THE NEEDS ASSESSMENT FOR REGULATIONS FOR THE COOKING SOLUTIONS SECTOR IN KENYA

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Assessment Report

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Executive Summary

In Kenya the lack of regulation in the clean cooking sector amidst ongoing policy advancements poses challenges to achievement of universal access to clean cooking. Kenya's cooking policy and regulatory environment are currently uncertain due to conflicting viewpoints, which could hinder the progress made towards green growth in the cooking sector. On one hand, some believe that new regulations can promote modern energy cooking solutions, bringing about significant socioeconomic and environmental benefits. On the other hand, there are those who caution against regulating the cooking sector before market maturation, fearing potential risks that could stifle innovation and hinder green growth.

The aim of this study was to assess the readiness of the clean cooking sector in terms of regulations. To address this uncertainty, this dedicated study was conducted as part of the "*Promotion of Climate-Friendly Cooking: Kenya and Senegal*" project, in collaboration with the MoEP, GIZ, and other partners. The study aimed to (a.) review the current regulatory framework for cooking technologies and fuels to identify the existing gaps and their impacts on the sector, (b.) provide recommendations based on the above findings, and (c.) propose a roadmap to achieve the recommendations.

The study adopted qualitative methods that targeted desk reviews and stakeholder engagements through Key Informant Interviews (KIIs) and Focus Group Discussion (FGDs) that took place between February and June 2023. The study findings highlighted (a.) the need for the gradual adoption of regulations in specific segments of the cooking sector to promote green growth. The report stresses the importance of prioritizing less stringent regulatory instruments, such as self-regulation mechanisms, guidelines, and advisories, before resorting to formal regulations. Based on these findings, (b.) the study has identified potential opportunities where specific regulations or less stringent instruments can be fast-tracked within the common cooking fuel and technology value chains. Similarly, the study has suggested a range of policy recommendations, including modalities and strategies for their implementation, to fast-track progress towards green growth in the cooking sector.

By justifying the need for new regulations and allaying concerns about potential negative consequences on the sector’s growth and development, the study lays a solid foundation for addressing the uncertainty within the regulatory environment, paving the way for green growth in the cooking sector.

The study's assumptions regarding stakeholders' awareness of regulatory instruments, the occurrence of regulatory needs at various stages of the value chains, and the triggers for such needs were proven valid. However, a significant portion of the sampled stakeholders exhibited a limited grasp understanding of regulatory instruments and processes related to energy, hence a key limitation to the study. Addressing this challenge is vital to strengthening the enabling environment for cooking sector policy and regulations.

The report provides a roadmap that is crucial for developing effective regulations and policies. It proposes a tiered classification of policy recommendations for achieving green growth in the cooking sector:

Tier 1 Recommendations (short-term—2023-27)

1. Assess the impact of progressive regulations and identify gaps for strengthening.

2. Strengthen the enforcement capacities of EPRA and KEBS.
3. Ban kerosene for domestic use.
4. Regulate fuelwood supply and use in communal institutions and cooking SMEs.
5. Regulate institutional and SME-targeted cookstove production.
6. Regulate Carbon Financing Schemes in the Cooking Sector.
7. Develop regulations and consumer labeling for e-cooking devices.
8. Regularly identify, prioritize, and adopt progressive regulatory instruments.
9. Zero-rate locally-produced bioethanol for cooking to stimulate local production.
10. Raise stakeholder awareness of the role of regulations, benefits, and entry points.

Tier 2 Recommendations (short-to-longer term)

1. Establish a Technical Working Group on Data Management.
2. Strengthen the institutional framework for cooking sector stakeholder collaboration and delivery of clean cooking policy.

Given that the MoEP is currently developing the Kenya National Clean Cooking Strategy (KNCCS), the study suggests integrating its relevant policy recommendations into the Strategy. By following the roadmap and implementing the proposed recommendations, Kenya can create a clear path towards green growth in the cooking sector while effectively addressing the existing uncertainty in its policy and regulatory environment.

Acronyms and List of Abbreviations

BioNET	Kenya Biogas Stakeholders Network
CC	Climate Change
CCAK	Clean Cooking Association of Kenya
CCD	Climate Change Directorate
CEP	County Energy Plan
CFA	Community Forest Association
COG	Council of Governors
CPA	Charcoal Producers Association
CSO	Civil Society Organization
DKUT	Dedan Kimathi University of Technology
EnDev	Energizing Development
EPC	Electric Pressure Cooker
EPRA	Energy and Petroleum Regulatory Authority
FGD	Focus Group Discussion
GCF	Green Climate Fund
GIZ	German Agency for International Cooperation
GOK	Government of Kenya
IAP	Indoor Air Pollution
ICRAF	World Agroforestry Centre
ICS	Improved Cookstove
IMC	Inter-Ministerial Committee
INEP	Integrated Energy Planning
IP	Innovation Platform
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KEBS	Kenya Bureau of Standards
KEFRI	Kenya Forestry Research Institute
KII	Key Informant Interview
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KIRDI	Kenya Industrial Research and Development Institute
KNBS	Kenya National Bureau of Statistics
KNCCS	Kenya National Clean Cooking Strategy
KS	Kenya Standard
LPG	Liquefied Petroleum Gas
MDA	Ministries, Departments and Agencies
MEL	Monitoring, Evaluation and Learning
MoEP	Ministry of Energy and Petroleum
MOH	Ministry of Health
MTon	Metric Ton
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
REREC	Rural Electrification and Renewable Energy Corporation
RIA	Regulatory Impact Assessment
SDG	Sustainable Development Goal
SEforAL	Sustainable Energy for All
L	Strathmore Energy Research Center
SERC	
SETA	Sustainable Energy Technical Assistance
SME	Small and Medium Enterprise

SNV	Netherlands Development Organization
TA	Technical Assistance
TWG	Technical Working Group
UN	United Nations
UoN	University of Nairobi
VAT	Value Added Tax
WHO	World Health Organization

1.0 Introduction

1.1 Background

Despite increasing availability of modern cooking solutions in the market, more than 70% of Kenyan households continue to rely on solid biomass fuels as their primary source for cooking and heating. Firewood accounts for about 65%, charcoal 10%, LPG 19% and Kerosene at 6% at household level[(1)]. In rural areas, biomass is predominant, with 93% of households using it as their primary cooking fuel[(2)]. The heavy reliance on traditional cooking practices is having significant impacts on human health, the terrestrial environment, climate change, and gender-biased development outcomes. Clean cooking alternatives including LPG, biogas, bioethanol and electric cooking still remain out of reach to the majority of the local households, communal institutions, and micro and small enterprises involved in cooking services due to a myriad of factors ranging from upfront cost, accessibility and reliability[(3)]. Consequently, leading to worsening health[(4)], climate change[(5)], and environmental conditions. This is also stifling innovation for green growth in the cooking sector.

The Government of Kenya (GoK) through the Ministry of Energy and Petroleum (MoEP) has prioritized the promotion of clean cooking as a key development goal in line with the objectives of the Sustainable Development Goal number 7(SDG7), the Sustainable Energy for All (SEforAll) Action Agenda (2016) and Kenya's revised Nationally Determined Contributions (NDC) of 2020 under the Paris Agreement. The GoK is further committed to the goal of achieving Universal Access to Modern Energy Cooking

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[1()] According to the Ministry of Energy (2019) Kenya Cooking Sector Study, 93.2% of the rural populations still rely on solid fuels as their primary fuel source. For further reference, see: https://eedadvisory.com/wp-content/uploads/2020/09/MoE-2019-Kenya-Cooking-Sector-Study-compressed.pdf

[2()] According to the 2019 Kenya Household Cooking Sector Study, Around 70% of Kenyan households rely on woodstoves for cooking, either as their main or backup cookstove. In rural areas, this percentage increases to a significant 92%. Moreover, the study found that 93.2% of rural households primarily use woodfuel, which includes fuelwood or charcoal, for cooking.

[3()] This according to the Kenya Cooking Sector Study: Assessment of the Supply and Demand of Cooking Solutions at the Household Level: Abridged Report. See: https://eedadvisory.com/wp-content/uploads/2020/09/MoE-2019-Kenya-Cooking-Sector-Study-Abridged.pdf

[4()] IAP continues to pose a global health risk with annual deaths of 1.6 million - revised down from 3.8 million. For further reference, see: https://eedadvisory.com/wp-content/uploads/2020/09/MoE-2019-Kenya-Cooking-Sector-Study-compressed.pdf

[5()] It is widely recognized that the use of inefficient and polluting cooking fuels and technologies contributes to environmental degradation and climate change. For further reference, see: https://ambitiontoaction.net/wp-content/uploads/2021/07/A2A_Kenya_CleanCookingStudy_July2021.pdf

Services by 2028, through the implementation of actions clearly outlined in both the Bioenergy Strategy 2020-2027[6] and the Clean Cooking Energy Compact of 2021[7].

To implement the clean cooking aspirations in an inclusive and coordinated manner, the MoEP with support from development partners is developing the Kenya National Clean Cooking Strategy (KNCCS) which is expected to be completed toward the end of the year 2023.

1.2 The Problem Statement

There is reasonable consensus across the policy documents referenced in the introduction section that enhancing the enabling policy and regulatory environment will accelerate emerging business models to scale up access to modern energy for cooking solutions in currently unserved (or underserved) areas. This in return can contribute to significant socioeconomic and environmental benefits. There are also differing opinions amongst other cooking sector players who have urged caution towards regulating the cooking sector, warning of potential risks that may hinder innovations and stifle enterprise growth. The lack of robust evidence to justify new regulations for the cooking sector on one hand, and the unsubstantiated fear of the negative impacts of new regulations on the other, compounds the uncertainty in the enabling environment. If left unresolved, this uncertainty threatens to stagnate the gains made so far in the sector. This justifies a focused study to determine if indeed there is a need for regulations or other policy instruments to facilitate sector growth.

To mitigate the above uncertainty, the MoEP in conjunction with the GIZ and other partners is implementing the project **"***Promotion of Climate-Friendly Cooking: Kenya and Senegal*" (GCF/EnDev) whose goal is to bring about long-term market growth for climate-friendly cooking stoves in both countries. MoEP and GIZ have commissioned this study, "*Assessing the Needs for Regulations in the Clean Cooking Sector*" as a contribution toward universal access to clean cooking in Kenya. Specifically, the study aims to review the current regulatory framework for cooking technologies and fuels, identify the existing gaps and their impacts on the sector, provide recommendations based on the findings and propose a roadmap to achieve the recommendations.

1.3 Scope of the Assessment

The design of the needs assessment study was based on four key considerations and assumptions to achieve its objectives. These considerations are as follows:

a) **Cooking solution value chains**: The assumption is that regulations should be established to protect consumers, the environment, and enterprises involved in the procurement,

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[6]() The *Strategy* will support the development of bioenergy as a complementary energy source in the medium term and, in the long term as an alternative to fossil fuels. Its implementation is the first step towards achieving the aspirations of Kenyans to have modern bioenergy solutions by 2028.For further reference, see: https://repository.kippra.or.ke/bitstream/handle/123456789/3017/Bioenergy-strategy%202020-2027.pdf?sequence=1&isAllowed=y

[7]() For further information, see the website: https://www.un.org/sites/un2.un.org/files/2021/11/kenya_clean_cooking_energy_compact_08_november_2021.pdf

production, sale, or use of cooking technologies and fuels. These regulations aim to address adverse issues that may arise at different stages of the value chains for fuels or technologies.

b) **Regulation-making process**: It is important for key stakeholders to be aware of the knowledge requirements and entry points into regulation-making processes specific to the cooking sub-sector. This awareness is crucial for effectively influencing the development of regulations that have a positive impact.

c) **Cooking sector categories**: The study recognizes that cooking activities primarily take place within households, communal institutions, and commercial cooking establishments. This categorization helps in understanding the different contexts and requirements associated with each sector.

d) **All common cooking technologies and fuels**: While there are numerous fuel types and cooking devices available, the study focused on commonly used fuels and technologies in five categories. These categories include E-Cooking (electric pressure cookers, induction cookers), Biogas (fixed systems, prefabricated systems), Bioethanol, LPG, and Biomass (pellets, briquettes, charcoal, and firewood). Only these commonly used options were considered for analysis and assessment purposes.

By considering these key factors and assumptions, the needs assessment study aims to provide comprehensive insights into the cooking solutions sector and inform the development of effective regulations and policies.

2.0 Methodological Approach

2.1 Inception Phase

During the inception phase, a meeting was held with the Technical Working Group (TWG) to align expectations and approve the study's proposed methodology, work plan, and expected outcomes. Additionally, the analytical framework presented in Table 1 received endorsement as a valuable tool for conducting the needs assessment. This framework was conceptualized on two key assumptions: Firstly, it considered that the successful identification of a need for regulation relies on stakeholders' awareness of regulatory instruments; and secondly, it acknowledged that the need for regulation would most likely arise at different stages of the fuel/technology value chain. Such needs would typically arise when specific triggers, such as safety breaches, health risks, or environmental hazards, surpass the permissible thresholds.

Table 1. The analytical framework (consultant's proposal)

	Value chain stages				
Methodology	**Procurement**	**Production**	**Sales and Marketing**	**Use and Disposal**	**Key Outputs**
1. Desk Review	*Status, gaps*	*Status, gaps*	*Status, gaps*	*Status, gaps*	**Where we are today** (section 3.0)
2. Consultative Workshop	*Status, gaps, solutions*	*Status, gaps, solutions*	*Status, gaps, solutions*	*Status, gaps, solutions*	**Where we want to go** (section 4.0)
3. KIIs & FGDs	*Status, gaps, solutions*	*Status, gaps, solutions*	*Status, gaps, solutions*	*Status, gaps, solutions*	
4. Overall Analysis	*Consolidated assessment of status, gaps, solutions, and enabling prerequisites for uptake of regulatory instruments.*				**How to get there** (section 5.0)

The framework also encompassed the value chains associated with cooking solutions, including the technologies and fuels involved in households, communal institutions, and productive energy users. This approach provided an organizational framework upon which data collection was founded. The different phases of the cooking solutions value chains, namely, procurement, production, sales/marketing, and use and disposal (Box 1), were integral components incorporated within the framework.

2.2 Desk Reviews

A range of publicly available references including inter alia, policy documents, technical reports, and peer-reviewed articles were reviewed with a view to uncovering crucial information pertaining to the following aspects: (a) technologies, fuels, and other regulations related to cooking energy, such as electricity; (b) the existing capacity within the cooking sector; and (c) documented information

highlighting gaps and challenges in the sector. These references are cited in relevant subsequent sections of the reports as footnotes or in the references section.

Box 1: **Value Chain stages and information specification**

- **Procurement Phase**: The focus of this phase is to investigate the procurement process at the enterprise level, specifically related to acquiring necessary parts or ingredients for local device production (such as materials for improved cookstoves or biogas digesters) and fuels (such as sustainable charcoal, bioethanol, and pellets). It also includes the importation of ready-to-use cooking solutions, including devices (e-cookers, LPG, and biogas burners) and fuels (LPG, ethanol). This phase will address issues such as taxation, transportation, and quality control. The main targets for interviews and research are businesses, tax authorities, and quality regulators.
- **Production Phase**: This phase focuses on local entrepreneurs and manufacturers involved in producing cooking devices (institutional stoves, improved cookstoves, LPG/biogas burners) and fuels (sustainable charcoal, pellets, ethanol, etc.). The goal is to address concerns and issues related to this production phase, including quality control, technology, and production capacity. The primary targets for interviews and research are producers and quality regulators.
- **Sales/Marketing Phase**: The emphasis of this phase is on entrepreneurs engaged in the sales and marketing of cooking devices and fuels to end users. The objective is to explore topics such as pricing, distribution, and financing models. Individuals such as stockists and distributors will be interviewed as examples of key targets in this phase.
- **Use and Disposal Phase**: This phase focuses on users of clean cooking devices and fuels/energy across the three user orientations considered in the study (institutional, public use entities, and households). The aim is to gather insights from community representatives and individuals involved in the disposal of used devices, including scrap metal dealers.

2.3 Stakeholder Engagement

A total of 26 participants (17 females and 9 males—see full list in Appendix 3) attended the cooking sector stakeholders' consultative workshop guided by the programme/agenda in Appendix 2. Similarly, Key Informant Interviews (KIIs) were held with 26 (8 females and 18 males) professionals (see Appendix 4) in the cooking sector to clarify some of the grey areas identified during the stakeholders' workshop. Two Focus Group Discussions (FGDs) were organized. The first of these brought together 13 participants—5 females and 8 males (see Appendix 6) to participate in four round-table group discussions organized around e-cooking, biogas, pellets/briquettes and bioethanol tables. The second series of FGDs targeting ICS value chain actors were conducted in four GCF clusters (Nyanza, Western, Central and Lower Eastern regions of Kenya) where 87 participants distributed across ICS value chain were engaged. The detailed distribution per cluster and gender can be found in Appendix 5. Data collection with all stakeholders explored possibilities of regulatory triggers (see Appendix 7) being active/detected at any of the four value chain stages. The triggers considered under this study included safety concerns, health concerns, environmental concerns, market development, quality control and policy goals (see Appendix 1).

2.4 Data Analysis, Reporting and Validation

The data analysis predominantly involved thematic analysis, which entailed reading through various data sets, such as transcripts from in-depth interviews and FGDs. In the final stage of data analysis, a comparison was made between the findings from the KIIs and FGDs on one hand and the key findings obtained during the desk review stage. This comparison informed the needs assessment exercise. Based on the findings, proposals supporting or opposing regulations, policies, and standards were distilled into a needs assessment report. This report underwent a thorough review and consultation between the consultant and the technical working group (TWG) for validation.

3.0 Status of the Policy and Regulatory Framework for the Cooking Solutions Sector in Kenya

Kenya leads in the East Africa region with the most advanced cookstove sector demonstrated by the number of individuals utilizing improved stoves, diverse manufacturers, and the assorted range of products available in the market (Stevens *et al.,* 2020) The regulatory environment is guided by various policies, regulations, and guidelines issued by the government and supported by development organizations and the private sector. To foster sector growth and safeguard consumer interests, Kenya has established a wide range of standards for cooking technologies and fuels. The section below describes the various policies, regulations, standards, and plans relevant to the clean cooking sector—starting with the Kenya Constitution 2010, which provides a framework that guides the development, regulation, and management of energy resources in Kenya.

3.1 The Energy Act 2019

The Energy Act 2019 provides comprehensive policy guidance for Kenya's energy transition. It provides the roles of National and County Government functions for the energy sector and establishes entities such as the Energy and Petroleum Regulatory Authority (EPRA), and the Rural Electrification and Renewable Energy Corporation (REREC). The Act regulates the production, supply, and use of electricity and other energy sources. EPRA's mandate is the regulation of the petroleum, electricity, and renewable energy sectors in Kenya while REREC promotes and develops local capacity for the manufacture, installation, maintenance, and operation of renewable energy technologies.[8]

The Energy Act requires the national government to formulate a National Energy Policy and an Integrated National Energy Plan (INEP) that consolidates all the county energy plans. County governments are required to use the INEP framework to develop their energy plans to ensure uniformity across the counties commonly called County Energy Plans (CEPs). This presents an opportunity to create harmonized plans that addresses the diverse energy needs of different communities based on their economic activities and cultural practices. However, the development of Energy Plans remains a challenge, with only 12 counties having made efforts in developing the CEPs[9].

In Kenya, the development of the CEPs is hindered by limited technical expertise and human resources. The limitations restrict the counties ability to understand energy demand patterns, assess resource potential, and evaluate project feasibility. As a result, the development of evidence-based energy plans that align with local needs and promote sustainable development becomes difficult to develop. All is not gloomy though, as development partners such as GCF through the SETA/MoEP programme are supporting 9 counties to develop CEPs.

3.2 The Petroleum (Liquefied Petroleum Gas) Regulations, 2019

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[8]() This and more information can be found at: Energy Act, No.1 of 2019 (2019). 43-44 https://www.epra.go.ke/download/the-energy-act-2019/

[9]() For further reference see: https://www.seta-kenya.org/what-we-do

This regulation replaced the LPG Regulations of 2009 and provides an additional layer of licensing requirements for LPG importation, storage, transportation, wholesale, and retail trade[10]. The regulations stipulate safety measures and allows EPRA to inspect business vehicles and facilities. The regulation mandates the Kenya Bureau of Standards (KEBS) to standardize cylinder specifications, handling, storage, and distribution of LPG. The regulation also prohibits the distribution of unbranded gas cylinders, improving accountability and traceability in the supply process. Brand owners are responsible for providing consumers with information on safe handling and usage through notices attached to the cylinders. EPRA's Enforcement and Consumer Protection Directorate enforces these regulations. For example, in 2019, EPRA reported a compliance level of 81% and during the same period, 11 illegal petroleum sites and 2 LPG refilling sites were demolished, while 34 licenses were revoked due to non-compliance with the regulations of 2019[11].

In a 2020 report, the Clean Cooking Alliance identified budget constraints as a significant obstacle to the advancement and enforcement of regulations in the LPG sub-sector. Companies face financial burdens in establishing requalification centres or obtaining certifications from authorized regulatory bodies, even when they consistently comply with national industry standards. Insufficient funds for the government and regulators also often hinder effective enforcement of the standards[12].
In early 2023, President William Ruto issued a directive instructing public institutions, including biomass-reliant schools, to transition to LPG by 2025. To support this transition, a project worth Ksh 2.5 billion was proposed to be funded from an adulteration levy. However, the project has faced hurdles even before it can take off the ground due to funding cuts imposed by the National Treasury under the budget policy statement (Mutai, 2023).

3.3 The Finance Acts of 2016, 2018 and 2020

The Finance Acts over the period have brought about mixed results to the cooking sector as discussed in this section. The Finance Act of 2016 brought about a significant change in the clean cooking subsector by addressing critical barriers to the growth of the sub-sector. It first removed the Value Added Tax (VAT) on LPG by zero-rating which saw the uptake of the LPG rise with a huge margin. During the same year the Finance Act introduced provisions that exempted non-electric stoves and similar appliances from VAT. It also expanded the VAT exemption to cover goods used in the assembly, manufacturing, or repair of clean cookstoves. These exemptions were implemented to ease the financial strain on individuals and businesses engaged in the production and upkeep of these eco-

[10] The Energy (Liquified Petroleum Gas) regulations of 2009 was later replaced by the 2019 Regulations: For more information on this, see: http://epra.go.ke/wp-content/uploads/2018/11/THE-ENERGY-LIQUEFIED-PETROLEUM-GAS-REGULATIONS-2009-f-1.pdf
[11] For further information on EPRA's compliance rate, see the following website: https://www.epra.go.ke/wp-content/uploads/2020/01/Press-release-Substantial-Achievements-in-2019-and-2020-Outlook.pdf
[12] To find out further on how insufficient government funds hinder the implementation of standards, please see the Clean Cooking Alliance report on this website: https://cleancooking.org/binary-data/RESOURCE/file/000/000/586-1.pdf

friendly cooking solutions[13]. In the same year, the government removed the excise duty on bioethanol for cooking fuel.

The decision catalyzed the private sector entry into the bioethanol sub-sector. For example, the Koko network was one of the key companies that entered the market then and today has successfully connected over 800,000 households with bioethanol and has employed thousands of people in the value chain[14]. This provided a strong evidence that eliminating tariff barriers could significantly impact the affordability and consumer demand for clean cooking solutions. However, many times the government has made the finance regulations quite unpredictable making it difficult for the sector to attract significant investment. For example, in 2018, the government re-introduced the 25% import duty on improved cookstoves from 10% which caused some companies to fold up. For example, Ecozoom which was running a successful cookstoves enterprise was forced to merge with Biolite as its business model became commercially unviable[15].

The Finance Act of 2020 expanded the scope of VAT to include stoves and fuels that were previously exempt or partially exempted under the Finance Act of 2016. As a result, investors, producers, and manufacturers increased prices (initially, LPG enjoyed a one-year extension with a zero rating, exempting it from taxes and charges, however, this exemption ended in July 2021). The re-introduction of the VAT made the LPG that was affordable become more expensive for majority of the households and led many to slide back to the use of traditional fuels such as charcoal and kerosene. Not because these fuels are cheap, but because one can get them in small quantities commensurate with their daily household budget. This ends up having negative ripple effects on the health of the users and the environment[16].

3.4 The Draft Energy (improved biomass cookstoves) Regulations 2013

The draft regulation was completed in 2013 but was never gazetted. The regulation aimed to accelerate the adoption of improved biomass stoves in institutions through sound business practice. It focused on the entire supply chain of improved institutional cookstoves–manufacturing, importation, distribution, contracting, installation (in terms of skills) and end-use (in terms of maintaining records e.g. name of the stove manufacturer, technical specifications, annual biomass

[13] According to this Act, LPG was zero-rated for VAT purposes effective from 9 June 2026. More information on this can be found at: https://www.pwc.com/ke/en/assets/pdf/tax-alert-finance-act-2016.pdf

[14] KOKO is promoting the widespread adoption of liquid bio-ethanol cooking fuel as a quick, secure, and cost-effective substitute for traditional and polluting cooking fuels like charcoal. For more information, see the website:https://www.businesslive.co.za/bloomberg/news/2022-11-01-koko-networks-provides-kenyans-with-cheaper-greener-cooking-fuel/

[15] For further information on how Ecozoom became part of Biolite, see the following link: https://help.bioliteenergy.com/hc/en-us/articles/14641101109531-Why-is-this-called-EcoZoom-and-not-BioLite-

[16] This information is contained in the report "Value Added Tax on Cleaner Cooking Solutions in Kenya" which was published by the Clean Cooking Alliance, Duke Energy Access Project, EED Advisory and CCAK. Access the report through the link: https://cleancooking.org/reports-and-tools/value-added-tax-on-cleaner-cooking-solutions-in-kenya-costs-outweigh-benefits-and-impede-national-climate-and-sustainable-development-goals/

consumption, date of Installation, distributor, installing technician, contractor, and certificate of completion).

EPRA further stipulated the licensing requirements for all relevant value chain players from technicians to manufacturers, importers, distributors, and contractors of stoves, and a mandatory warranty on stoves to the consumers. In compliance with the legal mandate, any proposed regulations must undergo a Regulation Impacts Assessment (RIA). This assessment aims to meticulously evaluate and quantify the prospective advantages, drawbacks, and overall impacts, encompassing social, environmental, and economic aspects. Regrettably, upon conducting the RIA, the proposed regulations failed to meet the necessary thresholds set by EPRA consequently rendering them ineligible for gazettement. These incorporates thresholds for, *inter alia*, economic impact, social impact, environmental impact, administrative impact, technological impact, feasibility and practicality, alternative, stakeholder consultation, and so on. Although it is not clear what guidance EPRA gave following the rejection of the draft, it is notable that some sections of this draft regulation are progressive and deserve to be isolated and promoted.

3.5 Quality Standards

The Kenya Bureau of Standards (KEBS) is the mandated institution that develops and enforces product standards in the country. Standards within the cooking solutions industry, continue to evolve as innovation emerges in the subsector. The following is a non-exhaustive description for the standards guiding the sector.

a.) ***Biomass stoves – performance requirements (KS 1814:2019):*** The standards define the biomass stove performance for firewood and charcoal covering both domestic and institutional stoves. It focuses on performance standards and has stipulated the minimum performance standards of stoves in terms of thermal efficiency, emissions (both carbon monoxide and particulate matter PM_{10}), durability, and safety. The standard was adopted in 2019 and regulates both imported and locally produced biomass stoves. For the locally produced stoves, enforcement has not been effective since the majority of the biomass stoves are produced by the informal sector or are artisanal. However, those producing stoves and distributing them through formal channels such as supermarkets are required to have their stoves tested and pass the set minimum standards - this qualifies them to have a standardization mark of quality.

b.) ***KS 2566-2:2015:*** **Design and Construction of Domestic Biogas Plants-Code of Practice Part 2**: Fixed Dome. This standard outlines the requirements for the design and construction of domestic biogas plants that are specific to the fixed dome design and its variants.

c.) ***KS 2951:2022: Biogas systems -code of practice for farm and industrial scale biogas systems:*** The KS: 2951:2022 standards were gazetted on May 13 2022 under the Kenya standards on Biogas systems code of practice for farm and industrial scale biogas systems. Full

implementation of this code of practice will ensure well-designed and constructed biogas plants that perform optimally[17].

d.) ***Meter for dispensing liquefied petroleum gas (LPG) from cylinder" (KNWA 2885:2019, 2019) standards:*** The Kenya Bureau of Standards collaborated with PayGo Energy to establish the groundbreaking standard meter for dispensing liquefied petroleum gas (LPG) from the cylinder. This standard, the first of its kind globally, adheres to high-level technical requirements and involved both public and private sector stakeholders[18]. PayGo Energy's Cylinder Smart Meter (CSM) monitors LPG consumption at the household level and sends notifications when the customer's cylinder is running low[19].

e.) ***Meter for dispensing liquefied petroleum gas (LPG) from cylinders-specification (KS2968:2022):*** A collaborative effort between the KEBS TC 105 Instrumentation and Calibration Coordination and KEBS TC 117 Liquefied Petroleum Gas installations, involving key stakeholders and under the guidance of the Standards Projects Committee, resulted in the preparation of this Standard. The purpose of this meter is to accurately dispense controlled quantities of liquefied petroleum gas (LPG) from cylinders. It plays a crucial role in measuring small amounts of vaporized LPG and enabling remote access control to the gas. The meter is specifically designed for applications with low pressure. Furthermore, this standard serves as a replacement for KNWA 2885: 2019 (see above).

f.) **Petroleum and petroleum products - Liquefied Petroleum Gas (LPG) – Specification (KS 91:2022).** Outlines the criteria, sampling procedures, and examination techniques for liquefied petroleum gas (LPG), and specifically commercial butane, when employed as fuel for residential, industrial, and internal combustion engine purposes.

g.) ***Technical Denatured alcohol standards (KS2838: 2019):*** The standards outline the applications, composition, identification, testing methods, and marking requirements for technical alcohol. This type of alcohol provides cost-effective and clean cooking fuel for low-income households. The KS 2838 applies to all sector players who distribute, produce, or handle the technical denatured alcohol.

h.) ***Ethanol Fuelled Appliances standards (KS2759: 2018):*** The standards illustrate the requirements for ethanol fueled appliances for cooking and heat generation in households with exception for the requirements for lamps. The standard applies to all sector players who distribute, produce or handle ethanol fueled appliances.

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[17]() For further information about the KS 2951:2022, see the link: https://www.the-star.co.ke/news/2022-10-10-state-sets-standards-for-construction-design-of-biogas-plant/

[18]() For further information, follow the link: https://www.engineeringforchange.org/news/kenyan-bureau-standards-launched-worlds-first-lpg-smart-metering-standard/

[19]() For further information about Pago Energy, follow the link: https://www.paygoenergy.co/

i.) ***Charcoal and carbonized briquette standards (2020) - KS 2912 2020 solid biofuel -sustainable charcoal and carbonized briquettes:*** The Sustainable Charcoal and Carbonized Briquettes for Household and Commercial Use were published in December 2020. They outline the quality requirements for KEBS certification of charcoal and carbonized briquettes traded in the market.

j.) **KS IEC 60350-2:2017 Kenya Standard — Household electric cooking appliances — Part 2**: Hobs - Methods for measuring performance, First Edition KS IEC 60350-1:2016 Kenya Standard — Household electric cooking appliances — Part 1: Ranges, ovens, steam ovens, and grills — Methods for measuring performance, First Edition: This standard, developed by KEBS, defines methods for measuring the performance of electric hobs for household use. However, they have been overtaken by events due to the invention of induction cookers and electric pressure cookers that require different testing criteria. Hence, there is the need to update them to reflect the current reality.

The implementation of these standards faces several challenges. Firstly, informal players especially in the ICS subsector dominate the industry and resist compliance with the standards due to high costs and lack of incentives. Secondly, regulatory agencies, like the KEBS lack the capacity to enforce the standards effectively. Lastly, limited access to testing facilities makes it difficult for entrepreneurs who are spread out across the country. These challenges have mainly affected ICS entrepreneurs due to the nature of their businesses.

3.6 The Forest (Charcoal) Regulations 2012

The Forest (Charcoal) Regulations of 2009, revised in 2012 regulates the production, transportation, and marketing of charcoal. The regulations require that charcoal producers and transporters be licensed by the Kenya Forest Service (KFS). Commercial charcoal producers must organize themselves into Charcoal Producers Associations (CPAs) and promote sustainable charcoal production across supply chains. They must also implement reforestation plans where necessary. Charcoal wholesalers or retailers must hold a license and maintain accountability in trade, including record-keeping of charcoal sources and prohibition of exploitation of endangered or threatened plant species during production.

Despite these regulations, Kenya continues to face significant forest degradation and deforestation caused by charcoal burning. As per data from Global Forest Watch, between 2002 and 2022, Kenya experienced a reduction of 50.7 thousand hectares of lush primary forests, accounting for 14% of the overall decline in its forest cover during that timeframe. The extent of humid primary forests in Kenya decreased by 7.8% over this duration[20].

[20()] For further reference, see: https://www.globalforestwatch.org/dashboards/country/KEN/?category=summary&treeLossPct=eyJoaWdobGlnaHRlZCI6dHJ1ZX0%3D

This, together with other activities such as logging, agricultural expansion and urbanization have undermined the aspirations of policy documents such as the National Strategy for Achieving and Maintaining over 10% of Tree Cover by 2022[21], and the emission targets as outlined in the National Climate Change Action Plan (2018-2022)[22].

According to the World Agroforestry (Sola *et al.,* 2021), variety of reasons why people fail to comply with these regulations exist which includes inadequate regulatory structures and doubts about their validity, limited ability to enforce regulations and instances of corruption, authorities lacking transparency and accountability, absence of markets that prioritize legal products, poverty, and the absence of alternative means of sustenance. Delayed licensing and weak penalties have also been identified as a challenge to effective implementation and enforcement (Muthui, 2018).

The 2018 moratorium on charcoal production and trade had a significant institutional impact on Charcoal Producers' Associations (CPAs). The ban rendered CPAs unable to fulfil their responsibilities, charcoal collection centres closed, and the issuance of certificates of origin ceased, affecting the legitimate movement of charcoal in the market. As a result, CPAs faced financial constraints, halted conservation and reforestation plans, and lost access to conservation funds. The disagreement between local counties and the national government on enforcing charcoal regulations has also hindered the effective implementation of the rules. This problem stems from the delayed transfer of responsibilities from the national government to local authorities. In addition, the limited resources in the counties further impede their ability to effectively take on the functions previously carried out by national agencies[23].

3.7 Draft Energy Policy 2018

The Draft Kenya National Energy Policy, formulated in 2018 aimed to replace the 2004 Sessional Paper and laid the foundation for the 2019 Energy Act. It aimed to provide affordable quality energy for all Kenyans by facilitating clean, sustainable, affordable, competitive, reliable, and secure energy services while protecting the environment. The policy recognized the challenges encountered at the household level with energy for cooking, with the majority of households depending on solid biomass (firewood and charcoal) as their main source of energy for cooking. This leads to increased indoor air pollution as well as environmental degradation and deforestation.

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[21] The aspirations of the National Strategy for Achieving and Maintaining over 10% Tree Cover by 2022 have been undermined by the lifting of the ban on logging by the President in July 2023. Access the strategy through: http://www.environment.go.ke/wp-content/uploads/2019/08/Strategy-for-10-Tree-Cover-23-5-19-FINAL.pdf

[22] The National Climate Change Action Plan 2018-2022 Second Implementation Status Report for the Financial Year 2019/2020 can be accessed through: https://napglobalnetwork.org/wp-content/uploads/2022/01/napgn-en-2022-kenya-NCCAP-2018-2022-Implemantation-Status-Report.pdf

[23] For further information on why Kenya's regulations in the charcoal sector have not achieved much, see: https://www.worldagroforestry.org/blog/2021/02/24/kenya-has-been-trying-regulate-charcoal-sector-why-its-not-working

The policy further notes that as disposable income increases, people tend to stack other than switching to cleaner cooking solutions. This finding aligns with a study by KIPPRA in 2009 that revealed that people engage more in fuel stacking rather than fuel switching - where households continue to use a mix of more than one fuel as income increases. Such include – LPG, bioethanol, biogas, and electrical cooking solutions among others.

The policy outlines key measures to lower the heavy reliance on biomass and further recognizes that although price is a major factor that influences choice, other factors are critical namely income, product quality, performance, convenience, accessibility, and affordability. Despite this policy being an improved version of the 2004 Sessional Paper, it is not clear from MoEP why it has remained a draft to this day.

3.8 The Gender Policy in Energy, 2019

The primary objective of this policy is to promote gender equality and empower women in national development, encouraging the active participation of individuals across gender, age, and vulnerable/marginalized groups to achieve sustainable development. The MoEP has been entrusted with the responsibility of facilitating the provision of clean energy at three different levels: industrial, institutional, and domestic. While the policy seeks to enhance access to clean and renewable energy across these 3 levels, particular attention has been given to household adoption, particularly in the context of clean cooking. The policy presents a well-defined implementation matrix (stakeholder role) to accomplish its goals. In addition, the policy highlights that the Ministry strives to promote alternative energy solutions, including biogas, clean cook stoves, fireless cookers, bioethanol, briquettes, and pellets. However, it acknowledges that the adoption of these technologies remains limited due to insufficient awareness, high product costs, resistance to change, and inadequate supply[24].

3.9 The Bioenergy Strategy 2020 – 2027 and Action Plan

The Kenya Bioenergy Strategy 2020-2027 aims to develop and promote bioenergy as a formal industry that can be a vehicle for the country's economic development. Launched in November 2020, the strategy provides guidelines, approaches, and strategic interventions to promote the development and utilization of bioenergy resources in Kenya between the period of 2020 to 2027. It addresses the challenges of the country's heavy reliance on solid biomass for cooking and heating.

The strategy estimates that 9.6MTon of fuelwood and 2 MTon of charcoal are consumed annually putting a lot of pressure on our forest cover which stands at less than the 10% threshold set by the UN. Despite government of Kenya putting a moratorium on logging to address environmental degradation, charcoal trade and use have been minimally affected. As a result of the above scenario, the Strategy recognizes the development of *inter alia* political leadership through policy implementation, regulations and strengthening institutions that govern the sector as progressive

[24()] For more information on the Gender Policy in Energy, see: https://www.energia.org/kenyan-ministry-of-energy-launches-first-national-gender-policy-in-the-energy-sector-ever/

options towards sustainability. The strategy recognizes the need for standards and regulations in the development of the bioenergy sector, addressing household, productive, and institutional use.

3.10 The National Climate Change Action Plan (2018-2022)

This plan aimed to integrate climate change considerations into various sectors of the economy, including energy, agriculture, water, forestry, and transport. It outlined a range of measures and policies to reduce greenhouse gas emissions, enhance climate resilience, promote sustainable development, and improve adaptation strategies. The plan sought to mobilize resources, engage stakeholders, and raise awareness to achieve Kenya's climate goals and contribute to global efforts in addressing climate change (Government of Kenya, 2018).

The plan aimed to promote environmentally friendly cooking methods, emphasizing clean fuels like LPG in urban areas and clean biomass cookstoves, charcoal, and wood in rural areas. It also sought to increase renewable energy use for electricity generation, however it failed to connect this to the clean cooking challenge as it did not recognize the emerging opportunities for electric cooking. Recognizing the significant role of women in household cooking and the negative impacts of traditional methods, the plan recommended monitoring the health effects of transitioning to clean cooking. However, it lacked clear assignment of responsibilities among the institutions involved and primarily focused on domestic cooking, neglecting productive and institutional cooking. At the time of this assessment, this plan is currently under review, to pave way for NCCAP III (2023-2027).

3.11 The Kenya National Energy Efficiency and Conservation Strategy 2020

The Kenya National Energy Efficiency and Conservation Strategy 2020 aims to enhance energy efficiency and encourage the use of renewable energy technologies across all sectors. However, the strategy primarily focuses on improving household cooking practices while neglecting institutional and productive uses. The proposed actions include implementing minimum energy performance standards for various cooking products, establishing standards for commonly used fuels and cookers, and creating a testing laboratory for fuels and cookers[25].

[25()] To access the strategy, see: https://unepccc.org/wp-content/uploads/2020/09/kenya-national-energy-efficiency-and-conservation-strategy-2020-1.pdf

4.0 Stakeholder Perspectives on Gaps in the Cooking Sector's Regulatory Framework

This section presents and discusses the findings of the stakeholders. It reflects on the main themes that emerged from the stakeholder engagement exercises (including consultative workshops, KIIs, and FGDs) that summarize the primary views expressed by the diverse stakeholders. For further elucidation, refer to Appendix 7.

4.1 Low level of Awareness of existing regulatory instruments

The findings indicated that the general public has little awareness regarding policies and regulations and a limited understanding of how regulations impacts their cooking practices. Similarly, other cooking sector actors across key technology and fuel value chains—including technology producers, marketers, and retailers were found to lack comprehensive knowledge on the policies and regulations relevant to the cooking subsector.

The findings indicated a lack of engagement or apathy towards cooking sector regulations. Stakeholders interviewed attributed the current state of affairs to lack of knowledge about these regulations, leading to a general disregard for their importance. Secondly, the informal nature of the cooking sector contributes to limited attention given to policy-related issues, resulting in non-compliance and the infiltration of unqualified individuals. Stakeholders also noted that the absence of organized public communication platforms hinders effective awareness of the problems related to current cooking solutions, which require regulatory intervention.

In addition, regulations are also viewed as punitive rather than beneficial leading to a negative mindset that hampers acceptance and compliance. For instance, resistance was amplified by poorly-informed biogas system artisans who were against progressive biogas sector regulations developed by a BioNET-led committee. The situation was reported to worsen when local leaders with limited technical know-how such as Members of County Assembly (MCAs) are unable to legislate effectively in favour of the widely-used cooking solutions and can lead to misalignment between national legislation and county policies.

4.2 Challenges in Data Quality and Management

Activity data plays a crucial role in the development of effective regulations for cooking solutions. It serves as the foundation for evidence-based decision-making, offering valuable insights into market dynamics, compliance assessment, issue identification, impact evaluation, and stakeholder engagement. By leveraging activity data can create tailored regulations that address the evolving needs of the cooking solutions sector and ensuring effective enforcement.

Within the cooking sub sector, stakeholders have identified various challenges concerning data. One such challenge is the lack of comprehensive and evidence-based data on sector activities, making it challenging to pinpoint specific issues that require regulatory intervention or incentives. For instance, data on the hard-to-cost parameters such as Indoor Air Pollution (IAP), productivity, fiscal incentives, and environmental damage are needed. Acquiring such data would facilitate the development of

measurable policy targets that can be monitored over time. Furthermore, there is limited availability of data regarding the current state of the clean cookstoves and fuels market in Kenya, including information on product availability, pricing, and distribution channels.

Currently, existing subsector data is fragmented among different stakeholders and institutions, focusing only on a few critical parameters. Despite an increase in studies conducted over the past decade, a comprehensive cooking sector Strategy that guides regular assessments based on predetermined data needs is lacking. Consequently, research efforts by development partners and sector players have been duplicated. While the 2019 Cooking Sector Study[26] marked a positive starting point, more coordinated efforts are required to address the data challenges in the sector.

4.3 Weak Enforcement Capacity

Strong enforcement capacity serves as a powerful deterrent against non-compliance for various reasons. When stakeholders perceive regulators as capable and willing to enforce regulations, they are more likely to comply voluntarily. This fosters a culture of compliance, where stakeholders recognize the significance of adhering to regulations and proactively strive to meet the required standards. One concern raised by stakeholders relates to the influx of imported cooking devices into the market without proper inspection for quality standards compliance, particularly in the case of e-cookers and other similar products. Stakeholders identified several reasons that could have contributed to the current situation:

a.) Widespread corruption, leading to goods being cleared without meeting necessary requirements.
b.) The absence of local standards, forcing inspections to rely on manufacturers' guidelines that may lack legitimacy.
c.) Limited capacity of organizations like KEBS (Kenya Bureau of Standards) to test a wide array of parameters. For example, KEBS labs can only assess the safety of EPCs (Electric Pressure Cookers) but not their performance. This is in regards to pressurization and not electrical safety.
d.) Low public awareness regarding the different qualities of cooking devices and what to consider before making a purchase. Consumers often prioritize pricing and aesthetics over other important factors.
e.) The absence of reliable verification mechanisms in standards testing, hampers the accuracy and reliability of cookstove evaluations. Inconsistent or unreliable performance assessments can hinder the effectiveness of standards implementation.
f.) Limited controls on market entry for new technologies and financing innovations, leading to actions that distort the market.

4.4 Stakeholder coordination framework

[26()] For further information on the Kenya Household Cooking Sector Study, see: https://eedadvisory.com/wp-content/uploads/2020/09/MoE-2019-Kenya-Cooking-Sector-Study-compressed.pdf

A robust and inclusive stakeholder coordination framework is critical for organizing members, identifying regulatory needs, and ensuring compliance with regulations in the cooking solutions sector. The sector involves numerous actors, including national and county governments, CSOs and NGOs, academia, think tanks, independent consultancy firms, private sector associations, and lobby groups. These stakeholders possess vital knowledge and represent significant constituencies. By pooling their knowledge, skills, and infrastructure, the cooking sector can be driven towards sustainable growth. However, stakeholders have identified obstacles that hinder effective coordination and prevent the leveraging of these attributes. Challenges in stakeholder coordination:

a.) Fragmented stakeholder groups: The cooking space lacks cohesive associations, and existing lobby groups like BioNET, Energy Dealers Association, CCAK, etc., rarely communicate with each other. Most of these lobby groups are based in Nairobi, with no regional chapters. Individually, some of these associations are weak, having few members who irregularly pay annual subscription fees – an indicator of lack of commitment.
b.) Limited priority and investment by MOEP: The Ministry of Energy and Petroleum (MOEP) has not allocated sufficient attention and resources to the cooking sub-sectors that serve over 70% of the population. The lack of prioritization has not spurred interest from lobby groups to invest in programs targeting these sub-sectors. To achieve the government's policy goal of universal access to clean cooking by 2028, it is essential to address this disparity and ensure equitable investment.

4.5 Unclear process for deriving Regulatory Instruments

Establishing clear and comprehensible processes for developing regulatory instruments that are understood by all stakeholders is essential to ensure transparency, accountability, stakeholder participation, legal compliance, efficiency, predictability, and stability in the regulatory landscape. Such processes promote effective regulation that addresses societal needs, safeguards public interests, and supports sustainable development. However, stakeholders have identified several challenges that hinder the realization of such an enabling process:

a.) **Top-down approach**: Although EPRA has clear guidelines for the development of regulations and regulatory instruments, many stakeholders interviewed were unaware of them. Additionally, EPRA has often followed a top-down approach, neglecting early engagement with stakeholders. Instead, EPRA tends to develop regulations internally and shares drafts for input and review by other actors in later stages of the process.
b.) **Lack of clarity on data needs and stakeholder roles**: Stakeholders lack clarity on the types of data and information required for a smooth regulation-making process. They are also unsure about their specific roles and entry points in the process.
c.) **Insufficient process documentation**: The development of regulations is not adequately documented and or publicly available limiting opportunities for learning and improvement.

4.6 Lack of Stakeholder Consensus on Cooking Sector Readiness for Regulation

Stakeholders were asked for their individual opinions on whether the cooking sector was prepared for increased regulations to accelerate its growth. The responses provided a wide range of viewpoints, with many participants offering multiple and conflicting perspectives. As a result, it was not feasible

to quantitatively assess the different opinions. To make sense of the responses and align them with the investigation's objectives, a thematic analysis approach was employed.

Through this qualitative analysis, a predominant theme emerged, which suggested the gradual adoption of regulations and targeted regulation for specific segments that were deemed ready for such measures. The stakeholders proposed implementing regulations within subsectors of the cooking solutions value chain, focusing on key actors who fulfilled the majority of the required criteria. This targeted approach enables a more focused implementation while addressing potential challenges.

To begin, the stakeholders emphasized the importance of regularly collecting data and evidence that quantifies the key "triggers" (Appendix 1) at the relevant phases of the different technologies and fuels within the value chains. These stakeholders suggested potential triggers and areas where regulatory intervention could be applied across the value chains for various cooking solutions. These can be found in Appendix 8.

5.0 Policy Recommendations

Based on the findings of the study, it is evident that a gradual adoption of regulations in specific segments of the cooking sector is necessary. Additionally, the study recognizes the importance of prioritizing less stringent regulatory instruments (such as self-regulation mechanisms, guidelines, advisories, etc.) and resorting to mandatory regulations only when all other options have been exhausted. With these considerations in mind, the assessment recommends a tiered classification of the recommendations. Tier 1 Recommendations are the most urgent and of short-term nature, while Tier 2 are short-to-longer term.

5.1 Tier 1 Recommendations

Recommendation 1: Assess impact of progressive regulations and identify gaps for strengthening

Analysis of the regulatory framework in the cooking solutions sector in Kenya highlights the crucial need for a robust regulatory framework to drive growth. Implementation of several regulations yielded positive impacts and should be enforced further, while any systemic barriers to their successful implementation are removed.

a.) **Undertake Impact Assessment of Forest (Charcoal) Rules 2012**— There is a need to conduct an impact assessment of the regulations to determine why they have not achieved the expected results to the desired extent. The findings will inform possible amendments to the regulations. The gains made so far will be enhanced by instituting actions to remove enforcement challenges experienced in the past. Successful enforcement will also go a long way in fast-tracking the achievement of the Kenya Kwanza administration's policy goal of 30% national forest cover by 2032. Special attention should be on leveraging the role of Charcoal Producers Associations (CPAs) as well as Community Forest Associations (CFA) with an aim to strengthening them. Given the long-standing presence of the charcoal industry, there is an urgent need for review and update of the charcoal regulation to address the existing and emerging challenges across the entire value chain. This comprehensive approach will ensure that all stakeholders are held accountable and actively contribute to sustainable practices. Specifically, guidelines should be issued to promote the sustainable use of charcoal, emphasizing efficient burning techniques, proper kiln design, and responsible consumption habits. By implementing rigorous enforcement measures and providing clear guidelines for sustainable charcoal use, Kenya can mitigate the environmental impact of the charcoal sector while simultaneously addressing the energy needs of its population.

b.) **Assess the RIA Report on Draft Energy (Improved Biomass Cookstoves) Regulation 2015**— An RIA was done on the draft regulations and it was on the basis of these findings that they were not gazetted. It is hence imperative that the findings of the RIA be examined against the current scenario in order to derive guidance whether sections of it could be salvaged into new regulations or simply develop guidelines to guide the subsector. To salvage the many positive provisions in this draft which if adopted and enforced, could bring a lot of gains to value chain entrepreneurs such as sound business practices. For example, the proposed requirement for the private sector

to report on, *inter alia*, what they do, their licensing, and the prescription on who is required under the regulation to use improved biomass stoves. EPRA can convene stakeholders afresh and point out all processes as well as technical gaps and lay out a clear roadmap for resubmitting the revised draft regulation for consideration.

Recommendation 2: Strengthen the Enforcement Capacities of EPRA and KEBS

Several steps can be taken to strengthen the capacity of institutions like EPRA (Energy and Petroleum Regulatory Authority) and KEBS (Kenya Bureau of Standards) charged with regulating the cooking sector. Starting off with raising the profile of clean cooking concept, its significance in the development space and the role regulations can play in the sector's growth can be a key first step. Other steps are:

a.) **Adequate Resources Allocation**: There is a need to ensure that both these institutions are provided with **sufficient financial resources, skilled personnel, and modern equipment** to effectively carry out their regulatory and market surveillance functions. Currently KEBS can only carry out limited testing owing to lack of modern technology. There is limited technology available to test a variety of parameters e.g. KEBS lab only tests safety of EPCs and not performance. This includes budgetary provisions for training programs, infrastructure development, and recruitment of qualified staff.

b.) **Training and Capacity Building**: Existing Government training frameworks should be optimized to enhance the technical capacity of EPRA, KIRDI and KEBS staff through specialized training programs on clean cooking technologies, regulations, and enforcement. Training should also focus on market monitoring, data collection, and analysis to ensure effective oversight and evaluation of the clean cooking sector.

c.) **Collaboration between organizations** like the Kenya Bureau of Standards (KEBS), Kenya Industrial Research and Development Institute (KIRDI), Dedan Kimathi University of Technology (DKUT) and other public or private institutions such as the University of Nairobi (UoN) and Strathmore University which can enable more extensive evaluations of cookstove performance, covering factors such as efficiency, emissions, and safety. These institutions possess diverse technical capabilities which could jointly go a long way in sealing reported gaps in testing quality and performance among others.

d.) **Enhancing county-level visibility**—The presence of EPRA at the County Level needs to be enhanced—and a good entry point is through awareness raising and training of EPRA county focal points. EPRA can begin by carrying out knowledge needs assessment for the County contacts and local value chain players in prominent cooking solution subsectors. EPRA can collaborate with COG and specific county governments.

Recommendation 3: Ban kerosene for domestic use

The government should implement total ban on kerosene for cooking and lighting while promoting incentives and regulations that favour the adoption of alternatives for cooking and renewable energy (solar systems) for lighting. The justifying reasons for a total ban on the use of kerosene include severe health risks associated with inhaling kerosene fumes and price distortions caused by the adulteration

of diesel with kerosene. Exposure to kerosene fumes by a typical urban household exceeds the allowed WHO exposure limit (25µg/m^3) leading to significant health hazards and fatalities. Indonesia used a Presidential Decree (Executive Order) to effect a ban on kerosene for domestic usage through the Kerosene-to-LPG programme in 2007 (Pertamina & World LP Gas Association, 2012). This calls for reliability in the supply of alternatives, and incentives to make them affordable for low-income households. In the Indonesian case, the government subsidized LPG, and formulated programs to enable the poor rural households attain the transition. In Peru the government came up with Emergency Decrees that aimed at helping poor rural households in transitioning to clean cooking solutions such as LPG. This study strongly believes that this is possible and can be done in Kenya through targeted subsidies. The Government has initially imposed VAT of up to 16% on kerosene through financial bills. As a viable and smooth transition pathway for urban kerosene users in Kenya, bioethanol is strongly recommended, in addition to LPG.

The transition process should be gradual, accompanied by appropriate mechanisms to support households facing challenges during the transition. A comprehensive monitoring and evaluation framework should be established to ensure effective implementation. Based on the data available concerning the number of deaths due to Indoor Air Pollution (IAP) and associated socio-economic consequences, this study recommends the implementation of Emergency Decrees to help fast-track the transition, especially among vulnerable groups and marginalized communities, inclusive of rural areas. Peru has successfully employed this approach to ensure no one is left behind in the transition (Ramirez *et al.,* 2022). The justified health benefits from the Indonesian Kerosene-to-LPG program included mortality rates, which were cut by half, from 109,846 in 1990 to 60,835 in 2016, accounting for 8% and 4% of total deaths respectively (Thoday *et al.,* 2018). Transition is feasible owing to the wide range of accessible alternative fuels and technologies available.

Recommendation 4: Regulate fuelwood supply and use in communal institutions and cooking SMEs
To promote sustainable and environmentally conscious practices in the clean cooking sector, Kenya should develop regulations for fuelwood sourcing and supply. This will help address threats to government forests such as clearing by squatters for settlement, logging, and fuelwood and charcoal production. Drawing from successful approaches employed in other developing countries, the following recommendations are proposed:

a.) **Regulate commercial vendors**: Kenya should establish regulations governing fuelwood vendors including certification of designated forest areas for commercial fuelwood harvesting. Licensing vendors supplying fuelwood to communal institutions and small to medium-sized enterprises (SMEs) in the hospitality sector is crucial. This process should involve comprehensive assessments of vendors' adherence to sustainability criteria and compliance with environmental regulations. By licensing vendors, Kenya can ensure that only responsible and qualified suppliers participate in the fuelwood trade, thereby promoting sustainable sourcing practices and mitigating the negative environmental impact associated with unregulated harvesting. This approach will enhance transparency, accountability, and the overall sustainability of the fuelwood sector in Kenya.

b.) **Sustainable Fuelwood Sourcing**: Clear criteria for sustainable forests should be established including guidelines for responsible fuelwood sourcing such as sustainable harvesting

techniques, reforestation practices, and the protection of biodiversity. By setting these standards, Kenya can ensure that fuelwood suppliers prioritize sustainable practices that minimize the environmental impact of their operations. For example, Costa Rica has made significant progress in sustainable fuelwood harvesting practices as part of its commitment to environmental conservation. The country has implemented reforestation programs, agroforestry initiatives, and regulations to promote sustainable forest management. Costa Rica's efforts have helped mitigate deforestation, promote biodiversity, and support sustainable fuelwood sourcing[27]. (For more recommendation options on sustainable fuelwood practices, see footnote 45). This boosts the Policy Goal on forest conservation.

Recommendation 5: Regulate institutional and SME-targeted cookstoves production

To ensure quality and promote sustainability in the clean cooking sector, it is essential to implement regulations targeting both institutional and commercial producers of improved cookstoves. These regulations should focus on compliance with quality standards and labeling requirements. Informal producers should also be encouraged to comply with existing standards. The Kenya Bureau of Standards (KEBS) plays a critical role in enforcing these standards to ensure the production of high-quality cookstoves. Furthermore, it is imperative to establish regulations that specifically target consumers associated with communal institutions and formal productive energy users in the hospitality industry. These regulations would involve labeling cookstoves and maintaining records of fuel usage. The objective is to stimulate sustainability initiatives upstream in the value chain. By raising consumer awareness and encouraging responsible energy consumption practices, these regulations can create a ripple effect that drives sustainability efforts throughout the entire supply chain. To achieve this, communal institutions and small to medium-sized enterprises (SMEs) should be required through GOK guidelines, and incentivized to purchase standardized improved cookstoves. In addition, provide guidelines for data collection on fuel consumption and monitoring exposure to indoor air pollution (IAP) emissions should be provided as part of the compliance requirements. These measures will not only ensure the adoption of cleaner and more efficient cooking technologies but also enable the monitoring of their environmental impact.

Recommendation 6: Regulate Carbon Financing Schemes in the Cooking Sector

The Government of Kenya (GOK) should prioritize the development of regulations for carbon credit market valuation while safeguarding the interests of smallholder farmers from exploitation. However, concerns have been raised regarding lopsided contracts signed between communities, county governments, and brokers in Kajiado County, leading the Governor to cancel such contracts in May 2023. In a positive development, the Kenya Forest Service (KFS) entered into an agreement with global audit firm BDO in 2022, enabling the government agency to earn significant revenue by offsetting

[27()] For more information, see: https://www.climatelinks.org/sites/default/files/asset/document/2022-01/Promoting%20Sustainable%20Woodfuel%20Systems%20Cleared.pdf

carbon dioxide. Under the agreement, KFS will receive $15 (Sh1868) for every tone of carbon dioxide removed from the atmosphere through government forests (Kahongeh, 2023)

To promote the clean cooking sector in Kenya, it is strongly recommended that the government establishes regulations for innovative financing schemes, specifically those involving carbon credits. This will ensure fair and equitable benefit sharing across the value chains, preventing distortions in local markets. Kenya can learn from India's experience and create a robust regulatory framework that safeguards against market distortions and ensures the equitable distribution of benefits throughout the clean cooking value chains.[28] By implementing transparent and accountable mechanisms for carbon credit financing, Kenya can attract investments, facilitate access to affordable clean cooking solutions, and make significant progress towards its sustainable development goals. It is also crucial for Kenya to establish effective monitoring and evaluation systems to track the impact and effectiveness of these innovative finance mechanisms, fostering continuous improvement and optimizing resource allocation in the clean cooking sector.

The Rural Electrification and Renewable Energy Corporation (REREC), established under Section 43 of the Energy Act (2019), plays a pivotal role in harnessing opportunities presented by clean development mechanisms and carbon credit trading. Section 75 of the Act further empowers the Cabinet Secretary to collaborate with relevant stakeholders in leveraging carbon trading opportunities. To address these matters, REREC should organize an Innovation Platform, in line with the Bioenergy Strategy 2020-2027, focused on carbon finance for clean cooking. This platform should deliberate on the subject and recommend a viable regulatory framework, inviting the participation of organizations such as the Climate Change Directorate (CCD), KEFRI, and EPRA.

Recommendation 7: Develop regulations and consumer labelling for e-cooking devices

This study recommends regulations in the e-cooking realm, particularly for Electric Pressure Cookers (EPCs) and Induction Cookers. These imported devices require stringent performance and safety regulations to safeguard consumers against substandard products flooding the market. An extension of EPRA's star rating for energy-efficiency currently applied on fridges to e-Cooking appliances, starting with EPCs and induction stoves, would be an important step forward. Presently, the responsibility lies with the Kenya Bureau of Standards (KEBS) to assess the standards of electric cooking devices upon entry at the port. However, the enforcement of these standards remains incomplete. There is the need to expand the scope of existing testing facilities for EPCs, currently available at Strathmore and Kijani (currently only used for voluntary certification programmes linked to results based financing-the Global LEAP+RBF). Mandatory regulations are crucial to ensure that EPCs adhere to the required performance and safety benchmarks, mitigating the risks of accidents, electric shocks, and potential fire hazards. This exemplifies the necessity of regulations as a means of upholding standards.

Alongside the emphasis on performance and safety, it is imperative to implement regulations concerning the proper disposal and management of electronic waste (e-waste) generated by electric cooking devices, including EPCs and Induction Cookers. As we advocate for increased adoption of

[28()] For further information, see: https://unfccc.int/sites/default/files/resource/India_LTLEDS.pdf

electric cooking equipment, it becomes paramount to address the potential environmental impact caused by device malfunctioning or improper disposal at the end of their lifespan. Recognizing that EPCs, microwave cookers, and similar electric equipment are non-biodegradable, regulations pertaining to e-waste management are essential for sustainable practices.

Recommendation 8: Undertaking Regular identification, prioritization and adoption of progressive regulatory instruments

Conducting regular mapping exercises to identify opportunities for regulatory intervention is highly recommended. To facilitate this process, the proposed Technical Working Group (TWG) on Data Management should take the lead. The objective is to map opportunities and identifying gaps, ensuring that regulatory triggers are promptly identified for timely and effective action. Appendix 8, derived from the study, highlights potential opportunities for developing regulatory instruments that target common fuels and technologies used in Kenya. The TWG-led mapping exercise will play a crucial role in informing regulatory decision-making and advancing sustainable practices in the sector.

Recommendation 9: Zero-rate locally-produced bioethanol for cooking to stimulate local production, while considering a short grace period of five years or less for tax-free importation of bioethanol, subject to review and recommendations on performance, to further enhance local production and adoption.

This study recommends the implementation of regulations that promote increased access to bioethanol as well as its accelerated local production as a cooking fuel in Kenya. Firstly, an amendment to the Finance Act should be pursued to zero-rate ethanol, making it more affordable and facilitating wider adoption among households. Similar to the removal of VAT on LPG, this would involve eliminating all taxes on bioethanol, making it a cost-effective option for clean cooking.

Furthermore, the government should provide a reasonable grace period for the tax-free importation of bioethanol, subject to review and recommendations based on performance. This will stimulate uptake and create a critical mass of households using bioethanol, building on the early successes triggered by private investors. Currently, the country cannot meet the demand from local production. During this period, the effectiveness of the tax-free importation policy is continuously monitored and evaluated, allowing for adjustments based on performance assessments. For instance, regular reviews can be conducted to assess the impact of the policy on local bioethanol production and adoption rates. Recommendations can then be made based on the findings of these reviews to optimize the policy and ensure its alignment with the objectives of promoting local production and adoption of bioethanol as a cooking fuel in Kenya.

This policy will give investors sufficient time to invest in local bioethanol production through a mix of large-scale and decentralized (Cooperative model) farming of energy crops and setting up of bioethanol distilleries. By encouraging local production, Kenya can reduce reliance on imports hence reducing the outflow of hard currency, foster local economic and social development by creating jobs and livelihood opportunities for the masses, and ensure a sustainable supply of bioethanol for clean cooking which could later be expanded to the blending of petroleum. Brazil's successful

implementation of policies and incentives for local production and use of sugarcane-based ethanol as a renewable fuel source, particularly in the transportation and cooking sectors, serves as an exemplary model (Rossi *et al.,* 2021).

To accomplish this, collaboration with other relevant ministries, such as the Ministry of Agriculture, Livestock, and Fisheries, is essential in creating an enabling environment for feedstock production, such as sugarcane (which has faced challenges in recent times within the Kenyan sugarcane industry). The *National Bamboo Policy of 2019* highlights the intention to develop a vibrant Bamboo industry, increasing the area grown with Bamboo and enabling commercialization and value-addition. Some private investors are setting up cassava production schemes with small-scale farmers to supply feedstock for bioethanol production ventures. Cassava has the advantage of possessing high amount of starch deposit in comparison to other crop residues such as rice straws, wheat, and sugarcane bagasse (Mustafa *et al.,* 2019).

Additionally, incentives should be explored to support local manufacturing of bioethanol stoves/burners to reduce costs. Presently, bioethanol burners are imported from India and China. This study recommends that the Ministry of Energy and Petroleum (MoEP) task the Innovation Platform (IP) on Bioethanol for Cooking, established under the Bioenergy Strategy 2020-2027 action plan, to expand its mandate by developing advisory recommendations for the MoEP on an appropriate regulatory framework that incorporates all the aforementioned elements.

Recommendation 10: Raise Stakeholder Awareness of the role of regulation, benefits and entry points

By promoting a comprehensive understanding of regulations, the entire value chain can work together to create a safer, more sustainable, and socially responsible cooking environment. Raising stakeholder awareness requires a multi-faceted approach that combines education, advocacy, and collaborative efforts. Any initiative must also aim to protect consumers from deceptive marketing practices, ensure transparency, and promote informed decision-making. By segmenting and engaging with key stakeholders, demonstrating the benefits, and advocating for supportive regulations, you can effectively promote clean cooking solutions in Kenya. The following approaches, many of which are emphasized in the Energy Compact, are proposed:

a.) ***County/Community leaders*** should showcase the advantages of clean cooking by sharing case studies and success stories. They can highlight the improvements in respiratory health and reduced mortality rates, as well as the financial savings and preservation of forest resources achieved annually when households switch to improved cookstoves (ICS). Furthermore, they can emphasize how regulations can enhance the overall well-being of the community. These grassroots leaders can effectively raise awareness about the benefits of clean cooking during their regular barazas, funerals, and other local gatherings. Non-governmental organizations (NGOs) can play a pivotal role in spearheading these efforts in collaboration with the County Government. County governments are currently grappling with the development of CEPs with so far only four Countries having a CEP in place. About 10 more are in the process of developing their CEPs with support from development partners such as SETA programme. It is important that their regulatory needs and challenges are captured in these documents,

which under the INEP framework, will inform the national-level needs. Efforts to support all counties develop their CEPs are imperative.

b.) ***Value Chain actors*** involved in the cooking technologies and fuels industry should organize meetings, workshops, and conferences to engage industry groups operating at different stages of the value chain. These platforms should discuss the benefits of clean cooking, the role of regulations, and the specific responsibilities of each value chain actor. Such discussions will help importers of cooking devices understand the safety, quality, and performance standards they should prioritize. Similarly, local producers can gain insights into achieving safety, quality, and performance standards within acceptable production margins. Sales and marketing professionals can also improve their packaging and communication strategies to influence consumers towards adopting clean cooking solutions. EPRA should document the processes involved in regulation development, using recent cases as examples, and make this information accessible to stakeholders in various formats. The Clean Cooking Association of Kenya (CCAK) and the Energy and Petroleum Regulatory Authority (EPRA) can lead these initiatives.

c.) To reach **the general public**, it is beneficial to form partnerships with celebrities and social media influencers to amplify the clean cooking message online. Sharing case studies and success stories that highlight the positive impacts, such as improved respiratory health, lives saved, financial savings, and forest conservation, can effectively communicate the benefits of cleaner cooking solutions. Additionally, the Ministry of Energy and Petroleum (MoEP) can secure airtime during prime hours on national TV to further promote clean cooking. Previous examples, such as the successful initiatives during the COVID-19 pandemic, demonstrate the government's ability to achieve this. The proposed Clean Cooking Directorate or Secretariat can incorporate these strategies into its program to maximize outreach and engagement.

d.) ***Senior policymakers*** should engage in policy advocacy to raise the profile of clean cooking benefits among key Ministries, Departments, and Agencies (MDAs). Case studies and success stories can be used to demonstrate the economic, social, and environmental benefits of clean cooking. By showcasing these tangible outcomes, policymakers can expedite decision-making and secure budget allocations for cooking-related activities and departments of the government. The Inter-Ministerial Committee (IMC) and the Kenya School of Government (KSG) present potential platforms to facilitate these advocacy efforts.

5.2 Tier 2 Recommendations

Recommendation 1: Establish a Technical Working Group on Data Management

The establishment of a Technical Working Group (TWG) on Data Management can play a crucial role in mobilizing diverse activity data related to clean cooking solutions towards 2028 policy target. This data is vital for informed decision-making within the proposed Clean Cooking Directorate/Secretariat. An existing precedent can be found in the Ministry of Health (MOH), which hosts the TWG on Evidence to Policy for Climate Change and Health to inform its ongoing development of the MOH Climate

Change Strategy. Similarly, the TWG for Data Management for clean cooking can convene key institutions such as JKUAT, KIRDI, KEFRI, REREC, and Strathmore, which possess or generate critical activity data. By incentivizing and leveraging their available capacities, these institutions can regularly mobilize data to support decision-making.

EPRA (Energy and Petroleum Regulatory Authority) can provide guidance to the TWG regarding the scope of data requirements and quality standards. To ensure comprehensive assessments of various parameters related to cooking technologies and fuels in the dynamic cooking market, the TWG can adopt a proven approach like the value chain/six-triggers framework suggested by stakeholders (see Appendix 7). This framework will assist TWG members in conducting regular evaluations to measure and analyze a wide range of parameters. This comprehensive data collection will enable the identification of potential opportunities for regulatory interventions. By utilizing this data-driven approach, the Directorate/Secretariat can make informed decisions and develop other effective strategies to promote clean cooking solutions.

By 2028, the Directorate/Secretariat will have established (i) a centralized data repository as a platform for collecting, storing, and sharing comprehensive sector activity data for knowledge management. This repository should encompass sub-sector data, needs assessment studies, and other relevant information. Successful knowledge management platforms can serve as models for its development. Secondly, it will have established a data governance framework led by the MoEP, encompassing procedures for data sharing, consolidation, ethics, and storage. An evaluation of the 2028 achievements can recommend absorption of the TWG as a MoEP unit or vote to hand it over to a strengthened CCAK. To ensure sustainability of efforts MoEP should prioritize funding for regular TWG meetings and data-driven research by allocating dedicated funds to projects focused on filling data gaps in the clean cooking sector encouraging innovative approaches to data collection and analysis suggested earlier.

Recommendation 2: Strengthen the Institutional framework for cooking sector stakeholder collaboration and delivery of clean cooking policy

A strong and sustainable regulatory framework survives on the flow of knowledge anchored on the collaboration of strong individual constituent institutions.

a.) **Strengthen the Inter-Ministerial Committee (IMC) on Clean Cooking**: The IMC, jointly convened by CCAK and MOEP, is an informal entity that brings together various MDAs involved in the cooking agenda. It addresses the challenge of MDAs not speaking with one voice. Stakeholders recommend allowing the IMC to remain informal for now, fostering organic growth and sustaining interest among the involved MDAs and other stakeholders. Strengthening the IMC would include measures such as further financial support to help facilitate more regular convenings, put in place a structure that allows deeper participation of other MDAs (e.g. rotational leadership in convening IMCs, with support from CCAK), improving programmes/agenda for meetings though an active and inclusive sub-committee, working with Council of Governors (CoG) to promote formation of devolved versions of IMC, and tracking progress to enhance accountability and learning.

b.) **Incentivize industry associations and community groups**: Both national and county governments should incentivize the formation, engagement, and operation of sub-sector associations and community groups operating both at the national and county level. These groups should operate

under existing regulatory frameworks to encourage innovation without stifling it. Promoting local-level stakeholder engagement will enable the capture of context-specific knowledge necessary to influence policy and regulations. Charcoal Producers Associations (CPAs) and Community Forest Associations (CFAs) should be strengthened and can provide effective guidance on sustainable forest management options. Lessons from NGOs' active involvement in this space in the 1980s-90s should also be considered.

c.) **Strengthen CCAK capacity**: Most stakeholders prefer the Clean Cooking Association of Kenya (CCAK) to play a leadership role due to its all-inclusive design and establishment, as well as its connection to MOEP through its co-convening of the IMC. However, stakeholders emphasized the need to strengthen the CCAK by redefining its value proposition and revitalizing its resource mobilization strategy to expand its reach. This will facilitate the support needed for awareness raising among its members, the general public, and smaller interest groups regarding relevant regulations.

d.) **Strengthen the coordination framework for sector stakeholders:** The coordinating framework to be enhanced by strengthening and connecting clusters representing different stakeholder groupings. The Cluster leads would be members of the CCAK technical committee. Figure 1 attempts to depict such a framework. By drawing insights from the interviews conducted, the majority of the respondents believe that CCAK is the best-placed institution to bring together all stakeholders and coordinate supportive activities towards achieving the sector's clean cooking aspirations. They similarly acknowledge the commendable work of the CCAK Secretariat despite resource constraints and hence the call for efforts to strengthen the organization. Ideas for exploration by CCAK include rethinking its value proposition to its membership and actively mobilizing private and public resources to support programs. In addition to co-hosting the IMC, the other key milestone in CCAK's wake is the Annual Clean Cooking Week which provides a platform for *inter alia* stakeholder consultative sessions, learning, sharing of research evidence, sector planning, training, and awareness sessions.

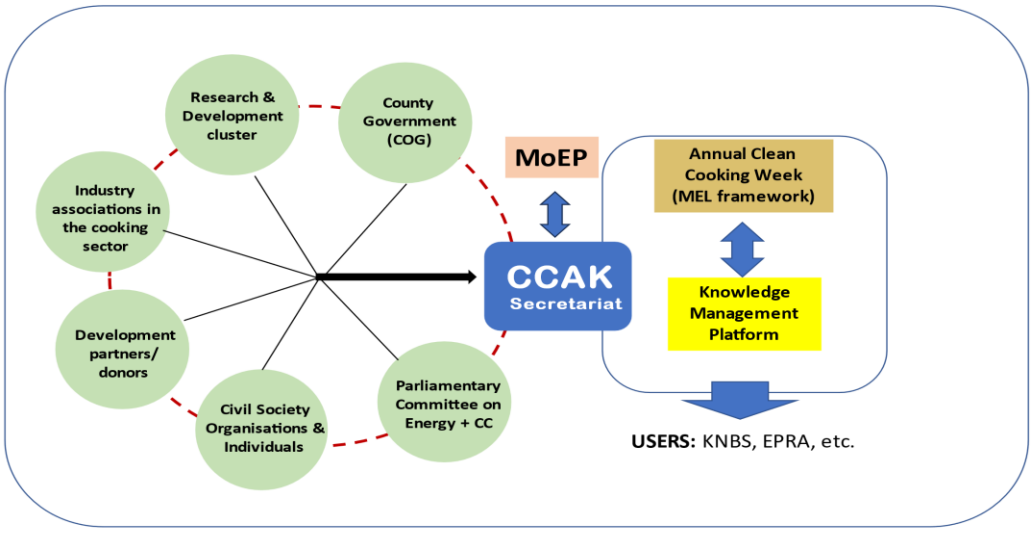

Figure 1. Stakeholders' coordination framework

The research and development cluster (consisting of universities, think tanks, etc.) for instance would convene annually on the margins of the clean cooking week to explore opportunities/data gaps across value chains of all major cooking solutions. The emerging research agenda would then be available for all stakeholders to identify appropriate components to run with. In some cases, strategic tasks would be assigned to some institutions and graduate students given scholarships. A good example to be emulated is where the Mabati Rolling Mills Ltd (MRM) recently funded a doctorate student at UoN to study corrosion properties and thresholds on its range of roofing materials when they interact with seawater at the Kenyan coast (Ondiere, 2023). The company is now applying these findings in packaging specific roofing materials for coastal residents—a factor that has implications for material and energy input during manufacturing, hence price.

e.) **Establishment of Clean Cooking Directorate/Secretariat:** Access to clean cooking solutions by all by 2028 is a key policy goal of the GOK and a strong enough trigger for regulation toward achieving the universal goal. After 2028, the purpose of the project Directorate/Secretariat would be reviewed based on the evaluation report. Cooking being a cross-cutting function and cutting across diverse MDAs, the already established IMC could be restructured and endorsed as the Directorate's governance/advisory organ. Fortunately, a wide range of opportunities exists on which the recommendation could leverage. First is the Inter-Ministerial Committee on Clean Cooking (IMC) which brings together key MDAs with interests and functions that touch on clean cooking. Those interviewed believed this body could provide an overarching policy advisory role to the stakeholder coordination framework. Then there is the Innovation Platform (IP) model anchoring the Bioenergy Strategy 2020-2027, and already being rolled out in the bioethanol and biogas subsector with MoEP oversight.

The Directorate/Secretariat would inter alia (a.) establish and coordinate clean cooking innovation platforms that bring together diverse various stakeholders, including government agencies, industry representatives, civil society organizations, and local communities in scaling up adoption of various cooking solutions (b.) Coordinate monitoring, evaluation and learning and adapting the strategy annually and finally (c.) facilitate enabling environments including capacity building, mobilizing finance and TA, political will, and county/national government interaction. Adequate institutional capacity and resources should be in place to carry out inspections, enforcement actions, and continuous monitoring of the cooking solutions sector.

6.0 Conclusion

This report signifies the successful completion of the consultancy assessment, which was undertaken with three main objectives: first, to review the existing regulatory framework for cooking technologies and fuels in order to identify gaps and assess their impacts on the sector; second, to provide recommendations based on the findings; and third, to propose a roadmap for the implementation of these recommendations.

The assessment revealed the necessity of gradually adopting regulations in specific segments of the cooking sector to promote green growth. It strongly advocated prioritizing less stringent regulatory measures, such as self-regulation mechanisms, guidelines, and advisories, before considering formal regulations. Additionally, the study identified opportunities where both regulations and less stringent instruments could be fast-tracked to facilitate cleaner cooking practices, presenting a range of policy recommendations for consideration.

By justifying the need for new regulations and allaying concerns about potential negative consequences on the sector's growth and development, the study lays a solid foundation for addressing uncertainty within the regulatory environment, paving the way for green growth in the cooking sector.

Finally, given that the MoEP is currently in the process of developing the Kenya National Clean Cooking Strategy (KNCCS) with the support of GIZ and other partners, the study strongly advises integrating its relevant policy recommendations into the Strategy. By following the proposed roadmap and implementing the provided recommendations, Kenya can chart a clear path towards green growth in the cooking sector while effectively resolving the existing uncertainties in its policy and regulatory landscape.

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Appendices

Appendix 1: Triggers for developing regulations (Consultant's compilation)

Trigger	Description
Safety concerns	If there are safety concerns associated with the use of a particular type of clean cookstove or fuel, it may be necessary to develop regulations or standards to ensure that only safe and reliable products are available in the market. For example, some fuels may be more hazardous or emit more harmful pollutants than others. Depending on the level of risk, it may be necessary to develop regulations or standards that mandate the use of specific fuels or cooking devices, or guidelines that recommend best practices for their use.
Health concerns	In some cases, the use of certain types of cookstoves or fuels can lead to health problems such as respiratory illnesses. In such cases, regulations or standards may be necessary to ensure that only products that meet certain health standards are available in the market. If there are health concerns associated with the use of certain types of cookstoves or fuels, such as the risk of respiratory illness or other health problems, regulations or standards may be necessary to ensure that only products that meet certain health standards are available in the market.
Environmental concerns	Regulations or standards may be necessary to ensure that only products that meet certain environmental standards are available in the market. If there are environmental concerns associated with the use of certain types of cookstoves or fuels, such as high levels of emissions or deforestation, regulations or standards may be necessary to ensure that only products that meet certain environmental standards are available in the market.
Market development	Regulations or standards can create a level playing field for manufacturers and suppliers and build consumer confidence in clean cooking products. This can help to stimulate the development of a robust and sustainable market for clean cooking products. The maturity of the clean cooking market in Kenya may influence the need for regulations or standards. If the market is relatively new and lacks established quality and safety standards (such as the e-cooking sector), it may be necessary to develop regulations or standards to create a level playing field for manufacturers and to build consumer confidence in clean cooking products.
Quality control	Quality standards or regulations can be used to ensure that clean cooking products meet certain minimum quality requirements, such as durability, efficiency, and performance. This can help to improve the overall quality of clean cooking products and enhance their effectiveness in reducing household air pollution and improving health outcomes in Kenya. If there are inconsistencies in the quality or safety of fuels and cooking devices in the market, it may be necessary to develop regulations or standards that ensure consistency in their manufacture and distribution. Guidelines may also be developed to provide guidance on best practices for their use.
Policy goals	The specific goals of Kenya's Universal Clean Cooking by 2028 policy may also influence the need for regulations, standards, guidelines, or rules. If the policy goals require a significant shift in the types of fuels or cooking devices used, it may be necessary to develop regulations or standards that mandate their use. Guidelines or rules may be more appropriate for policies that seek to encourage the use of cleaner fuels or more efficient cooking devices.

Appendix 2: Stakeholder consultative workshop Program

(Friday, 14 April 2023, Nairobi)

Time	Activity	Facilitator
8.30-9.00	**Welcoming Remarks** ● **Peter Thobora,** Assistant Director, Renewable Energy; Ministry of Energy and Petroleum ● **Fredrick Amariati**, GCF/EnDev Project; GIZ ● The Role of Regulations in Cooking Sector Development **Evans Kituyi**, Consultant	Mariam Karanja
9.00-10.30	**Panel Session** **Theme**: Is the cooking sector yearning for new regulations to drive further growth? **Panelists:** ● **Philomena Mitalo**, CCAK ● **Njuguna**, S & L Consultant ● **Peter Thobora**, DRE-MoEP ● **Fenwicks Musonye** EPRA	Daniel Wanjohi
10.30-11.00	**Tea/Coffee Break**	
11.00-13.00	Breakout Groups World Café **Assessing the need for regulations for growing the clean cooking sector.** **Station 1**: Status of the regulation-making processes **Station 2**: Household cooking solutions **Station 3**: Institutional cooking solutions **Station 4**: Productive energy use solutions	Evans Kituyi
13.00-14.00	**Lunch Break**	
14.00-16:00	**Group feedback** ● 4 rapporteurs present their feedback ● Discussants ● Next steps	Patricia Mbogo
16: 00	**Vote of Thanks**	

Appendix 3: List of Participants for the Stakeholder Consultative Workshop

Friday, 14 April, Pride Inn Azure Hotel, Nairobi

	Name	Organization	Email
1	Francis Maingi	ISAK	francismaingi.87@gmail.com
2	Esther Githinji	KEREA	mukamigeather@gmail.com
3	Beryl Onjala	MECS	beryl@genoseastafrica.org
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22	Hope Njoroge	Strathmore University	hnjoroge@strathmore.edu
23	Peter Thobora	MoEP	thor.pef@gmail.com
24	Joy Mugambi	GIZ	joy.mugambi@giz.de
25	Philomena Mitalo	CCAK	pmitalo@ccak.or.ke
26	Prof Erastus Gatebe	KIRDI	erastusgatebe@gmail.com
TOTAL	26		
MALE	9		
FEMALE	17		

Appendix 4: List of Key Informant Interviews (KIIs)

	Name	Organization	Email
1	Joseph Njunguna	S & L Expert	
2	Timothy Mwangi	Practical Action	tim.mwangi@practicalaction.or.ke
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5	Peter Thairu	KEPSA	pthairu@kepsa.or.ke
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9	Grace Gitiha	UBPA	GraceGitiha@gmail.com
10	John Kapolon	REREC	john.kapolon@rerec.co.ke
11	Simon Kiragu	CCAK	skiragu@ccak.or.ke
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19	Paul Mbuthi	MoEP	pmbuthi@gmail.com
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21	Edna Odhiambo	Climate Lawyer	ednaclimate@gmail.com
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23	Dr. Faith Odongo	MoEP	faithodongo4@gmail.com
24	David Jesse	BIONET	nbfkenya@gmail.com
25	Murefu Barasa	EED ADVISORY	mbarasa@eedadvisory.com
26	Ian Njuguna	COG	Iannjuguna.energy@cog.go.ke
TOTAL: 26			
MALE: 18			
FEMALE: 8			

Appendix 5: List of Field FGD participants

NYANZA	WESTERN	CENTRAL	LOWER EASTERN
Male Participants			
Pascal Otieno	Kevin Owino Odongo	Peter Muchoki	Kiangi Emmanuel
James Ongalo	Raphael S. Mukabana	Irungu Herman	Sila Nthakyu
Barnabas Teti	Omar M Juma	Laban Maina	Kioko Januaris
Joseph Ochere	Joab M Nanjira	Henry Macharia	Muusya Bernard
Alfred Nyagwa	Othieno B Wakhu	Michael Gatere Mwangi	Muoka Mwau
Chales Oloo	Nicholas M Washibako	Stephen Kariuki	Munywoki Benson
Expery Nyonye	Minjiro L Musa	Aston Kariuki Kamunya	Kitheka James
Hezborn Oduor	Kassim Okonyo	Charles Irungu Mburu	Josephat K Kivuva
Dennis Ogada	Suleiman Shikolio	Suleiman M Ndegwa	Njuguna J Kimani
	Kevin Simiyu	Kinyanjui Mathenge	Kiilu Benard Ngumbi
			Kinyili Muli
Female Participants			
Josephine Lilian Akinyi	Grace Lukoye	Lucy Nyambura Mburu	Mutunga Sarah
Hellen Awino Onyango	Mwanaima Kulundu	Florence Nyambura W	Matolo Dorcas
Bibiana Mugele Sapheth	Roselyne Ndombera	Jane Muthoni Maina	Darocas Kivuva
Pheny Odoyo	Lilian Okota	Grace Wangari Mwangi	Sabina Kioko
Pamela A Otieno	Benta Awino	Rose Wanjiru Kimani	Kaunge Susan
Jane Odeyo	Christine Obwamu	Margaret W Gatiriri	Nguyo Sabina
Beatrice A Oketch	Carolyne Nyongesa	Florence Wambui Ngure	Iala Elizabeth
Lilian Adhiambo Okello	Joyce Wanzala	Hellen Waithira Gatimu	Katua Scola
Florence Atieno Omiro	Mwanamima Chitechi	Grace Kinyanjui	Mwinzi Rolyn Rose
	Caroline Vihenda	Esther Wangui Gitau	Nzukuna Agnes
	Hellen Wawire	Naomi Njeri Ngotho	Mutambu Florence
	Zakina Maria	Rachel Muchoya	Kambua Luciah
		Charity Njeri	Hellen Wambui
TOTAL: 18 MALE: 9 FEMALE: 9	TOTAL: 22 MALE: 10 FEMALE: 12	TOTAL: 23 MALE: 10 FEMALE: 13	TOTAL: 24 MALE: 11 FEMALE: 13

NB. Full contacts available for each of the participants

Appendix 6: List of Participants for the Breakfast Meeting FGD

THE HERON HOTEL, NAIROBI, 12 MAY 2023

Biogas				
	Name	Organization	Email	Phone
1	David Jesse	BIONET	nbfkenya@gmail.com	0721579308
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4	Lydia Owenga	BIONET		
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Briquettes and Pellets				
7	Martha Waraga			0741110348
8	John Mwaniki			0706069727
Bioethanol				
9	Byron Mudhune	MAFARIQUE	mafafrique@gmail.com	0724605382
Others				
10	Peter Thobora	MoEP	thov.pet@gmail.com	0712239518
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12	Fredrick Amariati	GIZ	fredrick.amariati@giz.de	0720141274
13	Philomena Mitalo	CCAK	pmitalo@ccak.or.ke	0739704883
TOTAL	13			
MALE	8			
FEMALE	5			

Appendix 7: Potential opportunities for regulatory intervention using different instruments

Key Triggers	Procurement	Production	Sales & Marketing	Use & Disposal
1. Safety risks	Imported solutions such as EPCs that enter the market without being checked at the point of entry pose safety risks to end users. Lack of testing capacity. No regulations or guidelines for new technologies such as bio-LPG to ensure safety. Need to publish existing guidelines or regulations.	Factory safety guidelines are supposed to be applied but they are not due to informal nature of the enterprises - the solution here is education/awareness Informal producers are the most vulnerable because they mainly use their bare hands and legs.	Poor storage, and faulty or counterfeit solutions such as bioethanol canisters, or burners can be dangerous to suppliers and consumers (explosions).	There are no regulations on use and disposal of cooking devices—mainly electrical components of EPCs and ceramic liners from ICS at the end of their useful lives. Although EMCA provisions exist that stipulate how disposal is to be done, enforcement remains the problem. Low-quality LPG burners are not safe for end users. This calls for the enforcement of regulations/guidelines guiding LPG accessories
2. Health risks	Regulations or guidelines lacking e.g., for ICS raw materials (e.g., how to safely extract clay for liners).	Briquette standards exist (governing raw materials). The health of producers can be negatively impacted. Enforcement required. Health risks for ICS producers as artisans work unprotected from myriad of occupational hazards associated with material handling.		Guidelines are required on exposure to toxic fumes from cooking fuels e.g., firewood, charcoal, and kerosene.
3. Environmental risks	There are no environmental regulations on the sourcing of materials. Materials such as clay and vermiculite for bricks and ICS liners can have negative impacts on the environment. Guidelines on sustainable farm and tree management	Existing regulations need to be devolved and enforced to ensure sustainable production of charcoal (sustainable charcoal), bioethanol, biogas.	Need for guidelines or regulations on the quality of firewood for supply to markets and institutional consumers to curb indiscriminate cutting down of trees.	Enforcement of EMCA provisions is needed for safe disposal of retired cookers. Guidelines on efficient use of cooking solutions to cut on GHG emissions.

	e.g. pruning for domestic firewood production .			
4. Market maturity and Economics	Regulations that protect producers from exploitation by importers and other agents. This was cited mainly in the briquettes sub-sector Consumers need protection from imported solutions such as EPCs that are not checked by KEBS at the port of entry usher in counterfeit or low-quality technologies to the market		Consumer protection laws are required. Need to enforce existing regulations to ensure strict adherence by suppliers, installers, contractors, and LPG refillers Incentives on appliances and special tariffs on electricity bills are needed. This should mainly target EPCs and induction cookers. Consider VAT exemptions on clean cooking stoves for enhanced uptake.	
5. Quality concerns	Regulations and standards need to be developed and/or enforced in order to procure high-quality cookers or materials for stove making. Need for locally-developed standards on the efficiency of EPCs and induction cookers to ensure quality. Enforcement at point of entry is necessary.	*VAT exemptions on components of local fabrication of biogas systems (components that conform to accepted standards).* KEBS standards are available for briquettes. There is need to review quality standards to ensure production of high-quality briquettes.	Regulations required to curb the sale of counterfeit accessories such as EPCs. Enforcement of standards for LPG, bioethanol burners. Installers and builders need to be aware of the existing standards on ICS enforcement of the standards is necessary)	Creation of awareness on existing Standard & Labelling including efficiency labels for EPCs, etc. so that end users are made aware and are able to avoid low-quality solutions such as EPCs and induction cookers.

	Regulations are needed on accessories for LPG, biogas, bioethanol, and their burners to curb the importation of counterfeit goods. Improved biomass cookstoves need for Voluntary Standard & Labelling (VSL) (for both charcoal and firewood).			
6. Policy goals (e.g. Clean Cooking by 2028; 30% forest cover by 2032, etc.)	Material procurement and sourcing for cooking solution production should uphold sustainability criteria.	The state has policies in place to increase forest cover. Regulations need to be enforced to curb indiscriminate cutting of trees for charcoal production (sustainable tree harvesting for charcoal production) Harmonization of charcoal rules-national and county in order to achieve policy goals	Regulation e.g. Levy on firewood from controlled sources for institutional suppliers that the government can use for tree planting. Promote VSL for institutional and commercial ICS. Align goals on electrification (e.g. universal access by 2028 & renewable electricity production (100% by 2030) with those on clean cooking.	Need guidelines on the sustainable use of charcoal to reduce demand which subsequently reduces forest cover Promote massive public education in favour of ICS backed by data on health, economic benefits. Ban on the use of kerosene (the way Indonesia banned the use of kerosene through a presidential decree). Public policy e.g. KNCCS needs to prioritize e-Cooking, LCPDP needs to model cooking demand. NCCAP-3 needs to connect clean cooking actions with the decarbonization of the electricity sector

Appendix 8: Recommended regulatory instruments

Sub-sector	Regulation	Standards	Guidelines	Others advisories
LPG	• Sufficient **enforcement** of existing regulations.	• Standards are available (e.g. for LPG, cylinders, and valves): e.g. the Kenyan Standard as defined in the Petroleum (LPG) Regulations, 2019 • Enforce and update existing standards to meet industry standards • Scale up innovations such as the "Meter for Dispensing LPG" from cylinder (developed by KEBS and PayGo Energy)-standard: KNWA 2885:2019	• Enforce existing guidelines on safe use and handling of LPG	• Competition laws need to be developed and enforced for consumer protection • VAT exemptions needed to enhance adoption by low-income households especially in rural areas
E-cooking	• Develop sector regulations for disposal of retired cookers • Develop regulations to protect consumers from counterfeit and poor quality e-cooking solutions.	• Update existing standards to meet industry developments (need for locally developed standards), enhanced testing capacity, and enforcement at port of entry for imported products.	• Develop guidelines aimed at enhancing consumer awareness on safe handling and efficient use of EPCs and Induction Cookers. These can be backed up by guidelines in the manufacturers' manuals.	• Incentives (VAT & import duty exemptions) on energy-efficient e-Cooking appliances, in particular EPCs and Induction Cookers, and special tariffs on electricity bills are needed. • Awareness creation on existing S&L including efficiency labels.
Biogas	• Regulations for biogas accessories and installation of biogas systems	• Develop and enforce up-to-date standards to govern the quality of raw	• Develop guidelines for the safe and	• VAT exemptions on components of local fabrication of biogas systems

		materials for the construction of biogas systems	sustainable use of biogas	(components that conform to existing standards)
Bioethanol	• Regulations for newer technologies to ensure safety (include regulations for associated accessories such as burners)	• Develop standards for bioethanol, and ensure conformity	• Guidelines on the safe use of technologies to enhance safety	• Impose a moratorium on the importation of bioethanol to enhance local production.
Biomass: **Charcoal** **Firewood** **Briquettes & Pellets**	• Regulations on the sustainable sourcing of raw materials for stove production, such as clay • Devolve and enforce Charcoal Rules; strengthen CPAs • Regulations on the type of trees to be used for charcoal/firewood production • Sector regulations for disposal of retired cookstoves. • Regulations that protect producers from exploitation by suppliers of raw materials for briquettes • Regulations to enforce existing standards on cookstove production	• Update and enforce the current charcoal and carbonized briquette standards • Develop firewood and charcoal standards, such as those that determine moisture content in firewood (wet firewood produces a lot of smoke).	• Safety guidelines for ICS production by the informal sector • Guidelines on the safe extraction of raw materials for ICS production. • Guidelines required on exposure to toxic fumes from fuels such as charcoal • Guidelines on the quality of firewood for supply to markets and institutional consumers. • Guidelines for efficient use of cookstoves • VSL for institutional and commercial ICS.	• VAT exemptions on imported stoves and imported raw materials for stove construction • Presidential Decree (Executive Order) to ban the use of kerosene and traditional 3-stone open fireplaces to encourage adoption of clean cooking • Levy on firewood from controlled sources for institutional suppliers that the government can use for tree planting.

	● Update and adopt the Draft Regulations for Improved Biomass Cookstove Regulations (2015)		● Guidelines on the sustainable use of charcoal ● Guidelines on sustainable farm and tree management e.g. pruning for domestic firewood production	