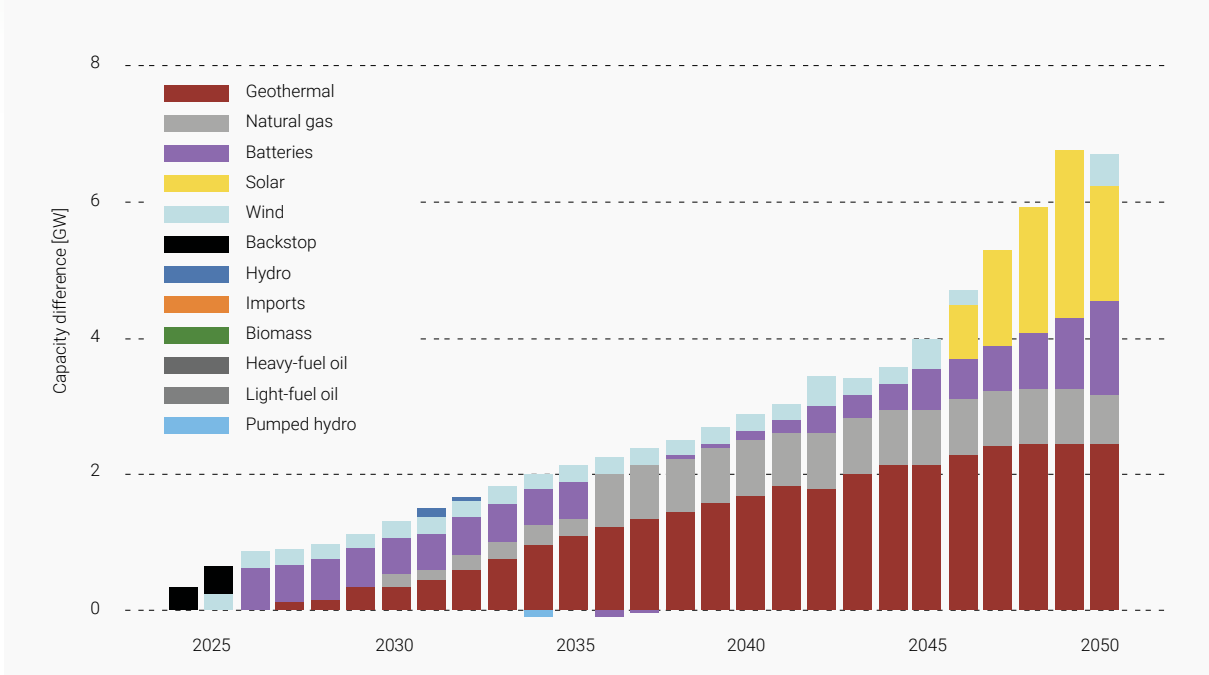
The model indicates that the eCooking Transition Scenario, with its progressively increasing demand for electricity, is projected to yield an estimated 110 billion shillings in additional revenue for Kenya Power by 2028, and approach 650 billion shillings by 2050 based on the current tariff rates. Kenya Power's total revenue for the 2022/2023 financial year was 190.98 billion shillings[12]. Thus, the additional revenue from eCooking demand will increase Kenya Power's current revenue by 2028 by about 60%. Consequently, eCooking serves as a potent demand stimulation tool, potentially yielding considerable revenue that could further strengthen the grid infrastructure and related sector utilities.

The eCooking Transition Scenario, identified as the most feasible intervention, serves as the blueprint for the Kenya National eCooking Strategy. The subsequent section of the strategy considers a variety of interventions outlined in Section 5, among them, system enablers to address bottlenecks in the enabling environment, eCooking pilots, capacity building initiatives, electrification initiatives and market development activities that lower barriers for households to adopt eCooking between 2024 and 2028.

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12 Statistics from Kenya Power Audited Financial Report for the year ended 30 June 2023. Available here: https://www.kplc.co.ke/img/full/Audited%20Financial%20Report%20for%20the%20Year%20Ended%2030th%20June%202023.pdf

4. THE STRATEGIC APPROACH

4.1 Vision, Mission and Objectives

The strategic interventions proposed below are designed based on this eCooking Transition Scenario.

Vision: Transforming the cooking and electrification landscape in Kenya through increasing adoption and sustained use of energy-efficient eCooking solutions.

Mission: To build a sustainable eCooking marketplace over the next 5 years, enhancing access, affordability, and innovation to achieve widespread electrification of cooking by 2050, while improving health, creating jobs, promoting gender equity, and reducing CO2 emissions.

Strategic objectives

The following three broad objectives will help achieve the mission and vision outlined above, as well as the strategic roadmap:

- Strengthen the enabling environment for eCooking by addressing policy, infrastructure and capacity gaps.

- Validate innovative eCooking solutions for broader market adoption through demonstration projects.

- Bridge affordability and access gaps for eCooking solutions through market development activities.

These objectives have been elaborated in the interventions described in detail below.

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4.2 Strategic Interventions

As the SWOT analysis in Section 2.3 showed, the eCooking sector in Kenya has strengths and opportunities that can be leveraged and expanded upon, and weaknesses and threats that need improvement and risk mitigation. This

comprehensive understanding has aided in specifying the three broad objectives into a number of specific and targeted initiatives, as outlined in Figure 4.1.

Figure 4.1 The eCooking strategy agenda and related interventions

eCooking Strategy Agenda

S1- Strengthen the enabling environment for eCooking

- **S1.1** Establish KNeCS Steering Committee
- **S1.2** Boost R&D and local manufacturing
- **S1.3** Training and capacity building
- **S1.4** eCooking appliance quality standards
- **S1.5** End-of-Life (EoL) management
- **S1.6** Grid and off-grid investments

S2-Validate innovative eCooking solutions

- **S2.1** Carbon finance in eCooking
- **S2.2** eCooking tariff study
- **S2.3** Institutional eCooking pilots
- **S2.4** Tax waiver study
- **S2.5** Solar and battery-supported eCooking

S3-Bridge affordability and access gaps for eCooking solutions

- **S3.1** Behaviour Change Communication
- **S3.2** Credit financing programme
- **S3.3** Subsidy programmes

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These interventions are designed to work synergistically, rolled out in a logical sequence for maximum efficiency and impact. Figure 4.2 below presents a summary of these interventions, and how they will be systematically phased over a five-year period from 2024 to 2028.

Figure 4.2 Cross cutting strategic interventions for scaling eCooking in Kenya

KNeCS Strategic Interventions	2024	2025	2026	2027	2028
S1. Systemic enablers					
S1.1 Establish KNeCS Steering Committee	██	██	██	██	██
S1.2 Boost R&D and local manufacturing	██	██	██	██	██
S1.3 Training and capacity building	██	██	██	██	██
S1.4 eCooking appliance quality standards	██	██	██	██	██
S1.5 End-of-Life (EoL) management	██	██	██	██	██
S1.6 Grid and off-grid investments	██	██	██	██	██
S2. eCooking demonstration projects					
S2.1 Carbon finance in eCooking	██	██			
S2.2 eCooking tariff study	██	█			
S2.3 Institutional eCooking pilots		██			
S2.4 Tax waiver study	██	██			
S2.5 Solar and battery-supported eCooking		██			
S3. Market development activities					
S3.1 Behaviour Change Communication	██	██			
S3.2 Credit financing programme	██	██	██	██	
S3.3 Subsidy programmes	██	██	█		

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The section below tackles each of these interventions in detail, highlighting the programme structure, target beneficiaries, a cost-benefit analysis and expected outcomes. *The Action Plan will provide more details on the key activities related to each strategic intervention, along with the monitoring and evaluation framework, and stakeholder engagement plan.*

4.3 (S1) - Systemic enablers

Kenya must first lay a solid foundation to enable widespread adoption of eCooking. This involves leveraging recent advancements in the enabling environment and tackling existing challenges that could hinder the adoption of eCooking. This section delineates these critical ecosystem activities aimed to garner the financial, human, and technological resources required for a widespread adoption of sustainable cooking solutions in the country.

4.3.1 (S1.1) Establish a National eCooking Steering Committee

Establish KNeCS Steering Committee
• Domiciled at and chaired by the MoEP • Coordinate and align stakeholder initiatives in the subsector to the strategy • Composed of KNeCS Technical Working Group members, GeCCo, civil society
Cost: USD 2.8 million KES 361 Million

A national eCooking Steering Committee will be established as a centralized mechanism that will implement this strategy by coordinating the interests, initiatives and resources of multiple stakeholders in the sub-sector. In addition, the interventions in the strategy are interconnected and will be implemented simultaneously. The eCooking steering committee will provide a platform to facilitate collaboration among different stakeholders, ensuring that cross-cutting interventions are effectively integrated. The role of the Committee will be to:

• Coordinate resource mobilisation efforts in the sub-sector to avoid duplication and ensure maximum impact.

• Provide technical support to activities that further strengthen the enabling environment, among them, the development of an eCooking innovation platform, training and capacity building programmes, appliance quality standards development and local manufacturing initiatives.

• Coordinate sub-sector demonstration projects and market development activities for eCooking adoption conducted by different sector players

• Coordinate stakeholder engagement efforts to support strategy implementation.

• Coordinate monitoring and evaluation efforts, among them, performance tracking, utilizing a set of predefined key performance indicators (KPIs),

to assess the progress of various components of the eCooking strategy.

• Advocate for supportive policies and regulatory frameworks that facilitate the adoption of eCooking technologies.

• Conduct a mid-term review of the eCooking strategy to assess its effectiveness and impact.

The Committee will be domiciled at and chaired by the Ministry of Energy and Petroleum, and will bring together selected members of the eCooking Technical Working Group[13], along with the Global eCooking Coalition (GeCCo) and other development partners, and civil society. The Committee will work closely with the KNCTS Coordination Committee to ensure that activities are aligned to the overarching strategy. The establishment of this Committee helps reinforce that idea that the eCooking transition is neither government- nor private sector-led, but rather a collaborative effort that capitalises on the strengths and resources of multiple stakeholders.

The Committee will have quarterly meetings for performance reviews, updates on upcoming projects, and reallocation of resources based on the achieved milestones.

Implementation Timeline: 5 years, from 2024 – 2028, and onwards

4.3.2 (S1.2) Boost research and development (R&D) and local manufacturing/assembly of eCooking products.

Boost R&D and local manufacturing of appliances
• Create an 'eCooking Innovators Platform' to further catalyse and support R&D • Develop local assembly and manufacturing capabilities, within Special Economic Zones
Cost: • Innovation platform: USD 1.2 mil (KES 149 million) • Manufacturing/ assembly plants USD 11.5 million (KES 1.46 billion

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13   The eCooking Technical Working Group, which is composed of eCooking sector stakeholders spanning government agencies and development partners, provided oversight over the eCooking strategy development.

Kenya has emerged as a hub for various eCooking innovations, evidenced by developments around local assembly of eCooking appliances, local embedding of IoT systems for smart metering, innovations in battery-supported eCooking systems, innovative business models such as PayGo and digitally enabled finance, a number of localised eCooking appliances, and local appliance repair and maintenance services. Kenya's vibrant entrepreneurial ecosystem has given rise to startups and companies dedicated to eCooking. These niche activities will be coalesced through an 'eCooking Innovation Platform' to further catalyse and support research and development efforts in the eCooking sector, for both household and institutional eCooking. The Innovation Platform will also support the eCooking demonstration projects, specifically, activities related to carbon financing for eCooking, and eCooking tariff development. Evidence from the eCooking demonstration projects will guide the design of targeted interventions to support market development for MSMEs. These interventions will include research and development grants, tax waivers for locally assembled and manufactured eCooking appliance, RBFs aimed at increasing efficiency and effectiveness through incentivizing market development and boosting returns for a fixed period, tailored credit financing products, and leveraging carbon financing to scale production.

Key activities of the platform include:

- Actively seek funding from diverse sources to support R&D efforts in eCooking technology and solutions, including both basic and applied research.

- Host innovation challenges to encourage creative solutions in the eCooking sector, providing incentives for inventors and innovators.

- Facilitate strategic partnerships between eCooking innovators, academic and research institutions, incubators and accelerators, and industrial parks.

The eCooking Innovation Platform activities can pave way for the development of local assembly, repair and maintenance capabilities with the view of building capacity for local manufacturing of components. As envisioned in the overarching strategy—the Kenya National Cooking Transition Strategy (KNCTS), industrial

'eCooking Innovation Platform' to further **catalyse** and **support research** and **development efforts in the eCooking sector**, for both household and institutional eCooking.

parks within Special Economic Zones (SEZs) can become catalysts for the growth of the eCooking appliance manufacturing sector in Kenya (see Figure 4.3 for a map of existing and proposed SEZs). By capitalizing on the SEZs' tax and regulatory incentives, robust infrastructure, and trade-enabling environment, manufacturers can benefit from reduced operational costs and streamlined processes. The SEZ model will not only attract foreign direct investment (FDI) from established eCooking appliance manufacturers to set up production units in these parks, but also lower entry barriers for local smaller scale appliance assemblers and manufacturers that need additional support.

Over and above the interventions put forth in the KNCTS, this strategy proposes to leverage industrial parks for eCooking in the following ways:

- Collaborate with the Ministry of Investments, Trade, and Industry and the Special Economic Zones Authority to develop or upgrade infrastructure in selected industrial parks to cater specifically to eCooking appliance manufacturing, assembly, repair and maintenance. This includes ensuring reliable power supply, water, waste management, and internet connectivity. Additionally, provide or facilitate access to specialized facilities like testing labs and R&D centres.

- Offer incentives to attract businesses to these parks, such as tax exemptions, reduced utility rates, or subsidized land leases. These incentives can lower the entry barriers for new companies and make operations more cost-effective.

- Offer innovation challenge funds and results-based financing incentives linked to utilizing manufacturing/assembly opportunities in industrial parks. R&D related to local assembly and/or manufacturing should also focus on technology enablers for eCooking, among them, integration of smart meters into appliances, and assembling solar and battery-supported eCooking systems, among others.

- Encourage joint ventures or partnerships between local enterprises doing related activities and international manufacturers to facilitate technology transfer and skill development.

- Collaborate with Technical and Vocational Education and Training (TVET) institutions to develop a skilled workforce for eCooking appliance manufacturing, repair and maintenance.

- Establish and enforce stringent quality standards for locally manufactured eCooking appliances. This ensures that products meet safety and efficiency benchmarks, boosting consumer confidence and market competitiveness.

- Careful governance and regulatory oversight are key to creating a sustainable and competitive manufacturing hub for eCooking appliances within these zones.

Implementation Timeline: 5 years, from 2024 – 2028, and onwards

Figure 4.3 Potential industrial parks and special economic zones. Source:Khisa (2016)
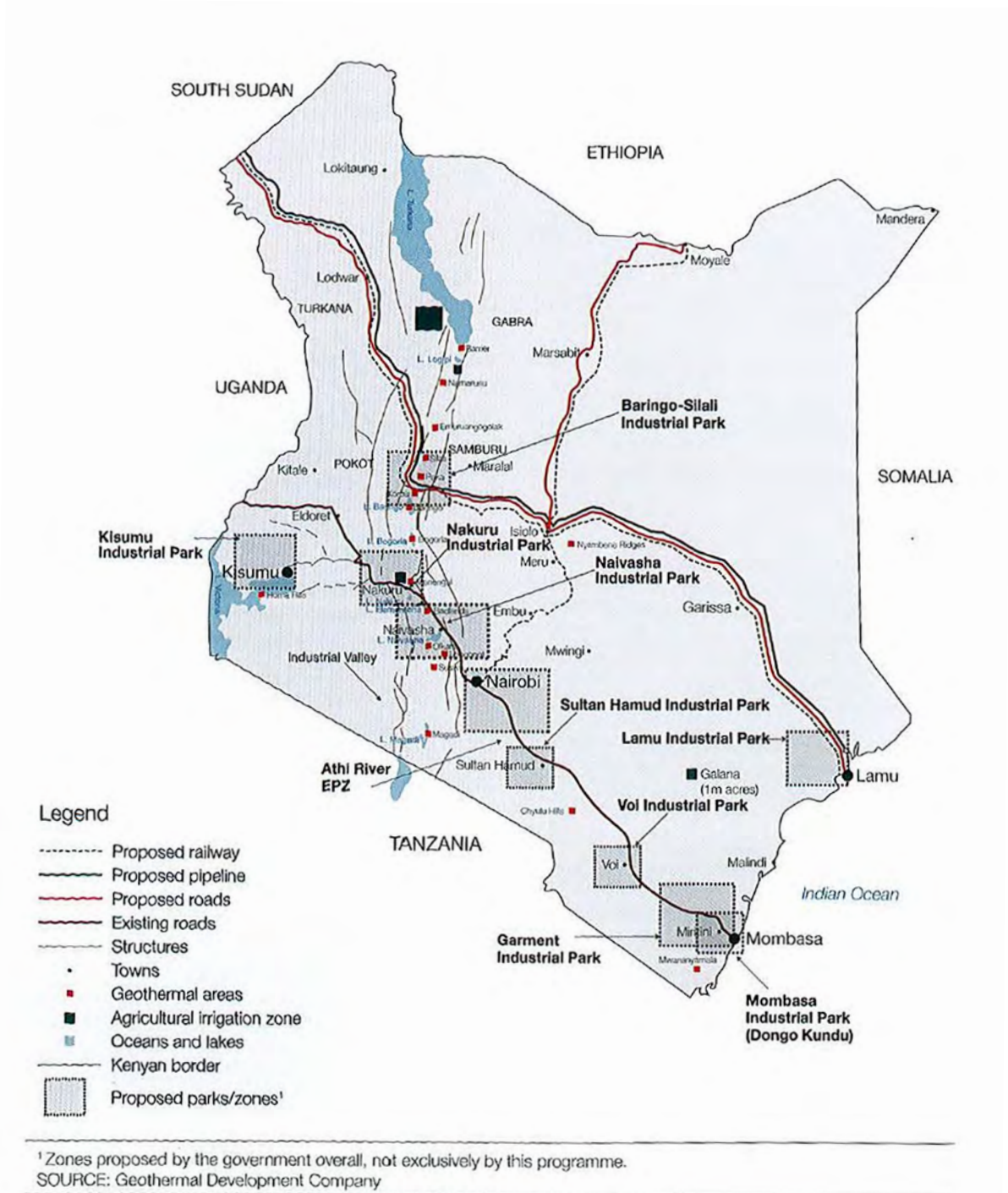
4.3.3 (S1.3) Develop training and capacity building programmes

Develop Training and capacity building programmes building
Training activities: • TVETs • Women's programmes Institutional capacity building • Testing facilities, Kenya Power, KEBS, eCooking Hubs
Cost: USD 2.3 million KES 292Million

The eCooking training and capacity building programme for Kenya serves as a critical pillar in the country's broader strategy to accelerate the adoption of eco-friendly cooking solutions. With a dual focus on individual training and institutional capacity building, the program aims to create a comprehensive support ecosystem for eCooking. By educating women in financial literacy specific to eCooking adoption, training technicians in Technical and Vocational Education and Training institutions (TVETs), and supporting women entrepreneurs in the eCooking supply chain, the program anticipates a multi-dimensional impact. On the institutional level, the program will invest in upgrading the testing facilities of local entities and support eCooking hubs in providing efficient after-sales services. Expected outcomes include an increased understanding among women about the cost-effectiveness of eCooking, a skilled workforce proficient in eCooking appliance assembly and maintenance, enhanced institutional capabilities for quality testing, and a network of entrepreneurs and hubs that can distribute and support eCooking solutions effectively. This program aims to build a self-sustaining eCooking ecosystem that can contribute to gender equity, economic empowerment and environmental conservation.

Programme structure

Training

• *Vocational training in TVETs*: TVETs will incorporate specialized modules related to eCooking appliance assembly, manufacturing, repair, maintenance, and quality assurance into their curriculum. This initiative

With a dual focus on individual training and institutional capacity building, the program **aims to create a comprehensive support ecosystem for eCooking**

aims to create a skilled workforce in collaboration with industry experts and manufacturers. The programme could build on the *Pika na Power* Academy.

• *Women entrepreneurship in eCooking*: An accelerator program will be established specifically for women entrepreneurs to enhance their distribution strategies, sales skills, and after-sales support for eCooking appliances. Industry mentors will guide them in various aspects of business management, fostering a network of capable women entrepreneurs.

• *Financial literacy programs for women*: eCooking will be integrated into financial literacy programs conducted by microfinance institutions and non-governmental organizations. These workshops will educate women on budgeting, credit management, and savings while also providing insights into the economics of transitioning to eCooking, empowering women to make informed financial decisions.

These three targeted training programmes create a comprehensive environment that enables the widespread adoption of eCooking technologies, all while empowering women and building institutional capacities.

Institutional Capacity Building

• *Infrastructure upgrades for testing facilities*: This facet involves providing financial and technical support to key local institutions, such as KEBS, KIRDI, the University of Nairobi, Strathmore Energy Research Centre, and Kijani Testing Lab, to enhance their testing facilities for eCooking appliances. Upgrades will include acquiring advanced equipment, hiring specialized staff, and potentially establishing dedicated eCooking testing labs. The goal is to ensure accurate and thorough assessments of eCooking appliances to improve their quality and safety.

• *Kenya Power eCooking capacity and skill enhancement:* Kenya Power is in need of new skills and expertise to effectively engage with the eCooking market, beyond selling power. Capacity building programmes could focus on Results-Based Financing (RBF) and carbon finance. A needs assessment should be conducted to identify which other capacity gaps exist, and to design a tailored program of activities can be developed, aligning with the identified needs.

• *eCooking Hubs*: The initiative aims to strengthen the role of eCooking Hubs as crucial intermediaries between consumers and the eCooking ecosystem.

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Support will be extended to existing and new hubs including those linked to faith-based organisations, including financial assistance, training, and provision of repair tools and spare parts. The focus is on enabling hubs to offer comprehensive customer training and after-sales services, fostering consumer trust and enhancing the long-term sustainability of eCooking technologies.

- *County Energy Departments (and equivalent):* To support the eCooking transition at the local level, capacity building programs will be developed for county governments to translate the national eCooking strategy into their specific contexts. This could be implemented through the INEP framework and will include training and resources to help county officials understand and implement the strategy effectively, e.g. support to develop localized action plans.

In summary, these two pillars of institutional capacity building aim to create an enabling environment to accelerate the adoption and sustained use of eCooking solutions in Kenya.

Implementation Timeline: 5 years, from 2024 – 2028, and onwards

4.3.4 (S1.4) Strengthen eCooking appliance quality standards: Testing, certification and labelling.

Strengthen appliance quality standards
• Adopt voluntary standards • Establish standardized national test methods, and mandatory testing and labelling
Cost: USD 0.44 million KES 56 Million

The ecosystem for efficiency and quality assessment for eCooking appliances in Kenya is still at its infancy. As the demand for eCooking appliances gradually begins to grow, there is need to develop capabilities around appliance testing and quality assurance for eCooking.

> As the demand for eCooking appliances gradually begins to grow, there is need to **develop capabilities** around **appliance testing** and **quality assurance for eCooking**.

In this regard, the strategic intervention will focus on the following key areas:

- Initially, adopt voluntary standards for eCooking equipment as a foundation for national-level market development programs such as the credit financing programme or RBFs. This approach can help stimulate market growth and consumer acceptance before implementing stricter regulations.

- Establish standardized national test methods for eCooking appliances to ensure consistent quality and performance across the market. This will involve developing test protocols that consider local cooking practices and environmental conditions.

- Implement mandatory testing and labelling for eCooking appliances to ensure safety and quality. Introduce mandatory labelling for these appliances, highlighting energy efficiency, safety, and performance to guide consumer choices.

- Develop the Minimum Energy Performance Standards (MEPS) for eCooking appliances. The Global LEAP offers a blueprint for EPC performance standards. For induction cookers however, standards could be adopted from other countries.

- Develop a quality verification portal for eCooking appliances to provide a reliable mechanism for verifying the authenticity and quality of imported eCooking products, including spare parts. This portal—which will be domiciled at the Kenya Bureau of Standards—will feature a database of certified products and Scannable QR codes for instant verification. Such a portal will facilitate easier identification of quality products, reducing the risks associated with importing low-quality goods.

- Anti-Counterfeit Measures should be implemented to prevent the entry of counterfeit spare parts into the country. These measures include implementing stringent scanning and checks at ports of entry and collaborating with international partners to trace the origin of counterfeit goods.

- Increase consumer awareness about the benefits of energy-efficient appliances and the importance of labelling. Educate consumers on how to interpret labels and make informed purchasing decisions.

Some of these activities link directly to capacity building in testing facilities addressed in Section .1.3. By implementing these strategies, Kenya can create a more robust and reliable ecosystem for eCooking appliances, ensuring that products meet high safety and efficiency standards while also being adaptable to local needs and preferences.

Implementation Timeline: 5 years, from 2024 – 2028, and onwards

4.3.5 (S1.5) Establish an End-of-Life (EoL) management framework for eCooking appliances

Establish an End-of-Life (EoL) Management Framework
• Implement Extended Producer Responsibility (EPR) schemes • Partner with certified eWaste recyclers and eCooking Hubs to recycle, repair or repurpose appliances. • Educate consumers on the importance of proper EoL practices
Cost: USD 0.1 million (KES 13 million)

Scaling up eCooking will inevitably lead to an increase in electronic waste (eWaste) from used appliances and components reaching the end of their useful life cycle. This growth in eWaste poses significant risks, including environmental pollution from hazardous materials like lead and mercury, and potential health hazards for communities if not managed properly. Establishing a robust End-of-Life (EoL) management framework is essential to mitigate these risks by promoting sustainable practices such as safe disposal, recycling and repurposing to safeguard the environment and public health. The following areas will be addressed:

• Implement Extended Producer Responsibility (EPR) schemes requiring manufacturers, assemblers and importers to take back used eCooking appliances and ensure their proper recycling or disposal in alignment with the existing national eWaste guidelines.

• Set up designated eWaste collection points in urban and rural areas to facilitate the proper disposal of eCooking appliances, leveraging eCooking Hubs. Utilize existing infrastructure like that provided by the National Environment Management Authority (NEMA) and expand as necessary.

• Partner with certified eWaste recyclers, such as those listed by the National Refurbishment, Reuse, Assemble and eWaste Management Program (NR4A)—also known as the eWaste Kenya Project, to

process collected appliances, focusing on recovering valuable materials and safely disposing of hazardous components. Capacitate eCooking Hubs to repair appliances that are not yet at the end of their life cycle.

• Explore the utilization of waste streams for other sectors, particularly the use of second-hand batteries from e-mobility in battery-supported eCooking systems.

• As part of the eCooking Innovation Platform, offer incentives or grants to startups investing in sustainable EoL management technologies and infrastructure.

• Educate consumers on the importance of proper EoL practices, e.g. proper eWaste disposal and the available recycling options for eCooking appliances in the planned Behaviour Change Communication and campaigns.

• Conduct regular audits and assessments of the EoL management practices of manufacturers, distributors, and recyclers.

The KNeCS Steering Committee will collaborate with the Ministry of Environment, Climate Change and Forestry, through NEMA, and the Ministry of Information, Communications and the Digital Economy through the Information and Communication Technology (ICT) Authority and other relevant agencies to develop and implement these and other relevant specific guidelines for EoL management in the eCooking sector aligned to the national framework.

4.3.6 (S1.6) Electrification

Electrification
• Strengthen the grid: capacity, reliability and availability • Expand off-grid electrification through mini-grids and high-capacity standalone Solar Home Systems (SHS) • Address informal electricity connections • Explore price signalling mechanisms like Time-of Use tariffs
Costs to be determined under the KNES and subsequent strategy activities

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14 At the time of developing this strategy, the process to update the 2018 Kenya National Electrification Strategy (KNES) had begun. The new strategy is expected to define a roadmap for achieving universal access to electricity services withing the shortest timeframe and at least cost. It will also assess the potential for an increased role for off-grid electrification and private sector.

Kenya has made significant strides in increasing electricity access, with rates jumping from 32% in 2014 to 81% in the most recently reported statistics. This has been achieved through multiple government initiatives like the Last Mile Connectivity Programme, electrification of public primary schools, the Rural Electrification Programme, and Kenya Off-Grid Solar Access (KOSAP) programme implemented in collaboration with development partners and agencies like KPLC and REREC. However, challenges remain, including high connection charges, elevated costs of rural and peri-urban electrification, lack of private sector incentives, and operational hurdles like delays in obtaining way leaves. In addition, there is significant grid reliability challenges in the Frontier Counties, the Western, and North Rift regions.

The Kenya National Electrification Strategy (KNES)[14]addresses the broad spectrum of the necessary policy direction, investments and collaboration required to achieve universal access to electricity in Kenya, including grid expansion, densification and intensification, and off-grid electrification expansion through mini-grids and standalone Solar Home Systems (SHS). In this regard, interventions to intensify, densify and expand the grid and off-grid systems should focus on the following aspects to facilitate eCooking, while also using eCooking as a demand stimulation tool to enhance the financial viability of the power sector:

- Enhance grid electricity capacity, reliability and availability, especially in regions like Western and North Rift, to ensure consistent power supply for eCooking. Address voltage instability and improve overall electricity quality to minimize damage to electric appliances and build consumer trust.

- Integrate eCooking objectives and targets into grid expansion programs like LMCP and KOSAP, and more explicitly into KNECS as a way to stimulate electricity demand and generate a viable return on investment for the off taker. Such programmes could bundle eCooking appliances with new electricity connections, along with user education.

- Kenya Power should experiment with and scale household smart meter installation to enable usage tracking and implementation of a dedicated eCooking tariff. Alongside this, price signalling mechanisms like Time-of-Use tariffs could be introduced to encourage households to shift cooking to off-peak hours, reducing peak loads.

- Address informal electricity connections by incentivizing formal connections and enforcing regulations to help alleviate system losses and improve stability in supply. To complement these efforts, the sector should explore business models bundling eCooking appliances with household wiring assessments and formalization efforts in informal settlements.

- Enhance the financial viability and reliability of mini-grids by integrating eCooking solutions. This integration will benefit mini-grid developers by boosting electricity consumption and revenue. Additionally, it will improve the load factor of mini-grids, making them more efficient and sustainable.

- Generate demand for eCooking services among SHS households to encourage them to upgrade from systems designed for lighting to higher-capacity systems and other off-grid solutions, particularly in rural areas where grid access is limited.

Provide financing and subsidies to mini-grid developers to incorporate eCooking into their systems and offer affordable tariffs.

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The Kenya National Electrification Strategy (KNES) **addresses** the broad spectrum of the **necessary policy direction, investments** and **collaboration** required to **achieve universal access to electricity** in Kenya.

4.4 (S2) - eCooking demonstration projects

The initiatives outlined below are designed not merely as pilot programmes, but as comprehensive projects intended to demonstrate the feasibility, benefits, and scalability of nascent but promising market development activities. These demonstration projects do not operate in a vacuum; they build on ongoing projects that, until now, have been smaller in scale and somewhat ad hoc. By consolidating learnings from these initial efforts, the demonstration projects aim to refine and enhance our understanding, while also pushing the boundaries of what is achievable in the eCooking sector. Ultimately, these initiatives will help address capacity and evidence gaps, develop supportive enabling frameworks to facilitate broader market adoption of these approaches for eCooking in Kenya.

4.4.1 (S2.1) Facilitating the responsible use of carbon finance in eCooking

Facilitating Carbon Financing in eCooking
• Develop a Carbon Developers' eCooking Toolkit
• Stakeholder engagement and capacity building for govt agencies on carbon markets
• Enable a diverse marketplace
• Explore innovative electricity pricing
• Develop a framework for eCooking carbon
Cost: USD 450,000 (KES 67 Million)

This intervention is designed to leverage carbon markets as a vehicle to drive forward the electrification of cooking in alignment with this Strategy. It draws upon sectoral best practices to ensure that carbon finance acts as a catalyst to facilitate the growth of the sector in a sustainable and equitable manner by creating a level playing field in which all sectoral stakeholders are able to benefit. This includes large, medium and small enterprises, in particular last mile distributors; the utility; end consumers and the nation as a whole.

Programme Structure

- *Carbon Developers' eCooking Toolkit:* Develop and maintain a set of resources endorsed by MoEP, with key datapoints that can facilitate the development of carbon projects, e.g. CCT/KPT results for key eCooking appliances against key baseline fuels and baseline fuel mix datasets. Datasets should be regularly updated and could be hosted by the Cooking Sector Knowledge Platform currently under development as part of the Knowledge Management Strategy.

- *Facilitate engagement between eCooking and carbon markets sectoral stakeholders:* Create spaces for intersectoral dialogue through events, working groups and other fora that can yield new strategic partnerships between stakeholders from both sectors.

- *Capacity building within key government institutions:* Aligned with the Institutional Capacity Building element of the Training and Capacity Building Programmes under this strategy's systemic enablers, specific capacity building initiatives on carbon finance should be developed for key government institutions (in particular MoEP and Kenya Power) to enable the development, management and oversight of carbon projects.

- *Enable a diverse marketplace via bridge financing, demand aggregation, streamlined crediting platforms and interoperable digitalisation solutions.* Enabling smaller players to enter carbon markets by facilitating the aggregation of demand, the availability of working capital to purchase appliances, facilitating the development and implementation of innovative platforms to streamline the carbon credit issuance process and the development of interoperable IoT solutions to digitalise existing eCooking appliances.

- *Explore innovative electricity pricing:* Explore the role of carbon finance in enabling sector utilities and minigrid developers to bridge the gap between electricity pricing that is cost-reflective from the utility perspective and cost-competitive with other cooking fuels from a consumer perspective.

- *Support the development of high-integrity, responsible carbon projects under Article 6 by developing a framework for eCooking carbon projects in Kenya:* The framework should encourage developers to design projects that align with sectoral best practices.

- *Establish a robust monitoring, verification and reporting framework* to track and report on the social and environmental impacts of carbon projects, ensuring transparency and accountability in data collection and fund allocation.

eCooking, and clean cooking in general, should be explicitly recognized on the whitelist of activities and technologies that can deliver mitigation outcomes within

> **eCooking, and clean cooking** in general, should be explicitly recognized on the whitelist of activities and technologies that can deliver mitigation outcomes within Kenya's Nationally Determined Contributions.

Kenya's Nationally Determined Contributions, and be prioritized by the Government of Kenya for Article 6.2 compliance. In this regard, future NDC updates or supplementary documents should explicitly recognise and integrate eCooking to secure carbon credits for eCooking projects.

Implementation Timeline

Within 3 years, from 2024 – 2026, with scale up to be determined based on programme outcomes.

4.4.2 (S2.2) eCooking Tariff Development

eCooking Tariff Development
• Test the viability and impact of a specialized eCooking tariff for Tier 3+ connected households in Kenya
Cost: USD 450,000 (KES 57 million)

eCooking tariff development activities will begin with a study to test the viability and impact of a specialized eCooking tariff for Tier 3+ connected households in Kenya, so as to generate evidence for the implementation of an eCooking tariff. A Randomised Controlled Trial (RCT) on the price elasticity of demand of electricity for cooking under a rebate program has been commissioned by the Ministry of Energy and Petroleum, with support from the MECS programme, EnDev through its Higher Tier Cooking (HTC) Results Based Reimbursement (RBR) program, EPRA and KPLC. The study will analyse the impact of varying rebate levels on electricity consumption and related financial and environmental metrics. In addition, the study will examine the responsiveness of household cooking practices to tariff incentives at different times of the day and week. This evidence will help inform the design of appropriate time-of-use tariff in line with households cooking practices or the EPRA off-peak hours. Depending on the evidence, this may assume the form of retaining EPRA off-peak hour or adjust the time-of-use tariff to better align with household cooking habits. The study targets approximately 3000 households, comprising at least 1500 EPCs and 1500 induction cookers. Findings will generate actionable insights to inform the design of eCooking tariff structures and demand-side tariff subsidy programs.

This demonstration project aligns with the dual objective of promoting clean cooking and ensuring optimal grid utilization. By offering attractive tariff structures, households are encouraged to adopt eCooking, leading to increased electricity consumption. For Kenya Power and minigrid developers, this equates to a win-win scenario: while the per-unit revenue might decrease due to the subsidized tariff, the total consumption increase will ensure overall revenue growth. Moreover, making use of the excess capacity on the grid, especially during off-peak hours, ensures better resource allocation and grid efficiency.

Programme Structure

• The study will use eCooking appliances with integrated electricity metering capabilities to continuously measure energy consumption and transmit data wirelessly to a data management platform.

• The study will test various tariff regimes, including Time-of-Use (ToU) tariffs and subsidized tariffs.

  • Time of Use Tariffs (ToU) will be designed to provide households with variable rates depending on the time of the day. During off-peak hours, when the grid has excess capacity, households will be incentivized with lower rates to use their eCooking appliances. Conversely, during peak times, the tariff will be higher to dissuade excessive energy consumption.

  • Subsidized eCooking Tariffs will offer fixed, reduced rates for electricity consumed by the smart-metered eCooking appliances, aiming to make the transition to eCooking more financially appealing for households.

• Participants in the treatment groups will receive monthly rebate tokens based on their electricity consumption for cooking. Rebates are provided as electricity tokens credited directly to post-

> The eCooking tariff has the dual objective of **promoting clean cooking** and **ensuring optimal grid utilization**

paid customers' accounts or sent via SMS to pre-paid customers.

- The programme will explore the potential of carbon markets to further lower or subsidize tariffs for eCooking in the short term.

Eligibility criteria

Target households:	Households with Tier 3+ electricity access
Technologies:	Electric Pressure Cookers (EPCs) and induction cookers are that meet predefined energy-efficiency standards
Vendors:	Must be registered, qualified under the EnDev Higher Tier Cooking (HTC) Results Based Reimbursement (RBR) program, and offer smart-metered eligible appliances.

Implementation Timeline

Within 2 years, from 2024 – 2025 in order to inform the design of a dedicated eCooking tariff at the next tariff control period.

4.4.3 (S2.3) Institutional eCooking programme

Institutional eCooking Programme

- Support R&D into large-capacity appliances
- Conduct studies e.g CCTs and cooking diaries in institutions, explore suitable tariffs
- Explore potential for solarising institutional kitchens
- Develop tailored financing solutions for institutions

Cost: USD 2.3 million
KES 292Million

The objective of the programme is to demonstrate the feasibility and benefits of transitioning Kenyan social institutions such as schools, healthcare facilities and correctional facilities from dirty fuels to eCooking. Pilot studies will help to build evidence and experience that can inform a scaled national programme that will play a crucial role in improving cooking efficiency, lowering costs, reducing carbon emissions, and providing a cleaner cooking environment in institutions. As of June 2024, small pre-pilot projects on institutional eCooking have been co-implemented by EnDev and the MECS programme in Kakuma refugee camp, the Rockefeller Foundation in collaboration with CLASP, MECS and Kenya Power (under the eCAP Programme) in a primary school, and the eCAP programme to introduce new energy-efficient appliances in the Kenya Power Institute for Energy Studies and Research Kitchen. Further studies need to be commissioned to generate a sound business case for using electricity for bulk cooking in institutions in Kenya.

Programme Structure

- Support research and development into large-capacity appliances ranging from 100 to 400 litres, among them EPCs, induction cookers and electric steam cookers, that meet large-batch cooking needs.

- Conduct studies such as CCTs, Kitchen Performance Tests (KPTs) and cooking diaries studies in institutions to gather empirical evidence on cooking technology performance and usage patterns.

- Leverage Time-of-Use tariffs already available to commercial entities, while exploring the most optimal eCooking tariff for institutions. In the same vein, explore solarising of cooking in institutions to lower fuel costs.

- Develop and provide tailored financing solutions to help institutions afford the initial investment in eCooking appliances.

- Explore the potential for carbon credits to lower institutional eCooking costs.

- Explore the viability of extending the above to commercial and industrial settings, e.g. kiosks, restaurants, hotels, food processing factories.

Eligibility criteria

Target institutions:	Educational institutions, healthcare facilities, correctional facilities and military barracks and bases, industrial canteens, community centres, humanitarian agencies, and other social institutions with Tier 3+ electricity access
Technologies:	Bulk cooking EPCs, induction stoves, rice cookers, electric steamers, among others that meet energy-efficiency standards.

Implementation Timeline

Within 3 years, from 2024 – 2026, with scale up to be determined based on pilot outcomes.

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4.4.4 (S2.4) Tax waivers on eCooking

Tax waivers on eCooking

- A dedicated study to define a suitable tax waiver regime to reduce upfront appliances costs to locally manufactured appliances, components and/or accessories, which will increase demand.
- Deterine the economic and financial impact of these waivers on governemntrevenues and household affordability.

Cost: USD 125,000
(KES 16 Million)

High upfront costs are often cited as a significant barrier to embracing cleaner, more efficient eCooking appliances. Reducing the financial burden through tax incentives will pave the way for greater public acceptance and usage. A tax waiver on energy-efficient, locally manufactured or assembled eCooking appliances serves multiple beneficial purposes. The most immediate effects will be to make these energy-saving appliances more affordable for consumers, thereby encouraging widespread adoption. Such a tax waiver will also create economic ripple effects. The increased demand for energy-efficient cooking appliances can stimulate economic growth, providing impetus to the retail and local manufacturing sectors related to these appliances, and yielding opportunities for more tax revenue collection in the future. Moreover, as the market for these products grows, it can spur further innovation and research and development in the sector. The VAT waiver, implemented alongside the RBF programme and credit financing programmes above could provide an attractive proposition for households to acquire eCooking appliances.

Programme structure

A dedicated study will be done to support the design of an effective and sustainable VAT waiver, with consideration of which other tax waivers will be beneficial. The study will examine, among others:

- the current pricing of eCooking appliances, the existing VAT and other taxes and their impact on final prices for consumers.

- enumerate which other appliances, apart from locally manufactured EPCs and induction cookers, components and/or accessories, will be included

in the waiver(s), and to what extent the waiver(s) can cover imported appliances.

- the economic and financial impact of these waivers on government revenues and household affordability, and review the legal and regulatory requirements for implementing the waivers.

A **tax waiver** on energy-efficient, locally manufactured or assembled eCooking appliances **serves multiple beneficial purposes.**

- develop metrics and feedback mechanisms for assessing the impact of the tax waivers on eCooking appliance adoption rates and market growth.

Eligibility Criteria:

Target market:	This is a market wide intervention.
Technologies:	Locally manufactured/assembled and imported Electric Pressure Cookers (EPCs), induction cookers and related components and accessories that meet predefined energy-efficiency standards and have integrated IoT. Additional appliances may be defined by the proposed study.

Implementation Timeline

The study will be carried out within 1 year. The implementation and scope of tax waivers will be determined by the outcomes of the study.

4.4.5 (S2.5) Solar and battery-supported eCooking

Solar and battery-supported eCooking

- Develop a business case for scaling solar and battery-supported eCooking in off-grid areas
- A scooping study on financing options within the electrification landscape.
- Through the eCooking innovation platform, support design, manufacture and develop viable business models

Cost: USD 0.44 million
KES 56 Million

15 Economic Project Appraisal Manual for Kenya (2021). https://www.treasury.go.ke/wp-content/uploads/2021/08/Case-Study-for-CBA-42.5-MW-SOLAR-PROJECT.pdf

16 INFORSE (2021). Plan for 100% Renewable Energy Scenario in Kenya by 2050. https://www.inforse.org/africa/pdfs/Pub_100-Renewable-Energy-Plan-for-Kenya-by-2050-12-08-2020.pdf

This intervention aims to generate further evidence and sector experience to establish a compelling business case for scaling solar and battery-supported eCooking. eCooking with Solar Home Systems (SHS) has immense potential in Kenya. Estimates suggest that the Kenyan SHS market could reach up to 50% or more of un-electrified rural homes[15]. With approximately 4 million households in rural Kenya, this represents a significant opportunity for this virtually untapped technology[16]. However, most SHS are below Tier 3, as they are designed to support services such as lighting and mobile phonecharging and thus, cannot support eCooking. These systems can be upgraded with high-performance batteries and suitably sized solar panels to support energy-efficient eCooking appliances.

> **Solar and battery-supported eCooking** presents a significant **untapped opportunity** for **50% or more of unelectrified rural homes**.

Battery-supported eCooking can also benefit mini-grid- and grid-connected households with below Tier 3 access by providing a reliable and consistent power source for cooking during blackouts, load shedding or voltage instability. Batteries can also help shift electricity demand away from peak times. The primary challenge remains the high upfront cost of such SHS upgrades and battery kits which is prohibitive for most low-income households, a lack of awareness among potential users about the benefits and usage of solar and battery-supported eCooking solutions, and supply chain and distribution challenges particularly in rural and remote areas.

Programme structure

This programme will build on existing evidence in Kenya and similar countries to develop a business case for scaling solar and battery-supported eCooking in off-grid areas, and where applicable, in on-grid areas and on power-limited mini grids by:

- Conducting a comprehensive scoping study on financing options for solar and battery-supported eCooking within the electrification landscape. This study should identify key funders, appropriate financial instruments, and relevant programmes best suited to incorporate solar and battery-supported eCooking within both grid-connected and off-grid electrification initiatives.

- Exploring how to mainstream the use of stand-alone SHS for eCooking into national electrification efforts alongside grid expansion to lower acquisition costs for households, leveraging the declining costs of solar photovoltaic (PV) power, lithium-ion batteries, and the emergence of energy-efficient eCooking appliances.

- Providing incentives and support for research and development, e.g., through the eCooking innovation platform, to design, manufacture and develop viable business models for affordable off-grid solutions suitable for eCooking.

Implementation Timeline

These will be carried out within 2 years to facilitate the design of a larger programme at the KNeCS mid-term review.

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4.5 (S3) - Market development activities

Market development interventions are designed to boost household adoption of eCooking solutions and directly impact the use of eCooking technologies. These interventions include behavior change communication (BCC), appliance subsidies, fuel subsidies, appliance financing, and fuel bans. However, due to evidence indicating that fuel bans disproportionately affect the poor, disrupt livelihoods, and foster illegal trading, they are excluded as a viable market development intervention[17]. Instead, the interventions considered are behavior change communication (BCC), appliance subsidy, fuel subsidy, and financing. While the analysis assumes that the interventions are discrete, in reality, they may overlap, as sector stakeholders may opt to implement cross-cutting interventions building upon the framework provided below.

4.5.1 (S3.1) Behaviour change communication

Behaviour Change Communication (BCC)
• **Build on existing BCC strategy:** integrating eCooking into Phase 2 • Emphasize unique eCooking components e.g. automating cooking, time-shifting cooking, cost savings etc. Example targeted messaging: Pika Githeri na Ksh. 20
Targeted beneficiaries: • Households with Tier 3+ electricity access • Unwilling to transition Targets 2,897,862 household, projected to be 10% effective
Cost: USD 3.9 million (KES 500 million) for programme implementation

Programme objectives

The Ministry of Energy and Petroleum is currently implementing a Behaviour Change Communication (BCC) strategy to increase awareness of the benefits of clean cooking and encourage the uptake of improved cooking solutions. The rallying call of this BCC campaign is **"Upishi Bora, Afya Bora."** The messages focus on the benefits of using improved cooking solutions, such as saving money and time, improving health, and positive environmental impacts. Other behaviour change communication interventions include Kenya Power's Pika na Power programme deployed through its brick-and-mortar demonstration centres and mobile demonstration kitchen, and activities under existing and upcoming the eCooking hubs.

Programme structure.

The existing BCC strategy offers a strong foundation upon which efforts to scale eCooking in Kenya can build on. eCooking can be integrated into Phase II of the current BCC. Subsequently, an eCooking-specific BCC will be implemented for 2 years between 2025 and 2026:

- *Ideation, branding, and rallying call:* Adapt the rallying call of "*Upishi Bora, Afya Bora*" to include messages about eCooking. Showcase the added benefits such as energy efficiency, safety, and sustainability alongside planned clean cooking messages.

- *Execution of an awareness and behaviour change strategy:* Use both above-the-line (ATL) methods such as media advertising, broadcast SMSs, social media adverts, and below-the-line (BTL) methods that employ existing institutional and community networks to execute an eCooking-specific awareness campaign[18]. Additionally, ensure all relevant avenues for reaching women and other marginalized groups, such as women and youth groups are considered.

- *Focus on elements of behaviour change*: Align the focus on elements of behaviour change in the existing strategy with the specific behaviours needed for the adoption of eCooking, such as the use of efficient eCooking appliances, safety precautions, shifting cooking times to off-peak hours, and efficient cooking techniques. Also include specific messaging tailored to women and other marginalized groups targeting their specific needs and challenges.

- *Media advocacy to enhance public awareness and understanding of clean cooking:* Extend existing media advocacy plans to feature stories and testimonials about the successful transition to eCooking. Highlight these in public service announcements and editorial pieces. Leverage on media channels that are widely accessed by women and youth to ensure they are reached.

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17 See Das, et al.,(2021) for a discussion on fuel ban.

18 These networks include Community Health Volunteers (CHVs), Community Forest Associations (CFAs), Agricultural Extension Officers (AEOs), Water Users Associations (WUAs) and women's groups

- *Special events to promote clean cooking:* Host events like cooking demonstrations, workshops, and exhibitions specifically focusing on eCooking technologies. Utilize these platforms to educate the public on safety, efficiency, and the range of eCooking options available. Partner with youth and women's groups to maximize reach and engagement.

- *Engaging the private sector/ industry players in promoting clean cooking:* Forge partnerships with electric appliance companies and financial institutions offering consumer-friendly financing options for appliance purchases. Use these platforms to educate people about consumer financing options, warranties and quality assurance, highlighting the longevity and safety of quality eCooking appliances. Additionally, raise awareness among private sector players, particularly appliance manufacturers and vendors, about the potential increase in demand.

Target beneficiaries

The strategy aims to target a specific population subset for a behaviour change communication intervention, primarily focusing on those who have Tier 3+ electricity access, predominantly rely on various fuel sources, but are less inclined to shift their consumption behaviour.

Implementation Timeline

2 years, from 2025 to 2026

4.5.2 (S3.2) Appliance subsidies through RBF programmes

Appliance subsidies
• **80% subsidy on upfront appliance costs**
• Forms: RBFs, discounted pricing, rebates on purchase cost, etc.
• Layer appliance subsidy with tariff subsidy (needs further study)

Targeted beneficiaries:
- Low-income household with Tier 3+ electricity access
- Willing to transition
Targets 1,049,833 household

Cost: USD 12.3 million (KES1.57 billion) for programmes implementation and appliance subsidies

The Result-Based Financing (RBF) programmes aims to serve as a catalyst for market transformation in the eCooking sector. This intervention is strategically timed to capitalize on both the supply-side demand for last-mile promotional support and the latent demand-side potential for higher-tier cooking solutions among households and MSMEs in Kenya. It is designed to overcome market entry and development hurdles by providing targeted financial support to manufacturers, distributors, and financial intermediaries. This subsidy programme leverages lessons from previous RBF programs and integrates a multi-faceted approach. Lessons from previous RBF programs suggest that a multifaceted approach, targeting both supply and demand, is most effective. This approach develops the market by empowering supply-side players and stimulating demand through price subsidies, making eCooking appliances accessible to low-income households. The specific type of RBF will be determined at the program design stage. It could either follow a market development design, giving full flexibility to supply-side actors on how to achieve results, or it could take the form of an inclusivity RBF, specifically targeting low-income households. In the inclusivity design, supply-side players will need to specify in their proposals who their customers are expected to be and how much of the supply-side subsidy they plan to pass on to the end consumer.

Programme structure

- A successful programme requires both ex-ante and ex-post incentives for both supply chain development and inventory.

  - Upfront financial awards will be made to supply chain actors for procuring eCooking appliances from eligible manufacturers. This aims to ensure sufficient product availability in the market and reduce stock-out situations. Further, upfront financial support will be provided for activities that aim to generate market awareness, establish sales distribution networks, and develop women-led sales agents. Training programs will be organized to boost the competence of sales agents, especially focusing on empowering women to take active roles. Additionally, the incentives will target local manufacturing, appliance assembly, and innovations like smart metering.

> **Appliance subsidies** develop the market by **empowering supply-side players** and **stimulating demand**, making eCooking appliances accessible to low-income households.

- Local banks will be encouraged to provide working capital as commercial debt financing to appliance distributors, with a special focus on last mile distributors.

- A performance-based ex-post incentives will be disbursed on a per eCooking appliance basis once sales are independently verified. Last mile Companies and vendors will pre-finance activities to lower market entry barriers. Upon verified sales to end-users, these companies will receive incentives. These incentives will lower the appliance retail price thus enhancing accessibility of eCooking appliances to households of diverse socio-economic class.

- The RBF payment schedule will be linked to the measured use of the appliances to encourage companies to invest in training and after-sales support for users. To support this, the programme should incorporate smart metered appliances. It is expected that costs of smart metering will be lowered due to economies of scale.

- Incentives will be tiered, considering market realities like currency fluctuations and external disruptions.

- A gender-inclusive approach will be incorporated whereby additional financial incentives for enterprises that effectively include women in the supply chain, either through employment or women-led distributorships.

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- A collaboration with utility companies will be encouraged to enable bundled offers and new market opportunities.

- To provide further consumer financing options, partnerships will be established with digital finance institutions and microfinance institutions to enable Pay-As-You-Go (PAYGO) or Pay-As-You-Cook (PAYC) financing schemes for consumers. The RBF programme may also include credit financing offerings as described in the next section.

- Monitoring and independent verification will be facilitated by regular tracking of supply chain metrics and consumer adoption rates. Independent Verification Agents (IVAs) will be employed to verify the results on which financial disbursements are based.

Eligibility criteria

Target households:	All poor households with Tier 3+ electricity access.
Technologies:	Electric Pressure Cookers (EPCs) and induction cookers that meet predefined energy-efficiency, safety, usability and durability standards.
Vendors:	Retailers, distributors, manufacturers

Implementation Timeline

3 years, from 2026 to 2028

4.5.3 (S3.3) Credit Financing programme

Credit Financing Programme

- **Appliance purchase in installments**
- Preferential interest rates based on various criteria.
- Capitalize on the existring PayGo infrastructure and foster **collaborations with banks and MFIs.**

Targeted beneficiaries:
- Household with Tier 3+ electricity access
- Lower- and middle-income households, willing to transition

Targets 2,471,754 households, projected to be 60% effective

Cost: USD 18.8 million (KES 2.4 billion) for programme implementaiion and appliance financing

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19 For comprehensive introduction to BAR-HAP tool see WHO (2021) BAR-HAP user manual, Das, et al.,(2021), and the references therein.

20 Lauer, Morton, Culyer, and Chalkidou (2020)

The credit financing programme aims to facilitate adoption of eCooking solutions across Kenyan households by significantly reducing initial appliance acquisition costs. The credit financing programme will capitalize on the existing PayGo infrastructure and foster robust collaborations with key financial stakeholders, including commercial banks and microfinance institutions. The programme could stimulate further developments within Kenya Power's plans to implement utility-led financing schemes such as data sharing/co-marketing and on-bill repayment, and on-bill financing in minigrids. Recognizing the economic challenges faced by many Kenyans, this initiative is designed to offer credit solutions that are both affordable and flexible.

The programme will provide households with preferential interest rates, extended repayment periods, and tailored financial education.

Programme structure

- The programme will engage with financial intermediaries: commercial banks, microfinance institutions, digital finance institutions, PayGo technology providers, and relevant government agencies to solicit interest and commitment. A suite of tailored credit products specifically for eCooking appliance purchases will be co-developed with partnering financial institutions, considering competitive interest rates, flexible repayment terms, and minimal processing fees. These credit products will be integrated with PayGo platforms, ensuring seamless purchase-to-payment experiences for consumers.

- A simplified credit assessment mechanism tailored to eCooking appliance acquisition will be developed, factoring in both formal and informal income sources, to ensure quick turnaround times for loan approvals to enhance customer experience. The terms may also be defined around the predicted savings from switching to eCooking. Raising household awareness about the savings from transitioning to eCooking, combined with financial education, will help redirect the savings from fuel expenses to credit servicing.

> The **credit financing programme will capitalize** on the **existing PayGo infrastructure** and **foster robust collaborations** with key financial stakeholders, including commercial banks and microfinance institutions.

- Flexible financing models will be considered such as traditional monthly repayments with competitive interest rates, tiered financing targeting different interest rates or repayment periods based on appliance type or household income. Leveraging PayGo technologies, customers can make flexible payments based on their usage or as they can afford.

- Building on the BCC intervention, widespread campaigns will be conducted to create awareness about the availability of credit financing for eCooking. The programme will incorporate financial literacy and customer education on understanding credit, responsible borrowing, and financial planning tailored to eCooking appliance purchase and use. Educational materials will be distributed with each appliance sale, providing tips on efficient use and maintenance. Targeted initiatives will ensure women and marginalized groups have access to information and financing options, in collaboration with women's groups, youth groups and community based organisations.

- Smart metered eCooking appliances will aid in monitoring the usage patterns, which can be crucial for remote shut-off in PayGo models, credit assessment and setting up customised loan terms. Further, the geo-location functionality of smart metering will mitigate credit risk by facilitating repossession.

- The programme will incorporate continuous monitoring of credit repayments and periodic check-ins with beneficiaries to ensure smooth repayment processes. Periodic assessments will be incorporated to measure the number of households transitioning to eCooking, carbon emissions saved, and overall impact on community well-being. In addition, credit financing programme will also leverage RBF to lower costs and improve repayment rates.

Eligibility criteria

Target households:	The target demographic has Tier 3+ electricity access, and falls in the lower middle & middle income brackets, that are willing to transition to eCooking.
Technologies:	Electric Pressure Cookers (EPCs) and induction cookers that meet predefined energy-efficiency, safety, usability and durability standards.
Vendors:	Microfinance institutions, commercial banks, digital finance companies, other financial intermediaries

Implementation Timeline

5 years, from 2024 to 2028

4.5.4 Impact of market development activities

As discussed in the preceding section, the market interventions create awareness, address the cost aspects of eCooking solutions through lowering prices, and financing challenges through instalment payment. The impact of the market development interventions is assessed using the Benefit of Action to Reduce Household Air Pollution (BAR-HAP) tool[19]. The BAR-HAP tool is an excel based tool developed by the World Health Organization (WHO) to assist stakeholders in the cooking energy sector to calculate the costs and benefits of transitioning to various cleaner cooking options. The tool allows users to examine the baseline fuel use situation, analyze one or multiple transition(s) to cleaner cooking fuels or technologies, as well as policy interventions to apply to the transition scenario(s). The tool incorporates evidence on the effectiveness of different interventions and on the demand for improved cooking solutions, for prediction of impacts from different interventions. The tool uses cost-benefit analysis following WHO advice on health economic analysis and evaluation[20].

In analysis and evaluation of the potential cost and benefits, eCooking adoption is determined by factors like households' access to Tier 3+ electricity, willingness to switch to eCooking, and economic status. Accordingly, interventions are customized for specific household profiles. These profiles have been utilized to calculate the target households for cost estimation. Nonetheless, it is anticipated that spillover effects will occur, where non-targeted households also gain from the interventions. *See the KNeCS Modelling Report for a more detailed methodological note on intervention targeting, along with the rationale for stove stacking.*

It is on this backdrop that the BAR-HAP tool is used to assess the potential costs and benefits of the following interventions:

- **Behaviour Change Communication (BCC)** targets households with Tier 3+ electricity access but reluctant to switch. Assumed to run for 2 years, BCC is projected to be 10% effective.

- **Appliance Subsidy** aims at poorer households willing to adopt eCooking, offering an 80% subsidy on appliance costs for 3 years.

- **Credit financing** focuses on lower and middle-income groups willing to transition, allowing appliance purchases in instalments over the strategy's 5-year span, potentially increasing demand by 60%.

- **Tax Waiver,** targeting upper-middle and wealthy households ready to switch, offers VAT exemptions for 2 years. This intervention is implemented in BAR-HAP with the assumption that households in the upper middle and wealthy quintiles are most likely to respond to a VAT waiver. However, the strategy provides for a dedicated tax study to generate evidence on the market-wide implications of a tax waiver on eCooking appliances and the eCooking tariff.

Table 4.1 below shows a breakdown of the expected impact of each market development intervention. It takes into account the empirical effectiveness of each intervention, the number of targeted households, stove stacking, and the overall prevalence of eCooking post intervention.

Table 4.1 Outcomes of market development activities

Interventions	No. of Targeted Households	Proportion of the Population	Transition to eCooking			Prevalence
			One Solution	Primary Solution	Secondary Solution	
Behaviour Change Communication (BCC)	2,897,862	21.0%	0.70%	0.80%	0.10%	1.60%
Appliance subsidy	1,049,833	7.6%	0.50%	0.30%	0.00%	0.80%
Financing program	2,471,754	17.9%	0.60%	2.90%	0.00%	3.50%
Tax waiver	3,087,451	22.3%	1.20%	2.30%	0.10%	3.60%
Baseline Prevalence			0.13%	0.11%	1.02%	1.26%
Total Prevalence	9,506,900	68.8%	3.13%	6.41%	1.22%	10.76%

The market development interventions have a potential to transition a total of **10.76%** of households from other cooking solutions into primary and secondary eCooking. The analysis shows that the largest contribution comes from the VAT waiver and the credit financing program (3.6% and 3.5% new eCooking households respectively). BCC contributes 1.6% new eCooking households, and the stove subsidy (RBF programmes) 0.8%. The expected number of eCooking households in 2028 will be 1,484,880. (see the Action Plan for a detailed investment overview).

> The market development interventions have a potential to **transition a total of 10.76% of households** from other **cooking solutions into primary and secondary eCooking**.

4.6 Cost-benefit analysis

Assuming stability in economic conditions, effective implementation of the interventions, and sustained use of proposed eCooking solutions, the strategy will incur costs amounting to approximately **USD 55.7 million (KES 7.1 billion).** These costs cover systemic enablers, the eCooking demonstration projects, and market development activities.

Cumulative benefits are derived from household transitions from dirty fuels to eCooking solutions based on the market development activities. The advantages are categorized into health and environmental benefits and overarching social gains in monetary terms. The health benefits from these interventions are substantial, with 40,096 Disability-Adjusted Life Years (DALYs) avoided, 1,438 premature deaths avoided, 23,875 Years of Life Lost (YLL) saved due to reduced mortality from diseases and conditions caused by household air pollution, and 53,449 illness cases prevented annually. This highlights the potential for significant public health improvements, which can reduce healthcare costs and improve the overall well-being of the population. Significant time savings are expected, with an average of 3,607 hours saved per adopting household annually, which can translate into increased productivity and improved quality of life particularly for women and girls. Environmental benefits include a reduction of 12 MtCO2e and the avoidance of 1.6 million tonnes of unsustainable wood harvest. The net present value of the social benefits for the full program is estimated at USD 241.7 million (KES 30.8 billion), indicating that the societal gains from implementing the strategy far outweigh the costs, as

illustrated in Figure 4.4[21]. Thus, investment into eCooking is economically justified by its potential to generate long-term benefits.

Figure 4.4 A comparison of monetized costs and benefits for the eCooking Transition Scenario
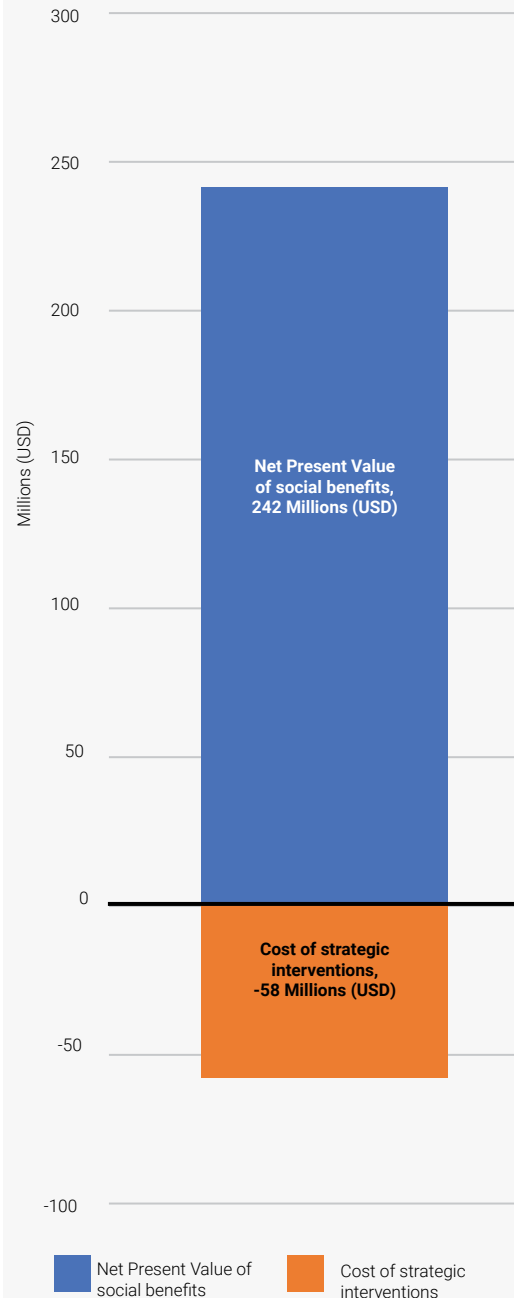
The net benefits value refers to the cumulative benefits over the strategy implementation period (2024-2028).

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21 These benefits were derived using the Benefit of Action to Reduce Household Air Pollution (BAR-HAP) tool.

Cumulative benefits are derived from household transitions from dirty fuels to eCooking solutions based on the market development activities.

Health benefits

40,096 Disability-Adjusted Life Years (DALYs) avoided,

1,438 premature deaths avoided,

23,875 Years of Life Lost (YLL) saved due to reduced mortality from diseases and conditions caused by household air pollution

53,449 illness cases prevented annually.

Environmental benefits

A reduction of **12 MtCO2e** and the avoidance of **1.6 million tonnes** of unsustainable wood harvest.

Net present value of the social benefits

Estimated at **USD 241.7 million (KES 30.8 billion)**

Time savings

an average of **3,607 hours** saved per adopting household annually, which can translate into increased productivity and improved quality of life particularly for women and girls

5. TOWARDS A COORDINATED POLICY APPROACH TO ECOOKING IN KENYA

Embedding eCooking within broader national strategies and related policy instruments is crucial for achieving integrated energy planning. By aligning the eCooking initiative with existing policies on energy, environment and climate action, health, and industrialization and innovation, we can ensure a more harmonious and effective rollout.

This approach creates synergies across sectors, maximizes resource utilisation, and fosters a coherent and comprehensive framework for energy planning that can better attract investment and facilitate easier monitoring and evaluation. This section explores opportunities to embed eCooking with other national strategies.

5.1 Opportunities to integrate clean cooking and electrification policy

To create a more integrated policy framework for eCooking in Kenya, connections can be made across various policies and national strategies in the energy sector. Clean cooking and electrification goals need to be better aligned within existing energy policy and planning frameworks, among them, Kenya's National Energy Policy, the Kenya National Electrification Strategy (KNES), the Integrated National Energy Plan (INEP) under development, the Least Cost Power Development Plan (LCPDP) and County Energy Plans. Table 5.1 outlines areas for synergies and opportunities to embed eCooking within broader policies.

Table 5.1 Potential areas for synergies between clean cooking and electrification policy

Potential Areas for Synergies	Actions and Recommendations
Develop a coherent policy framework	• Create a clear narrative linking eCooking with broader objectives such as public health, deforestation reduction, and climate change targets in all energy policies, plans and strategies. • Harmonize targets and objectives by integrating clean cooking and electrification goals across energy policy and planning frameworks.
Foster coordination and collaboration among stakeholders	• Foster information sharing, joint planning, and resource mobilization among established mechanisms like Integrated National Energy Planning Committee, County Energy Planning Committees, and LCPDP oversight committee. • Include diverse stakeholders such as civil society and organizations like CCAK and ELCOS in coordination bodies to ensure inclusivity and diverse perspectives. • Strengthen capacity of relevant stakeholders through technical assistance, training, and capacity-building support from international partners like the GeCCo coalition.
Integrate clean cooking and electrification goals into County Energy Plans	• Engage local stakeholders in the process and conduct local assessments to tailor strategies and interventions to specific county needs and opportunities. • Ensure cooking and electrification effectively integrated in Integrated National Energy Plan (INEP) framework for County-level reporting.
Leverage existing monitoring and evaluation systems in energy policy processes	Utilize existing monitoring and evaluation systems to track progress towards eCooking goals and inform future policy decisions.

5.2 Opportunities to embed eCooking within other national strategies.

eCooking can further be embedded within other policy domains and national strategies can help create a more integrated and supportive environment for promoting clean cooking solutions. Table 5.2 outlines ways that eCooking can be integrated in climate change and environmental policies, health policies and innovation and industrial policies.

Table 5.2 Opportunities to embed eCooking within other national strategies

Policy Area	Policies	Opportunities for Embedding eCooking
Climate Change and Environmental Policies	• National Climate Change Action Plan (NCCAP) (2023 - 2027), • The Climate Change Act (2016), • The Environmental Management and Coordination Act (EMCA) (1999, amended in 2015), • The Forest Conservation and Management Act (2016), • the National Adaptation Plan (NAP) (2015-2030) • the Green Economy Strategy and Implementation Plan (GESIP) (2016-2030) • the new Nationally Determined Contribution (NDC) targets	• Ensure consistent inclusion of eCooking across relevant climate change and environmental policies, strategies, and plans. • Incorporate targets and strategies for promoting eCooking in the National Climate Change Action Plan (NCCAP) and the Climate Change Act. • Integrate eCooking into pollution control measures, waste management strategies, and natural resource conservation efforts outlined in the Environmental Management and Coordination Act (EMCA). • Leverage the Forest Conservation and Management Act to promote eCooking as a means to reduce deforestation and forest degradation. • Establish inter-agency working groups or committees for coordinated target setting, messaging, implementation, and monitoring of clean cooking and electrification initiatives.
Health Policies	• The Kenya Health Policy (2014-2030) • Kenya National Strategy for Maternal and Child Health (2018-2022)	• Incorporate specific health targets related to implementing clean cooking and electrification strategies into health policies and strategies. • Strengthen collaboration between the Ministry of Health, the Ministry of Energy and Petroleum, and respective county departments to develop a coordinated approach for target setting, implementation, and messaging. The Air Pollution Centre of Excellence at KEMRI can play a role through joint awareness campaigns, policy formulation, and research to promote electric and clean cooking to reduce household air pollution. • Develop capacity-building programs for healthcare providers, policymakers, and stakeholders to raise awareness of the health benefits of eCooking. This could be achieved by for instance, connecting with the Clean Air Africa programme to integrate eCooking into their Community Health Volunteer capacity building programme. • Establish financial mechanisms and incentives to encourage adoption in areas with high rates of indoor air pollution and related health issues.
Innovation and Industrial Policies	• Kenya's Vision 2030, • Science, Technology, and Innovation (STI) Act (2013) and draft STI policy, • Kenya's Industrial Transformation Programme (2015), • Micro, Small, and Medium Enterprises (MSMEs) Development Policy, • The Startup Bill (2020), • The draft Intellectual Property Bill 2020, • The Big Four Agenda)	• Intensify research and innovation in eCooking technologies by supporting collaboration between academia, research institutions, and the private sector. • Enhance technical and entrepreneurial skills in the clean cooking and electrification sectors through targeted training programs. • Provide access to financing, grants, loans, and investment incentives for businesses and entrepreneurs involved in clean cooking and eCooking projects. • Support market development for eCooking technologies through targeted interventions and a comprehensive regulatory framework. • Align policies with Kenya's Vision 2030, Science, Technology, and Innovation (STI) Act, Industrial Transformation Programme, and the Big Four Agenda.

In conclusion, embedding eCooking within various policy domains and national strategies can create a more integrated and supportive environment for promoting clean cooking solutions in Kenya. By aligning eCooking with climate change and environmental policies, health policies, innovation and industrial policies, the country can optimize the benefits of eCooking in multiple areas, such as reducing mitigating climate impacts, improving health outcomes, and stimulating innovation. A coordinated approach that fosters collaboration between relevant government agencies and stakeholders, leverages resources and expertise, supports development of the innovation system, and raises public awareness will be instrumental in driving the widespread adoption of eCooking in Kenya.

6. CONCLUSION

This inaugural eCooking strategy provides a roadmap for building the foundation for a sustainable eCooking marketplace in the next five years, which will then enable an accelerated scale up over the next two decades to facilitate the 2050 Net Zero transition. As key strategic interventions, the document outlines system enablers to address bottlenecks in the enabling environment, among them, the establishment of a coordinating mechanism for eCooking initiatives, eCooking pilots, capacity building initiatives, electrification initiatives and market development activities that lower barriers for households, enterprises and institutions to adopt eCooking between 2024 and 2028.

Proposed market development activities include Behaviour Change Communication, and financial relief measures such as VAT exemptions on eCooking appliances, subsidies and dedicated credit financing programmes which will be rolled out for specific population segments. 10% of households are expected to be successfully transitioned from other fuels into primary and secondary eCooking by 2028. The strategy also outlines synergies with existing policies on energy, environment and climate action, health, and industrialization and innovation.

6.1 Complementary documents

An Action Plan has been developed for this strategy to provide a structured approach to achieving the strategic objectives, intended as a guide for stakeholders at all levels. The Action Plan outlines the key activities, a monitoring and evaluation framework, a stakeholder engagement plan, the investment overview and the resource mobilisation strategy. The National eCooking Steering Committee will use this Action Plan to provide technical support, coordinate demonstration programmes and market development activities, engage stakeholders, monitor and evaluate strategy implementation, advocate for supportive policies, and conduct a mid-term review of the eCooking strategy. An updated action plan should be developed during the mid-term review to ensure ongoing relevance and effectiveness.

A Modelling Report is also provided to detail the modelling approaches and findings used to inform the interventions within the eCooking Strategy. It utilises data collected during the KNeCS Baseline Study, and is designed to explore key research questions that have emerged during the strategy development process, among them, different eCooking scenarios, the impact of scaling eCooking on the electricity grid, and modelling stacking and eCooking transitions.

6.2 Proposed further studies

However, due to the scope of the current strategy and the pace of developments in the eCooking sub-sector, there are some gaps in the strategy. Thus, additional studies will complement the mid-term review and support further design and implementation of programmes such as eCooking tariff development, institutional eCooking, the tax waiver, among others. Additionally, the KNeCS baseline dataset can be used to conduct complementary studies, providing a deeper understanding of other relevant aspects of the eCooking transition.

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▶ **Suggested studies to be commissioned include, but are not limited, to the following:**

- Determine the current expenditures and frequency of payments for cooking fuels across different market segments, and assess their compatibility with existing and potential payment models for electric appliances and electricity, such as cash purchases versus consumer financing options.

- Produce a set of load profiles that represent the likely demand for electricity for cooking amongst key market segments.

- Identify underserved areas of the country, both in terms of appliance retail and after-sales service, and explore mechanisms to incentivise supply chain development and the establishment of repair and maintenance infrastructure.

- Identify any bottlenecks in the electricity supply infrastructure (e.g. poor-quality household wiring, overloaded transformers or load limited connections), evaluate the severity of fluctuations in the electricity supply (blackouts and voltage instability) in different parts of the country and for different market segments and explore potential mitigation strategies such as energy storage, wiring upgrades, fuel stacking, solar eCooking.

- Conduct a deeper analysis on the proposed VAT waiver regime to be applied to locally manufactured appliances, and potentially, eCooking components for assembly, and IoT components proposed in the strategy in order to design an effective intervention.

- Conduct an analysis on the effects of lowering or eliminating import duties and other charges to decrease the initial cost of energy-efficient appliances.

- Develop the investment prospectus further to attract funding into the eCooking sector by showing the costs/benefits of implementing the strategy for the power sector, in terms of increased revenue for the off taker and off-grid energy companies. Similarly expand the investment prospectus for banking sectors, e.g. in terms of specific products for e-cooking.

These studies will not only refine the strategy's effectiveness but also stimulate further investment in the sub-sector.

In conclusion, this strategy provides a robust foundation for accelerating the development of an enabling environment and market activities in the eCooking sector. However, there is significant potential to scale eCooking beyond the forecasted 10% target. Sector players should capitalize on this opportunity by leveraging eCooking to achieve net zero targets, while simultaneously addressing broader developmental challenges such as public health and economic development. With strategic investments and coordinated efforts, eCooking can play a pivotal role in transforming the cooking energy landscape in Kenya.

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8. APPENDIX

Contributions from Key Stakeholders

The development of this strategy has been a collaborative effort, relying on the invaluable contributions and guidance of numerous stakeholders. This section acknowledges the diverse range of institutions and individuals who participated in the Technical Working Group, provided critical written feedback, supported the modelling process, contributed through key informant interviews, and participated in the validation workshops.

Technical Working Group

We are thankful to the following institutions for their participation in the Technical Working Group, which oversaw the development of the strategy and provided valuable feedback and guidance during regular meetings and bilateral discussions.

Public sector institutions	
1	Ministry of Energy and Petroleum
2	Ministry of Environment, Climate Change & Forestry
3	Ministry of Health
4	Sustainable Energy Technical Assistance (SETA)
5	Petroleum Institute of East Africa
6	Kenya Bureau of Standards (KEBS)
7	Energy and Petroleum Regulatory Authority (EPRA)
8	Kenya Power and Lighting Company (KPLC)
9	Rural Electrification and Renewable Energy Corporation (REREC)
10	Kenya Medical Research Institute (KEMRI)/ CLEAN-Air (Africa)

Development Partners	
11	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) - Energizing Development (Endev) and Green Climate Fund (GCF)
12	Clean Cooking Alliance (CCA)
13	Modern Energy Cooking Services (MECS)
14	Agence Française de Développement (AFD)
15	UK PACT (Partnering for Accelerated Climate Transitions) / The Palladium Group
16	Foreign, Commonwealth & Development Office (FCDO) Kenya

17	Sustainable Energy for All (SE4ALL)
18	Global Energy Alliance for People and Planet (GEAPP)
19	Rockefeller Foundation
20	World Resources Institute (WRI)

Associations	
21	Clean Cooking Association of Kenya (CCAK)
22	Global Off-Grid Lighting Association (GOGLA)
23	Access Coalition

Academia	
24	Strathmore University
25	Loughborough University

Consultants	
26	EED Advisory

Peer Reviewers

In particular, we extend our deepest appreciation to the following individuals who directly contributed to the strategy development process by reviewing various drafts of the strategy and providing written feedback.

Ministry of Energy and Petroleum and Petroleum

Eng. Isaac Kiva	TWG Member
Dan Kithinji Marangu	Reviewer/TWG Member
Dr. Faith Wandera Odongo	Reviewer/TWG Member
Diana Masika	Reviewer/TWG Member
Rukia Bakari	Reviewer/TWG Member
Douglas Rabura	Reviewer/TWG Member

Energy and Petroleum Regulatory Authority (EPRA)

Eng. Nickson Bukachi	Reviewer/TWG Member
Lee Okombe	Reviewer/TWG Member
Mercy Kimwa	Reviewer/TWG Member

MECS- Gamos East Africa

Dr. Jon Leary	Reviewer/TWG Member
Beryl Onjala	Reviewer/TWG Member
Syprose Ochieng'	Reviewer/TWG Member

MECS – Loughborough University

Prof. Ed Brown	Loughborough University	Reviewer/TWG Member
Jane Spencer	Loughborough University	Reviewer/TWG Member
Samir Thapa	Loughborough University	Reviewer/TWG Member
Matthew Leach	University of Surrey	Reviewer/TWG Member
Dr. Simon Batchelor	Gamos	Reviewer

Kenya Power

Irene Wanjohi	Reviewer/TWG Member
Christina Kiwiri	Reviewer/TWG Member

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)/ Energizing Development (Endev)

Maxwell Musoka	Reviewer/TWG Member
Fredrick Oluleka Amariati	Reviewer/TWG Member
Mariam Karanja	Reviewer/TWG Member

EED Advisory

Murefu Barasa	Reviewer/TWG Member
Ruth Gichuhi	Reviewer/TWG Member
Daniel Wanjohi	Reviewer/TWG Member
Tom Shikorire	Reviewer

World Resources Institute (WRI)

Douglas Ronoh	Reviewer/TWG Member
Doreen Irungu	Reviewer/TWG Member

Sustainable Energy Technical Assistance - Practical Action

Jechoniah Kitala	Reviewer/TWG Member

Clean Cooking Alliance

Lindsay Umalla	Reviewer/TWG Member

Agence Française de Développement (AFD)

Gitahi Nyokabi	Reviewer/TWG Member

Ministry of Environment, Climate Change & Forestry

Victor Kirwa	Reviewer/TWG Member

Ministry of Health

Lokolile Lolem	Reviewer/TWG Member

ACCESS Coalition

Patricia Mbogo	Reviewer/TWG Member

Stockholm Environment Institute

Mbeo Ogeyo	Reviewer

African Institute for Development Policy

Rose Oronje	Reviewer
Violet Murunga	Reviewer

Kenya Medical Research Institute (KEMRI)/ CLEAN-Air (Africa)

Nancy Chebichii	Reviewer

The Global Energy Alliance for People and Planet (GEAPP)

Zeph Kivungi	Reviewer

Independent consultants

Paul Mbuthi	Reviewer/TWG Member

Sun King

Mark O'keefe	Reviewer

Key Informant Interviews

In addition, we wish to thank the institutions who have contributed to the development of this strategy through key informant interviews and various bilateral consultations:

	Name	Organization
1	Perez Rocio	Bidhaa Sasa
2	Meredith Muthoni	BURN Manufacturing
3	Agnes Kalyonge	Jikoni Magic
4	Danson Ligare	Kakamega Renewable Energy Network
5	Stewart Crane	Village Infrastructure Angels
6	Leonard Nyongesa	Village Infrastructure Angels
7	John Maina	SCODE Ltd
8	Anderson Bett	Powergen Renewable Energy
9	Gladwell Momanyi	Powerhive
10	Abel Mamwacha	Powerhive
11	Karlijn Groen	SNV Netherlands Development Organisation
12	Duncan Mwangi	SayonaPPs Kenya
13	Sam Grant	Collaborative Labeling and Appliance Standards Program (CLASP)
14	Nyamolo Abagi	Collaborative Labeling and Appliance Standards Program (CLASP)
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18	Dorothy Otieno	Nyalore Impact
19	Geoffrey Kimiti	PowerPay Africa
20	Michelle Akute	Kenya Power and Lighting Company
21	Wairimu Njehia	Kenya Power and Lighting Company
22	Dan Kithinji Marangu	Ministry of Energy and Petroleum
23	Dr. Faith Wandera Odongo	Ministry of Energy and Petroleum
24	George Ayoma	Ramogi Institute of Advanced Technology (RIAT)
25	Kennedy Makori	Ramogi Institute of Advanced Technology (RIAT)

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Name	Organisation
Pietro Lubello	Climate Compatible Growth programme and UCL Energy Institute, University College London
Steve Pye	Climate Compatible Growth programme and UCL Energy Institute, University College London

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Validation workshop participants

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KNeCS Consultants

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