

ENACT

Enabling African Cities for Transformative Energy Access

Policy recommendations for clean cooking access in Freetown, Sierra Leone

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This Policy Recommendations for Clean Cooking in Freetown document was developed as part of the Enabling African Cities for Transformative Energy Access (ENACT) project being implemented in Freetown, Sierra Leone and Kampala, Uganda by ICLEI Africa and Energy 4 Impact – Mercy Corps.

The purpose of the policy recommendations is to give an overview of the current clean cooking landscape and challenges in increasing the uptake of clean cooking fuels and technologies in Freetown and Sierra Leone, with a special focus on urban informal settlements like Susan’s Bay. It then delves deeper into proposing policies that can be enacted at the local and national levels to promote the uptake of clean cooking to gain the attendant benefits therein

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Abbreviations

ECOWAS	Economic Community of West African States
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EDSA	Electricity Distribution and Supply Authority
EGTC	Electricity Generation and Transmission Company
EPA-SL	Environment Protection Agency Sierra Leone
EE	Energy efficiency
FCC	Freetown City Council
GoSL	Government of Sierra Leone
GST	Goods and services tax
ICS	Improved cookstoves
LPG	Liquefied petroleum gas
MLG	Multi-level governance
NDC	Nationally determined contributions
NPAA	National Protected Area Authority
NREAP	National Renewable Energy Action Plan
PPP	Public Private Partnerships
RE	Renewable energy
SDG	Sustainable Development Goals

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Cooked food seller in Susan's Bay (Freetown) using an LPG stove (InkeeMedia)

1. Introduction

In sub-Saharan Africa, about 79% of the population (International Energy Agency [IEA], 2024a) relies on inefficient and polluting fuels like charcoal, dung, firewood and crop waste for cooking. While 40% of the population in urban areas in sub-Saharan Africa has access to clean cooking technologies and fuels, only 7% of rural households have access (IEA, 2024a). The trends indicate that three sub-Saharan African countries need a 0-1% annual increase in access rates, 11 countries need a 4-7% annual increase, and 17 countries need annual increases of 8-12% to meet the 2030 Sustainable Development Goals (SDGs). If no action is taken, over one billion people lacking access to clean cooking will reside in sub-Saharan Africa in 2030, with little or no improvement expected by 2050 ([IEA 2024 report](#)). For such a large population, it is important to note that using polluting and inefficient fuels significantly impacts public health and the environment as the continent's population and energy demand grow, further worsening climate change. Unsustainable deforestation for charcoal and firewood production contributes to increasing temperatures, erosion, environmental degradation, landslides, flooding and the like.

At the recent IEA Summit on Clean Cooking in Africa (May 2024), the participants agreed that to gain the benefits for health, productivity, gender equality and reduced emissions, all stakeholders need to focus on ensuring affordable access to cleaner and modern cooking solutions. It was also proposed that the strategies taken by each African country in an attempt to advance clean cooking will depend on its local context. However, one common factor in advancing access across all countries was access to financing. The IEA estimates that \$4 billion of capital investments would be required annually to achieve clean cooking access in Africa (IEA, 2024b).

In Sierra Leone, access to energy – electricity and clean cooking – is currently far from optimal. Only 27% of the population has access to electricity from the grid, while access to clean cooking fuels and technologies is at a much lower level of about 1%, with the majority (99%) relying on traditional biomass fuels like firewood (72%) and charcoal (27%) for cooking (International Trade Association, 2024). However, the government is working with international organisations such as the United Nations Office for Project Services (UNOPS), the United States Agency for International Development (USAID) and Sustainable Energy for All (SEforALL) to address its regular blackouts by deploying standalone solar systems and mini-grids in communities and the healthcare sector. Sierra Leone was amongst the 130 countries and organisations that endorsed the high-level declaration on Making Clean Cooking a Priority at the recent IEA Summit on Clean Cooking in France in May 2024. The declaration clearly demonstrates shared commitments, reaffirming countries' and organisations' actions and cooperation in addressing the lack of clean cooking access. Sierra Leone, in its updated nationally determined contributions (NDCs), has also indicated its commitment by assuring that there would be a similar focus on policies for clean cooking (UNFCCC, 2022).

Freetown, the capital of Sierra Leone, is home to over one million people (Freetown City Council (FCC), 2020). With its high and still increasing population density, the city, like many others, faces significant development challenges in meeting demand for access to electricity, quality housing, infrastructure, and healthcare, amongst others. Less than 5% of its population has access to clean cooking fuels and technologies (like biogas, ethanol, liquified petroleum gas (LPG) or electricity), and relies primarily on

the unsustainable use of biomass for cooking (Clean Cooking Alliance, 2023). If Freetown, like the rest of sub-Saharan Africa, is to attain the goal of "affordable, reliable, sustainable and modern energy for all by 2030", a lot of work needs to be done not just at the national level but in the provinces, districts and wards.

The primary stakeholders at the national level charged with this responsibility are the Ministry of Energy, and the Ministry of Environment and their respective agencies. These include the Ministries of Agriculture, Forestry and Food Security; Health; Finance and Economic Development; Women Affairs; Trade; and Industry, all of which also play significant roles. In this light, one such initiative at the national level, in addition to efforts of the Ministry of Energy to address the accessibility issues effectively, is the establishment of the Presidential Initiative on Climate Change, Renewable Energy and Food Security in July 2023. This initiative aims to ensure the prioritisation of climate resilience across key sectors and promote coordination between ministries, departments and agencies (African Business, 2023). This would significantly improve clean cooking access while addressing climate change, using renewables such as solar-powered electricity, bioethanol and biogas as alternative cooking fuels. At the recently concluded High-level Sierra Leone Investment Roundtable on Renewable Energy and Food Security in Vienna, Austria, in June 2024, up to \$800 million was received in pledges from international banks and development organisations to provide funding to support investment and projects in the renewable energy and agriculture sectors of Sierra Leone.



Freetown, Sierra Leone (Carine Buma)

2. Overview of existing policies

Existing policies for clean cooking vary widely across countries and regions and are at different stages of development based on local economic conditions and priorities. Global initiatives such as the Clean Cooking Alliance and the SEforALL foster public-private partnerships (PPPs), market development, and support advocacy. Regional organisations like the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and the West African Clean Cooking Alliance (WACCA) also set regional standards, encourage PPP and promote advocacy for access to clean cooking fuels and technologies. At the national level, Sierra Leone has also developed a range of policies (as presented in Table 1) and is developing, in partnership with ECREEE, policies and plans to support the use of renewables and bioenergy to address clean cooking challenges. However, for these policies to be relevant and useful in achieving clean cooking targets, there is a need for collaboration between a mix of actors – government, international organisations, private sector and non-governmental organisations (NGOs), academia and civil society.

Table 1: An overview of key policies, strategy and action plans supporting the clean cooking transition in Sierra Leone

Updated NDCs for Sierra Leone (2021)	
Goal	To keep national greenhouse gas (GHG) emissions within an acceptable range
Key points	In the process of achieving the goal and keeping emissions within limits, the energy sector, as stated in the NDCs, can contribute to reduction of emissions via: <ul style="list-style-type: none"> • Switching and promoting renewable energy (solar energy and LPG) • Providing alternative energy sources such as biofuels (from corn, sugarcane, rice husk, etc.) • Promoting briquettes made from grass and other waste materials
Targets and objectives	Developing technical capacity to manufacture energy-efficient cook stoves
Policy: Sierra Leone Clean Cooking Compact, 2019	
Goal	To ensure that every household in the country has access to clean, affordable, reliable and sustainable cooking solutions by 2030
Key points	<ul style="list-style-type: none"> • The Sierra Leone Clean Cooking Compact was established with a vision extending to 2030, aligning with the Sustainable Development Goals (SDGs).

	<ul style="list-style-type: none"> • The initiative was formally launched in 2021, providing a 9-year timeframe for implementation and achievement of its objectives. • It has a specific target of increasing the use of LPG to an adoption rate of 25% as an alternative to wood fuel by 2030. • The Compact also highlights that wood fuel will be consumed efficiently by increasing the efficiency of most biomass stoves to a minimum of 20% (Tier-2 stove efficiency). • The energy efficiency of the production process of charcoal will increase by 40%. • The illegal and uncontrolled logging of trees for biomass (firewood and charcoal) in and around urban areas will be banned. • Organic waste such as municipal and agricultural waste to energy conversion would be a new source for providing domestic cooking energy fuel.
<p>Targets and objectives</p>	<p>Universal access to clean cooking</p> <ul style="list-style-type: none"> • Achieve universal access to clean cooking solutions by 2030. • Ensure that the entire population, including the most vulnerable and hard-to-reach groups, benefits from clean cooking technologies. <p>Health improvement</p> <ul style="list-style-type: none"> • Reduce the health burden associated with household air pollution from traditional cooking methods. • Decrease respiratory and cardiovascular diseases, particularly among women and children who are most affected by indoor air pollution. <p>Environmental sustainability</p> <ul style="list-style-type: none"> • Mitigate deforestation and environmental degradation caused by the unsustainable harvesting of wood for cooking. • Lower GHG emissions and contribute to global climate change mitigation efforts. <p>Economic empowerment</p> <ul style="list-style-type: none"> • Create economic opportunities by fostering a market for clean cooking solutions. • Support local entrepreneurs and businesses involved in the production and distribution of clean cooking technologies. <p>Energy efficiency</p> <ul style="list-style-type: none"> • Promote the use of energy-efficient cooking appliances that reduce fuel consumption and costs. • Encourage the transition from traditional biomass fuels to cleaner alternatives such as LPG, biogas and electric stoves.

Linkages to clean cooking	<ul style="list-style-type: none"> In addition to the target and outcomes listed, the Compact also details actions, impacts and monitoring and evaluation steps and indicators to track progress.
Policy: Bioenergy Policy, 2017	
Goal	GoSL will promote the sustainable supply and production of woodfuel, the production of efficient end-use technologies, an organised market of fuel wood and charcoal, and encourage the use of alternative sources of energy such as biofuels for cooking and heating.
Key Points	<p>The main objectives are to</p> <ul style="list-style-type: none"> promote and ensure sound management as well as expansion of the country's natural forest for sustainable supply of wood fuel, include additional fuels such as biofuels to reduce reliance on wood, develop human and technical capacity for bioenergy equipment production, and promote low-cost technologies for waste-to-energy plants.
Targets and Objectives	<ul style="list-style-type: none"> Substitute national petroleum fuels consumption with biofuel by 10% by 2025, and 20% by 2035. Create public awareness on energy efficiency and conservation practices and health impacts (especially on women) in the use of wood fuel. Increase LPG penetration rate to 20 percent by 2025 through increased production at refineries, providing subsidies for the poor to purchase stoves and improving the LPG distribution network. Encourage sustainable commercial scale production of biofuel feedstock through supporting feedstock production and waivers for feedstock production companies Create incentives for logging off-cuts and wood processing residues, municipal and industrial wastes to be used for energy purposes. Enact legislation and develop feed-in-tariffs for electricity produced from waste.
Linkages to clean cooking	The Bioenergy policy seeks to promote sustainable fuelwood production, the development of low-cost technologies for efficient cookstoves and biofuel production, and generation of energy from waste (useful for producing briquettes or generating electricity).

Policy: Energy Efficiency Policy of Sierra Leone, 2016	
Goal	The Energy Efficiency Policy of Sierra Leone aims to promote sustainable energy use, reduce energy consumption and enhance the overall energy security of the country. The policy focuses on optimising the use of energy resources, reducing GHG emissions and supporting economic growth through efficient energy practices (GoSL, 2016).
Key points	<ul style="list-style-type: none"> • The Government of Sierra Leone (GoSL) will do the following. • Establish legal and regulatory instruments for the energy efficiency sub-sectors. • Introduce compulsory minimum energy efficiency and environmental standards for the sale and use of clean cook stoves and for charcoal production technologies. • Decrease the overall energy demand through efficient energy use in various sectors. • Provide incentives for retailers and importers of energy-efficient products and promote local manufacturing of such products. • Provide incentives for consumer adoption of energy-saving technologies. • Enhance energy security by improving the reliability and resilience of the energy supply in Sierra Leone. • Mitigate environmental impact through lowering GHG emissions and other pollutants by promoting energy efficiency. • Provide financial incentives, such as subsidies, tax breaks and low-interest loans to encourage investments in energy-efficient technologies. • Establish legal and regulatory instruments for the energy efficiency sub-sectors. • Introduce compulsory minimum energy-efficiency and environmental standards for the sale and use of clean cookstoves and for charcoal production technologies.

Targets and objectives	<ul style="list-style-type: none"> • Improve efficiency in key sectors of the economy by promoting energy-efficient technologies and developing energy-efficient infrastructure. • Strengthen institutional frameworks for the implementation of relevant policies. • Engage and create a civil society organisation of at least 50 organisations and individuals advocating on clean cooking options and the danger of current cooking practices. • Promote nation-wide awareness raising through advocacy (jingles/radio/TV/posters/billboards/mobile text messaging/town hall meetings etc.) on the environmental and health effect of deforestation and dirty cooking.
Linkages to clean cooking	<p>The Energy Efficiency Policy highlights specifically the role of efficiency in the clean cooking sector by focusing on improving the efficiency of cookstoves, increasing awareness about efficient stoves and introducing standards to be adopted in charcoal and stove production.</p>
Policy: National Renewable Energy Action Plan (NREAP), 2015	
Goal	<p>The NREAP of Sierra Leone was enacted in 2015. The primary goal of the NREAP is to increase the share of renewable energy in the country's energy mix to promote sustainable development, reduce dependency on fossil fuels and enhance energy security (GoSL, 2015).</p>
Key points	<p>The NREAP highlights a comprehensive and multifaceted approach in transforming Sierra Leone's energy sector towards a more sustainable and resilient future.</p> <ul style="list-style-type: none"> • Aims to have 25% of population using modern fuel alternatives for cooking (e.g., LPG, biogas, solar cookers) by 2030. • Emphasises the country's commitment to integrating renewable energy into its national energy mix and underscores the importance of sustainable development and energy security. • Targets a reduction in GHG emissions by shifting from fossil fuels to renewable energy sources and aligns with global climate change mitigation efforts. • Streamlines regulatory processes to facilitate the development and deployment of renewable energy technologies. • Focuses on building the necessary institutional and human capacity to support renewable energy development. • Outlines mechanisms to mobilise domestic and international funding for renewable energy projects. • Encourages PPPs and innovative financing models.

	<ul style="list-style-type: none"> Ensures that projects are developed sustainably and benefit local communities.
Targets and objectives	<p>Key targets of the NREAP include the below.</p> <ul style="list-style-type: none"> Boost the installed capacity of renewable energy sources such as solar, wind, hydro and biomass significantly. Expand access to electricity, particularly in rural areas, through decentralised renewable energy solutions. Improve energy efficiency across various sectors to reduce overall energy consumption and enhance the sustainability of energy use. Contribute to the reduction of GHG emissions by replacing fossil fuel-based energy with renewable energy. Establish enabling and supportive policy and regulatory environment to encourage investment in renewable energy technologies. Strengthen institutional and human capacity to support the development and implementation of renewable energy projects.
Linkages to clean cooking	Though the policy aims to increase the share of clean cooking fuels by 2030, there remains detailed steps for implementation, monitoring and evaluation, as indicated in the SEforAll compact.

In addition to overarching targets presented in Table 1, Table 2 summarises specific targets for particular fuels, population sizes and the efficiency of technologies and fuels as captured in the existing Sierra Leonean policies.

Table 2: National targets for specific fuels

	Sierra Leone Clean Cooking Compact (2019)	Bioenergy Policy (2017)	NREAP (2015)
LPG	Increase the use of LPG to an adoption rate of 25% as an alternative to wood fuel by 2030	To increase LPG penetration rate to 20% by 2025.	25% of population use modern fuel alternatives for cooking (e.g., LPG, biogas, solar cookers) for cooking by 2030
Improved cookstoves (ICS) and briquettes	Wood fuel will be consumed efficiently by increasing the efficiency of most biomass stoves to a minimum of 20% (Tier-2 stove efficiency). The energy efficiency of the production of charcoal will increase by 40%.	N/A	75% of the population using ICS by 2030
Ethanol	N/A	N/A	25% of population use modern fuel alternatives for cooking

			(e.g., LPG, biogas, solar cookers) for cooking by 2030
Biogas	N/A	To substitute national petroleum fuels consumption with biofuel by 10% by 2025 and 20% by 2035	25% of population use modern fuel alternatives for cooking (e.g., LPG, biogas, solar cookers) for cooking by 2030
Electricity	N/A	N/A	25% of population use modern fuel alternatives for cooking (e.g., LPG, biogas, solar cookers) for cooking by 2030

In order to meet these different targets for cooking fuels over the years, key stakeholders in the clean cooking space have a role to play in promoting the uptake of clean cooking. These include:

- Ministry of Energy and agencies such as the Petroleum Regulatory Agency (PRA)
- Ministry of Environment and its departments and agencies, such as the Environment Protection Agency (EPA-SL) and the National Protected Areas Authority (NPAA)
- Sierra Leone Electricity and Water Regulatory Commission (SLEWRC)
- Ministry of Agriculture, Forestry and Food Security
- Ministry of Social Welfare, Gender and Children Affairs
- Ministry of Local Government and Rural Development
- Ministry of Education, Science and Technology

The above stakeholders were mapped during multi-level governance (MLG) dialogue workshops on clean cooking in Freetown, Sierra Leone. These workshops included participants from various departments and agencies at the national and local government levels (mainly Freetown City Council), the private sector, development partners and community-based organisations. More information about the mandates and roles of the aforementioned stakeholders can be found in the Freetown City Energy Profile, published earlier in 2024 via the ENACT project.



Susan's Bay (Freetown) resident using an LPG stove (InkeeMedia)

3. Challenges and policy recommendations to scale clean cooking access in Freetown and Sierra Leone

Despite the benefits of clean cooking to individuals' and families' health, public health, the climate and the environment, the transition from traditional charcoal and firewood to modern and clean cooking fuels and technologies is not at a pace commensurate with the dire need to make this transition happen and to meet the country's clean cooking targets and the SDG7 goal of universal energy access by 2030. A range of barriers, from economic to political, technological and regulatory, constrain the adoption of clean cooking by households and institutions across Freetown, similar to other sub-Saharan African cities. Some of these barriers and recommendations are discussed in further detail below

3.1 Brief methodology for proposed recommendations

Developing policy recommendations for clean cooking involves a systematic approach to ensure that the solutions are effective, sustainable and widely accepted. Policies for clean cooking are critical as they contribute to improving the health of residents (especially women and children), protecting the environment, fostering economic and social benefits, promoting gender equality and supporting global sustainability goals. Policies can also ensure the widespread adoption and long-term success of clean cooking initiatives by supporting the development of infrastructure needed to improve access to clean cooking fuels and technologies. The steps that guide policy development and implementation are captured in Figure 1 and explained briefly thereafter. The ENACT project has followed the preliminary phases to develop these recommendations for Freetown and Sierra Leone's clean cooking sector.

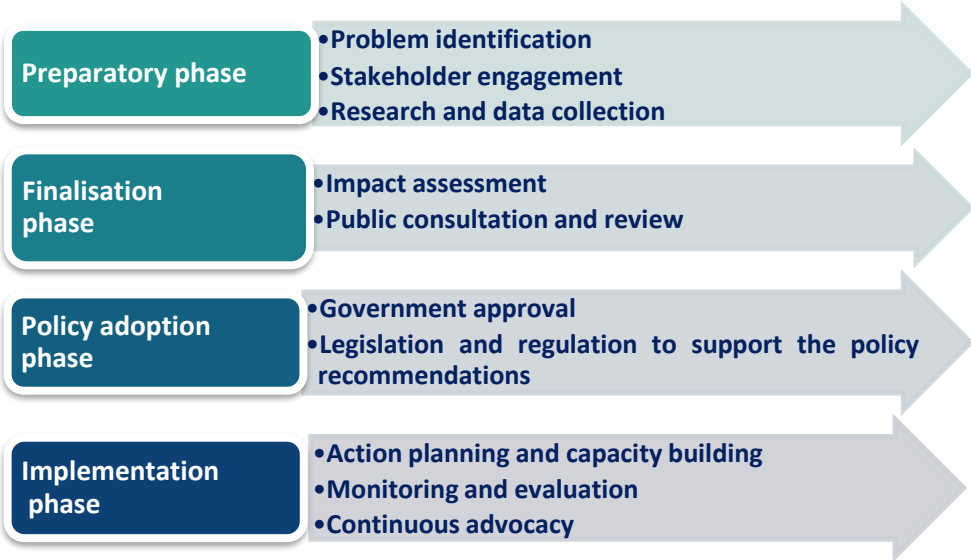


Figure 1: Phases for clean cooking policy development and implementation

In the preparatory phase of developing these policy recommendations for clean cooking, the first step was to understand the current level of access to clean cooking fuels and technologies¹ and the scope and impact of the problem. Then, clear objectives were set. The objectives were aligned with the national and/or regional targets for access to clean cooking for the city.

During the course of executing the ENACT project in Freetown, a series of engagements with stakeholders from the private and public sectors fed into the policy recommendations. These included the two MLG dialogue workshops, a policy dialogue workshop, a capacity-building workshop on "Access to clean cooking", and many project team meetings. The different groups were able to present the key issues and potential solutions from their own perspectives. In addition, a few bilateral meetings with stakeholders from the private sector (see Annexes 1 and 2) and beneficiary communities, such as Susan's Bay community, also enriched the proposed policies. Simultaneously, a review of existing literature, such as national policy documents, research articles and case studies on clean cooking solutions from other cities, was carried out. During this time, the technology options most suitable to the context of Freetown were considered. This involved considering factors such as affordability, cultural acceptability, socio-economic impact and environmental implications in the short and long term. Therefore, this document presents policy recommendations derived from evaluating various options.

The next steps to finalise the policy recommendations involved further stakeholder engagement and public consultation to enrich them. Once completed, government approval and the regulations required to support the implementation of the policies need to be developed. The implementation phase will start with capacity building for key stakeholders involved in program delivery, followed by action planning and active collaboration with potential project partners. Monitoring and evaluation measures should be established as the projects are implemented, along with ongoing awareness and advocacy efforts to ensure sustainability.

A survey conducted during the implementation of the ENACT project in Susan's Bay assessed reasons why users switched to clean cooking. It was found that 73% of respondents switched for health reasons, 71% for safety reasons, and 94% because clean cooking technologies were faster to use. Considering these reasons, addressing the identified barriers requires a multifaceted approach. This section presents barriers identified during the course of the project. It proposes recommendations that can be put in place to enable a transition to the use of modern and clean cooking fuels and technologies. The recommendations are also based on the experiences of the ENACT project thus far and include measures that can address the identified obstacles while identifying the roles of relevant stakeholders in implementing the proposed recommendations. The barriers are addressed from the demand (consumer side) and supplier side.

¹ The status quo was determined during the development of the Freetown City Energy profile and the Feasibility studies on clean cooking conducted in Susan's Bay

3.2.1 Demand side barriers and recommendations

i) **Affordability:** This is a major barrier to the increased uptake of clean cooking technologies across many population groups in Sierra Leone. The initial cost of buying cookstoves (which are largely imported) and of refuelling the stoves could be quite high for the average household. On average, residents of urban informal settlements earn even lower and more irregular incomes than other residents in urban areas of Freetown. They may be unable to afford modern fuels such as electricity, ethanol or biogas in bulk using the usual cash-and-carry business models. For instance, a household that usually buys a small bag of charcoal for 5 SLE to cook a meal may find the upfront cost of 230 SLE to refill a 6 kg LPG cylinder – which lasts one to three months – too high to pay all at once. Thus, innovative measures like Pay-As-You-Go (PAYG) are needed to make the fuels and technologies more affordable to low-income users. Summarised below are some recommendations for addressing this affordability challenge.

Policy recommendation 1	Provide incentives and/or financing options for end-users
<p>Description and justification</p>	<p>Incentives are a good way to encourage more households and institutions to adopt clean cooking technologies and fuels. Affordability is one of the major barriers to clean cooking adoption, and incentives such as subsidies, free distribution of fuels for a limited period or microfinancing (the option of repaying stoves purchased in instalments), can encourage households to adopt these technologies and fuels.</p> <p>Payment options (loans, lay-by schemes, etc.) presented by financial institutions should be tailored to the households considering the lower costs of stoves compared to other assets like land and cars which require much higher capital to purchase.</p> <p>Also worthy of note is that giving away stoves for free is not recommended, except if strict monitoring and enforcement measures are put in place. This is to avoid situations where end-users do not use the stoves, but rather collect them and keep them for reselling later on.</p> <p>This policy recommendation, if adopted, will contribute to increasing the affordability of clean cooking stoves.</p>
<p>Stakeholders involved and the roles they can play</p>	<ul style="list-style-type: none"> • The Ministry of Energy can lead the discussion with other relevant ministries and agencies and the private sector players. • The Ministry of Finance can support government-funded subsidy programmes. • International development organisations, NGOs and civil society can collaborate with the Ministry of Energy and private sector to provide the technical assistance and funding needed to deliver projects promoting affordable clean cooking within the community.

	<ul style="list-style-type: none"> Local and international finance institutions can offer products on lay-by or credit for purchasing stoves in instalments or provide grants to clean cooking companies to enable them to subsidise their products. Research and academia can use data gathered before, during and/or after project implementation to provide evidence to government when proposing relevant policies to be adopted.
Time horizon	Medium term (2024-2028)

ii) Inadequate support from financial institutions: Financial institutions that offer loans or savings products for ownership of clean cooking products are few and far between. Most times, the cost of owning a stove – though high for the households – is still too low to be of interest to many financial institutions. Due to the cost and volumes, many are not eager to offer facilities for purchasing clean cooking equipment compared to other appliances/products. For some of those who do offer such facilities, such as loans, lay-bys, etc., the conditions laid down could also limit the eligibility of a wider pool of interested users. Lastly, the lack of interest-free banking products further discourages potential users who do not engage in interest-based transactions for religious reasons.

The private sector can, however, offer a way out. Afrigas engaged microfinance institutions, such as BRAC and Munafa, to offer loans to potential customers to purchase gas stoves and accessories. They also approached EasySolar to provide in-house microloans for customers willing to purchase cookstoves but cannot make a full upfront payment.

Policy recommendation 2	Creating an enabling environment for financial institutions to offer suitable banking products for clean cooking technologies
Description and justification	<p>Personal asset financing offered by banks are usually for larger assets like homes, cars, and in some cases computers, and typically to richer middle-to-high-income level customers. However, banks and microfinance institutions can develop tailored clean cooking asset financing plans to fit the low-income earners in Freetown and similar cities so that they can purchase clean cooking technologies and pay back over time.</p> <p>BRAC and Munafa are two microfinance institutions working with Afrigas SL to make owning LPG stoves more affordable for users.</p>
Stakeholders involved and the roles they can play	<ul style="list-style-type: none"> Finance institutions can offer clean cooking asset financing, and adjusting the loan requirements to suit the profiles of low-income earners in informal settlements. The Ministry of Energy can collaborate with the private sector and relevant ministries to raise awareness about the financing options and to deliver clean cooking projects across Freetown and other cities. The Freetown City Council (FCC) can support the implementation of projects within Freetown and also offer the necessary support to microfinance institutions (MFIs) to provide the necessary clean cooking financing for low-

	<p>income earners, or even signing simple PPPs with such MFIs for provisions of such services to its citizens.</p> <ul style="list-style-type: none"> • The Public Private Partnership Unit, Office of the President can develop and manage PPP projects in collaboration with relevant ministries and provide guidelines on collaboration and partnerships with MFIs for end-user financing of clean cooking. • The private sector can drive, with support from national and local governments, the uptake of clean cooking through offering innovative financing options. • Community leaders can help MFIs identify trustworthy individuals and savings groups within communities (especially informal settlements) who can be granted end-user financing support by MFIs
Time horizon	Short to medium term (2024-2028)

iii) Low level of awareness on clean cooking fuels and technologies: There is a generally low level of awareness on clean cooking, especially its health and environmental benefits, as well as possible economic and social benefits. Awareness campaigns are needed to change perceptions and behaviours that prevent households and public institutions from using clean cookstoves. These campaigns must focus on enlightening users about how to use modern technologies and how to store these modern fuels and use them efficiently and safely. Within the community, specific groups like landlords, who believe that certain fuels pose a higher fire risk, restrict the clean cooking options available to tenants. Awareness campaigns can be carried out via radio, social media, community ambassadors' sponsorship of community events and door-to-door campaigns. Still, it should be noted that this can be quite expensive. The ENACT project, through its local partners, has found door-to-door campaigns to be quite efficient as potential customers and early adopters of the clean cooking technologies can interact with the marketers and ask relevant questions that have led to the continuous use of these products by early adopters. Likewise, the integration of cooking demonstrations at community and social events in Susan's Bay informal settlements has helped more people better understand the benefits of such clean cooking technologies and fuels and has increased adoption.

Policy recommendation 3	Increase advocacy and awareness raising on clean cooking fuels and technologies
Description and justification	<p>Across many households, there is still a relatively low level of awareness on clean cooking alternatives, their benefits and the impact of continuous consumption of charcoal and firewood.</p> <p>Awareness campaigns on the benefits, safe use and storage of modern cooking fuels can be carried out via mass media (radio, television), on social media platforms or through one-on-one engagements with community ambassadors and members.</p>

	<p>Cooking competitions, roadshows and cooking demonstrations within communities can also raise awareness on clean cooking. During the campaigns, those with challenges – such as hearing-impaired individuals – should be included by using more graphical illustrations to convey the message rather than text only. The awareness campaigns could also be targeted towards groups such as community development associations or landlord associations within the urban informal settlements, to allay their fears of fires from cooking fuels destroying their homes.</p> <p>It is equally important for the message of the awareness raising campaigns to be simple and clear, and in a language the target audience can easily understand.</p> <p>It should be noted, however, that changing established habits and adopting new ones takes some time. This means awareness programmes could run for a long period and may need to be repeated from time to time, until a significant percentage of the population has adopted clean cooking.</p> <p>This recommendation can improve safety, convenience and impacts SDGs 3, 5, 7, 8, 11, 13 and 15.</p>
Stakeholders involved and brief notes on the roles they can play	<ul style="list-style-type: none"> • The FCC can lead and/or support awareness campaigns led by NGOs and civil society at the community level. • The Ministry of Energy can work in collaboration with other stakeholders on awareness raising and public enlightenment. • The Ministry of Information and Civic Education can work on enlightenment of the public. • The Ministry of Environment can work in close collaboration with the Ministry of Energy and other stakeholders. • Telecommunication companies can support awareness programmes. • The National Fire Force could partake in the campaigns to allay fears of residents and enlighten on proper fuel use and storage, as well as emergency response procedures. • The Disaster Management Authority can work with other stakeholders during awareness campaigns. • NGOs and civil society groups and community-based organisations could take active roles in enlightening the communities at the grassroots level.
Time horizon	Short term (2024-2026)

3.2.2 Supply side barriers and policy recommendations:

iv) Unreliability of electricity supply: Electric stoves and electric pressure cookers are some of the most energy-efficient clean cooking options available. However, in communities where the grid supply by the Electricity Distribution and Supply Authority (EDSA) is unreliable, using electric stoves is impractical even though the households may have access to the electric stoves. Thus, the uptake of such technologies is limited in Sierra Leone due to its currently unreliable grid supply and much more limited in informal settlements like Susan’s Bay.

Policy recommendation 4	Leading stakeholders in the electricity sector should prioritise improving availability and reliability of quality electricity supply
Description and justification	<p>The generation, transmission and distribution of electricity involves a range of stakeholders. Though electricity supply is currently centralised in Sierra Leone, the decentralisation of electricity could open up cities and smaller communities to alternative electricity supply such as solar mini and microgrids and rooftop solar photovoltaics (PV) systems. A reliable electricity supply, in addition to offering another clean fuel for cooking, also has a lot of benefits within electrified communities. These benefits include increased productivity, wealth creation, improved health and education, and security, to name a few.</p> <p>The plans laid out in existing strategic plans, such as the Electricity Sector Reform Roadmap (2017-2030) should be implemented urgently to ease access to electricity for clean cooking.</p>
Stakeholders involved and roles they can play	<ul style="list-style-type: none"> • The Ministry of Energy and related authorities such as Electrical Generation and Transmission Company (EGTC) and EDSA can be charged with the responsibility to improving electricity access nationwide. • Local governments, once functions are devolved, can be capacitated to handle local generation and distribution of electricity. • International development banks and organisations can work with the GoSL to support the deployment of electrification projects such as improving existing network infrastructure (for example, the Côte d'Ivoire, Liberia, Sierra Leone and Guinea (CLSG) Electricity Networks Interconnection Project) and setting up off grid solutions.
Time horizon	Medium term (2024-2028)

v) Inadequate enactment and enforcement of environmental regulations: Uninhibited tree felling and the lack of strict enforcement of laws for controlling logging and securing protected zones nationwide can lead to excessive deforestation to meet the growing demand. With the relatively lower prices and high availability of traditional biomass, many residents are less inclined to switch to modern cooking fuels. For instance, the Forestry Amendment Act of 2022 stipulates fines or imprisonment for unlawful felling of trees in protected communities or national forests. The strict enforcement of this will deter the persons responsible from cutting trees illegally, and market forces will determine prices for charcoal and firewood.

Policy recommendation 5	Ensure regulations regarding indiscriminate tree felling are enforced nationwide
Description and justification	Measures against indiscriminate felling of trees could include fines for trees felled, zoning areas (as protected areas and reserves) or programmes targeted at preserving specific species such as mangroves. The enforcement of regulations

	<p>might be challenging due to limited resources or the remote location of protected areas, but it is essential to ensure that the measures are implemented if this should succeed.</p> <p>Another important part of the implementation of this recommendation is to secure community buy-in and equip the community with skills and tools needed to earn an alternative means of livelihood.</p>
Stakeholders involved and roles they can play	<ul style="list-style-type: none"> • The Ministry of Environment, the Environment Protection Agency of Sierra Leone (EPA-SL), and the National Protected Area Authority (NPAA) can ensure enforcement of laws preventing illegal and indiscriminate logging, work with communities, carry out regular patrols and support those in the firewood and charcoal production value chain with skills needed to earn a living from engaging in other businesses. • The Ministry of Energy can lead the discussion with other relevant ministries and agencies and the private sector players, and work with the EGTC and EDSA to enhance the reliability of grid supply and other alternative cooking fuels to reduce demand for charcoal and firewood. • The Ministry of Finance can support government-funded programmes across all sectors. • Community groups of residents living near the creeks and coastal areas support the implementation of restoration projects by government or external stakeholders and report any illegal activities to the relevant authorities. • International development organisations, NGOs and civil society can collaborate with the Ministry of Environment and other relevant ministries and authorities to offer alternative incomes and livelihoods to attract current firewood and charcoal retailers to other businesses. • Research and academia can use data gathered before, during and/or after project implementation to sensitise government on the impact of indiscriminate logging and propose relevant policies to be adopted to discourage deforestation or explore fast-growing species to enhance reforestation.
Time horizon	Medium term (2024-2028)

vi) Limited support for the private sector: Limited access to financing options for the private sector constrains the amount of working capital that companies use in their business activities. Due to the relatively high costs of stoves, companies tend to need to explore grants so that they can offer products to end-users at subsidised prices to encourage more sales. This is, however, unsustainable as the private sector cannot scale its business solely on grants from donors. The private sector needs further support, as outlined below.

Policy recommendation 6	Provide incentives and support for the private sector
Description and justification	<p>As affordability is one of the major barriers to clean cooking adoption, this can be addressed from the supply end as well.</p> <p>Tax breaks, duty waivers, ECOWAS levies, goods and services tax (GST) exemptions, and carbon financing schemes provided to companies can reduce the selling price of clean cookstoves and fuels. The private sector can also benefit from incentives such as grants and subsidies for implementing pilot projects, especially in less-familiar markets such as public institutions, urban informal settlements and camps for displaced persons. The grants can also offer the opportunity of testing new and innovative solutions such as the shared-stove model, shared-canister model or community kitchen models currently being tested by companies like Afrigas in Susan’s Bay informal settlement</p> <p>In addition, new small and midsize enterprises (SMEs) in the clean cooking space can be provided with working capital and low interest loans to increase the supply and availability of clean cooking products in the markets.</p> <p>This policy recommendation, if adopted and effectively implemented, will boost production at scale, thereby reducing the unit cost of production and distribution of clean cooking products, and consequently reduce the selling price to end users.</p>
Stakeholders involved and brief notes on the roles they can play	<ul style="list-style-type: none"> • The Ministry of Energy can lead the discussion with other relevant ministries and agencies and the private sector players. • The Ministry of Finance can allocate funds for government-funded projects or programmes. • The National Revenue Authority can provide tax incentives. • International development organisations, NGOs and civil society can collaborate with the Ministry of Energy and private sector to deliver projects promoting clean cooking within the community and provide technical assistance to companies on how they can leverage different financing options to scale clean cooking. • Local and international finance institutions can offer grants, loans or results-based financing options to clean cooking companies. • Research and academia can use data gathered before, during and/or after project implementation to advise government on relevant policies to be adopted.
Time horizon	Medium term (2024-2028)

vii) Inadequate infrastructure for installation and distribution clean cooking technologies:

The lack of proper infrastructure such as good roads, waste collection services, reliable water, sewage management and a steady reliable supply of organic waste makes the operation and maintenance of biogas plants difficult and potentially unsafe for residents. A related barrier specific to informal settlements like Susan’s Bay, is the lack of adequate space for setting up equipment needed to process feedstock and generate biogas or produce briquettes.

Policy recommendation 7	Improving the infrastructure of distribution networks to improve accessibility in hard-to reach areas such as urban informal settlements, as well as rural areas
Description and justification	<p>Provision of new gas refilling plants or vendor locations, an improved road network to ease the movement of gas canisters or drums of ethanol from storage plants closer to the end-users and better electricity infrastructure will increase accessibility to fuels like LPG, ethanol and electricity.</p> <p>This policy recommendation will improve availability and accessibility of fuels and can support affordability in the long run.</p>
Stakeholders involved and the roles they can play	<ul style="list-style-type: none"> • The Ministry of Energy can lead the discussion with other relevant ministries and agencies and the private sector players and enhance the reliability of grid supply to support e-cooking. • The Ministry of Finance can support infrastructure development and government-funded programmes across all sectors. • The Ministry of Transport and Aviation and the Sierra Leone Roads Authority can improve the road network to facilitate movement of clean cooking products across cities and into hard-to-reach areas. • International development organisations, NGOs and civil society can collaborate with the Ministry of Energy and private sector to deliver projects promoting clean cooking within communities. • Local and international finance institutions and development banks can support infrastructure development. • Research and academia can use data gathered before, during and/or after project implementation to advise government on policies to be adopted or updated.
Time horizon	Medium to long term (2025-2030)

viii) **Low level of engagement with academia and research institutes**

Continuous research and development on a range of topics related to clean cooking, including improving the efficiency of stoves and fuels, will lead to the design of new, creative and innovative technologies that suit end-users' needs. Research institutions and academia within and outside Freetown can do this with support from local and national government and development partners.

Policy recommendation 8	Details
Title	Promote an enabling environment for academia, research institutions and start-up companies to lead research and innovation on new fuels and improving stove efficiencies
Description and justification	Continuous research on developing and improving cooking fuel options such as biogas and briquettes from locally available raw materials, improving fuel and stove efficiencies and developing products to support replacing traditional fuels with modern fuels (for instance gas or electric grills, rather than charcoal-lit grills,

	<p>or closed chambers for roasting peanuts) can increase the range of cooking fuel options available.</p> <p>This would, however, require some resources such as funds for access to recent literature, access to resources for building prototypes, attending local and international conferences and exhibitions, getting standards approved, etc. Being able to have alternative fuels will improve the availability of cooking fuels and can enhance job creation, provide additional income and reduce waste ending in landfills (from materials such as sawdust, wastepaper, farm waste, etc., that can be processed into cooking fuels).</p>
Stakeholders involved and roles they can play	<ul style="list-style-type: none"> • The Ministry of Energy can lead, support and collaborate with other stakeholders. • The Ministry of Environment can support and collaborate with other stakeholders. • The Ministry of Education, Science and Technology can lead research and innovation in close collaboration with academia, research institutions and the industry (private sector). • Private and public research institutions like universities and research consultancy firms can get access to grants or support from national and international organisations to support their research, prototype development and scaling up. • NGOs and civil society groups can champion pilot projects developed by research community through extensive community engagement.
Time horizon	Medium to long term (2025-2030)

ix) Low levels of collaboration between national and local government and the private sector

It is not uncommon for national and local government to work in silos towards achieving the same objective – the energy sector is not an exception. However, increased collaboration between both tiers of government in addressing gaps in energy access will lead to achieving results faster. A notable example is Kenya, where the Energy Act of 2019 has devolved certain energy functions, particularly those related to planning and implementing clean cooking interventions, to local governments. This has significantly contributed to increased clean energy access in the country. In addition, both levels of government can and should work together with the private sector to improve access to clean cooking fuels and technologies.

Policy recommendation 9	Active stakeholder engagement involving the private and public sector to promote public-private partnerships
Description and justification	Given the limited resources available to most government agencies to carry out projects, the role of the private sector is paramount in delivering clean cooking projects to meet the national targets. Private companies are instrumental in resource mobilisation as they, rather than local or national governments, are more

	<p>likely to have access to international funding and grants, results-based financing, carbon financing and the like.</p> <p>Our experience under the ENACT project shows that PPPs are instrumental in building sustainable business models for clean cooking. The public sector is needed to provide the enabling environment and support to the private sector to innovate, test and pilot context-appropriate clean cooking interventions needed to meet targets set by the national governments.</p>
Stakeholders involved and the roles they can play	<ul style="list-style-type: none"> • The Ministry of Energy can collaborate with the PPP unit, relevant ministries, FCC and private sector companies to deliver clean cooking projects across Freetown and other cities. • The FCC can support the implementation of PPP projects within Freetown. • The Public Private Partnership Unit, Office of the President can develop and manage PPP projects in collaboration with relevant ministries. • The private sector can drive, with support from national and local governments, the uptake of clean cooking through resource mobilisation, facilitating last-mile delivery of fuels and stoves, offering innovative delivery and financing options and providing technical support and after-sales services to customers.
Time horizon	Medium to long term (2025-2030)

x) Inadequate monitoring and reporting

Inadequate capacity in the public sector to follow up on deployed clean cooking projects can hinder the sustainability of concluded clean cooking projects. Where local and/or national government staff are not able to do this, the private sector (related to policy recommendation #09) and other development partners could support the public sector with the capacity and resources to efficiently monitor and report on clean cooking projects.



Resident using LPG stove (Green Lens)

Policy recommendation 10	Ensure there is adequate maintenance, monitoring and evaluation (M&E) and reporting post project implementation
Description and Justification	<p>This recommendation proposes actively working with the private sector to follow up on projects delivered by the government or local/international NGOs, such as subsidy programmes or free stove/fuel distribution with regular maintenance (if applicable) and monitoring to ensure sustainability.</p> <p>To do this effectively, the project’s goals, appropriate indicators to use, targets to be met and related timeframes will need to be identified from the beginning. Thereafter, continuous data collection will inform progress of the implementation. Further analysis of the data collected will give an indication as to the progress of the work, identify new barriers and highlight the interventions needed to be promptly made to meet targets set.</p> <p>Regular monitoring and evaluation activities to assess progress and identify new barriers can inform future policy adjustments and ensure clean cooking programmes achieve their intended benefits.</p>
Stakeholders involved and the roles they can play	<ul style="list-style-type: none"> • The FCC has relevant departments or units that can work with the private sector. • NGOs, as project owners, can put in place some M&E terms to be met when the project is deployed within the community
Time horizon	Medium to long term (2025-2030)

3.3 Additional recommendations and enablers

In addition to the ten policy recommendations detailed in the above section, additional barriers and relevant recommendations are presented below.

Recommendations

- **Standards and quality of clean cooking products:** The low quality and poor standardisation of some locally manufactured ICS affect durability and could eventually reduce consumer confidence in clean cooking products over time. There is currently no stove testing facility in Sierra Leone, and certification of locally produced stoves must be done in neighbouring West African countries. There are currently no minimum energy performance standards (MEPS) for cookstoves in Sierra Leone, but this could be developed at a regional level (ECOWAS) and adopted by Sierra Leone.
- **Cross-border movement of assets into neighbouring countries:** Gas canisters are sometimes smuggled out of the country into neighbouring countries, especially Guinea and Liberia. As gas canisters are the most expensive asset in the LPG value chain, this distorts the market as local companies have to repeatedly buy more canisters to sustain their business models or transfer the extra cost directly or indirectly to end-users. Also, smuggling canisters out of the country means less revenue for the companies as the different companies out of the country will benefit from the refills without investing in the canisters. The tightening of the borders and more cooperation between customs and the Ministry of Energy will help reduce the smuggling rate.

- **Inter-ministerial collaboration on clean cooking:** Government ministries and their respective agencies often implement policies that can either promote or hinder clean cooking adoption. For example, while imposing taxes on the importation of clean cooking products and fuels may generate revenue, it also increases landing costs for these goods, resulting in higher prices for end-users. This, in turn, can reduce the uptake of clean cooking solutions. Synergy and collaboration among ministries are crucial to finding a balanced approach that benefits all parties while supporting the country in achieving its SDGs.
- **Consistent policies:** To boost investor confidence in the clean cooking sector, government policies' short- and long-term impacts should be thoroughly considered before being presented and implemented. Global commitments signed at the international level should facilitate the development of required policies at the national and local levels. Strong and implementable policies boost investor confidence and facilitate additional investments flowing into the clean cooking sector to expand the market.

Enablers:

- **A liberalised and vibrant energy sector:** Sierra Leone's broader energy sector is currently undergoing significant restructuring and liberalisation, fostering a competitive environment conducive to investment and innovation. This vibrant energy landscape facilitates the introduction and adoption of clean cooking technologies. Privately owned companies are motivated to develop and market efficient cooking solutions, thus benefiting from a regulatory framework that supports entrepreneurial activities and contributes to the national commitments to improve access to clean cooking technologies and energy.
- **Support from development partners:** The support from development partners assists in creating an enabling environment for adopting clean energy solutions by providing grants, low-interest loans and investment capital to support clean energy projects tailored for low-income households and informal settlements. This support, mostly through financial resources and capacity building, assists local enterprises and local NGOs in scaling up their operations and making clean energy solutions more affordable for residents. The ENACT project (implemented through a partnership between ICLEI Africa and Energy for Impact – Mercy Corps), for example, is advancing market-led energy access solutions for people living and working in urban informal settlements in sub-Saharan Africa and, more specifically, promoting wider adoption of alternatives to traditional sources of energy through awareness raising and capacity support. Similarly, GOAL SL, has been involved in projects focusing on waste-to-energy solutions in Freetown, often including capacity-building components for sustainability. By combining financial resources, technical expertise, policy support and community engagement, development partners are playing a significant role in transforming the energy landscape in Sierra Leone.
- **Political stability and goodwill:** The stability of the political environment and substantial goodwill in Sierra Leone contribute significantly to enabling conditions for the widespread implementation of clean energy interventions. A stable political climate means consistency in policy implementation and long-term planning, which are therefore important for successfully implementing renewable energy projects. The Sierra Leone Government's commitment through policies like the Energy Efficiency Policy and the Clean Cooking Compact, for instance, facilitates ongoing investments and fosters investor confidence, thereby attracting international

development partners and private sector investors who are key actors in providing funding for renewable energy initiatives. Similarly, political goodwill also encourages PPPs and international cooperation, which is vital for advancing clean energy projects. The GoSL's commitment to the SDGs aligns national policies with global standards. It, therefore, attracts international funding and technical support, thus advancing a conducive environment for the growth and sustainability of clean energy initiatives.

- Urban population in Sierra Leone:** The dense population of Freetown, like many urban areas in Africa, facilitates access to modern energy services by creating economies of scale and attracting investment. High population density reduces the per-unit cost of energy infrastructure, making it economically viable for service providers to set up last-mile energy provision infrastructure. The concentrated market demand provides business opportunities for local and international investors, encouraging competitive pricing and innovation in clean energy technologies. Urban areas also benefit from synergies with other infrastructure developments, creating opportunities for integrated projects that include energy solutions. These factors collectively create a conducive environment for enhancing the feasibility, affordability and sustainability of clean energy interventions

A summary of some of the challenges per fuel type and attribute and the proposed recommendations are summarised below. Most of these are coming from engagements with various stakeholder groups at ENACT project workshops and engagements

Fuel/ technology	Attribute	Challenges	Recommended actions to improve uptake
Liquefied petroleum gas (LPG) and related stoves and assets	Affordability	High cost of stoves and refills of gas relative to users' incomes	<ul style="list-style-type: none"> Innovative business and product delivery models such as PAYG, shared canister model (piloted by Afrigas) and microfinance asset loans for clean cooking products to be provided Leverage informal savings groups within community to enable members to obtain loans from microfinance institutions or purchase the products for their members Reduce import duties and tax on stoves
	Availability	Refill canisters and outlets not available within the community, especially informal settlements, compared to the widespread availability of wood and charcoal	<ul style="list-style-type: none"> Set up more vendors within the community Add LPG canisters and related assets to retailers within the communities so that the products are readily available within walking distances in the communities. This is one of the cheapest options of increasing product availability in the communities.

Fuel/ technology	Attribute	Challenges	Recommended actions to improve uptake
			<ul style="list-style-type: none"> Partner with distributors of competing products (mainly wood and charcoal) to add LPG canisters and assets to their product offerings. This also ensures job security for individuals relying on the sale of wood and charcoal as they will gradually transition to the sale of cleaner and more sustainable products.
	Safety	Perceived high risk of fire outbreaks	<ul style="list-style-type: none"> Safety training and awareness campaigns on how to start, switch off and store fuels, and extinguish fires Awareness raising campaigns should be combined with demos on how to address potential incidents that may occur when storing and using LPG. Short videos (similar to what Afrigas has developed – explaining safety procedures for LPG) should be developed and disseminated within the communities.
	Efficiency	Wind causing more gas to be consumed when stoves are used outdoors	<ul style="list-style-type: none"> Set up windshield (metal) to block off wind blowing the stove (similar to what has been piloted by Afrigas in Susan’s Bay.) Encourage consumers to pair the gas stoves with more efficient pots like flat base pots or pressure cookers, which ultimately results in higher efficiencies.
Briquettes	Affordability	Higher cost of briquettes (0.62 USD) compared to charcoal (0.15 USD) ²	<ul style="list-style-type: none"> Package into sizeable affordable quantities. Provision of funding to small companies and start-ups producing briquettes will boost production, enable them to benefit from economies of scale and hence reduce selling price of the products. The provision of tax holidays to briquette producers in Sierra Leone, which is a relatively "new" product, will equally lead to

² These were the costs of 1kg of briquettes and 1kg of charcoal respectively. ILEM Africa (2022)

Fuel/ technology	Attribute	Challenges	Recommended actions to improve uptake
			briquettes selling at a competitive price.
	Availability	Low supply as not many private sector players are into briquette manufacturing	<ul style="list-style-type: none"> Local manufacture of briquettes from readily available local materials and capacity building of residents to learn briquette making Use of retailers of competing products (charcoal and wood) to retail the briquettes within the communities will make it more available when needed by users
	Safety	N/A	<ul style="list-style-type: none"> Improved safety precautions as with using charcoal
	Efficiency	N/A	<ul style="list-style-type: none"> Explore and research on locally-available materials for producing briquettes with higher temperature rise rate than others Government to put in place measures to ensure that briquettes being sold in the market are of high quality
ICS	Affordability	ICS are usually more expensive than the traditional inefficient stoves being used in these communities.	Put in place relevant financing options to make the products more affordable for end-users, as high upfront cost is usually the main challenge affecting the transition to clean cooking technologies.
	Availability	Highly efficient ICS are still not commonly available in the market, when compared with competing traditional inefficient alternatives, and even when available, consumers are not aware of this nor where to obtain them.	The distribution channels of ICS should be improved and consumers made aware, through awareness campaigns, on where they can obtain these.
	Safety	ICS are generally safer to use than traditional stoves. However, certain designs of these stoves present safety risks to users, such as their lightweight construction, sharp edges and hot surfaces.	Stoves should be tested not only for efficiency, durability and emissions; safety should be a key consideration. Safety plays a significant role in consumers' choice of stoves and can prevent serious incidents if proper design and usage measures are implemented.
	Efficiency	Standardisation of ICS and testing facilities not available in-country	<ul style="list-style-type: none"> Develop own or adopt regional (ECOWAS) standards The government can also consider introducing labelling systems to enable consumers to know the

Fuel/ technology	Attribute	Challenges	Recommended actions to improve uptake
			actual efficiencies of different ICS available in the market.
Electricity and associated appliances	Affordability	High electricity tariffs in the country challenges its use for cooking by majority of the population	<ul style="list-style-type: none"> Promote energy efficiency and use energy-efficient cookstoves and electric pressure cookers (to reduce cooking time).
	Availability	<ul style="list-style-type: none"> Irregular and unreliable grid supply, sometimes of poor quality, inhibits the use of electricity for cooking, even by those who can afford it. Electric pressure cookers are one of the most efficient, clean and convenient clean cooking alternatives. However, their usage in Freetown and Sierra Leone is limited due to low availability. 	<ul style="list-style-type: none"> Decentralise power and use more off-grid systems where relevant. The government and the private sector can improve availability of efficient electric cooking appliances, especially electric pressure cookers, by targeted awareness raising campaigns, improving last-mile distribution of such products and reducing import duties on such appliances.
	Safety	Illegal and sub-standard wiring and electricity connections can result in fire incidents.	Training local artisans on proper wiring methods, and use of quality cables, meters, distribution boards, etc.
	Efficiency	Not many challenges relating to efficiency have been registered to date as very few households in the country currently use electricity for cooking.	It is recommended that the government sets standards for electrical appliances used for cooking and also promotes (mainly through awareness raising and tax incentives) the use of electrical pressure cookers in households and institutions as they are more efficient.

3.4 Co-benefits and trade-offs of transitioning

Transitioning to using clean and modern cooking technologies and fuels can bring about numerous cross-cutting benefits relating to health (decrease in respiratory and eye-related illnesses, child mortality and burn incidences), the climate and environment (reduced deforestation and GHG emissions), the economy (job creation, time and costs saved), and development of infrastructure. Implementing the policy recommendations to achieve these benefits will also involve a few trade-offs.

Job displacement: One trade-off of economic importance is the potential loss of income for those engaged in the firewood or charcoal value chain. From the point where labour is required – whether for operating machinery or using manual methods – for tasks like felling trees, cutting them up into logs, processing charcoal and transporting and distributing to retailers, a significant number of

personnel are involved. Therefore, policies that provide alternative or supplementary means of income are crucial.

Risk of incidents due to poor usage: In addition, for modern technologies, which many users may not be familiar with (such as LPG), there could be a risk of fires due to new users being negligent or not taking the necessary precautions when using gas. This can, however, be prevented with constant awareness campaigns and demonstrations or exhibitions.

Environmental risks: The environmental impacts of resource extraction are also another trade-off of using modern stoves, particularly ICS made from clay. Extraction of clay from the riverbed to fabricate ICS could also have significant environmental impacts in the long run if done at a very large scale without adequate plans for restoring the ecosystem.

Potential strain on the electricity grid: Lastly, increasing demand for electricity as more people use electric pressure cookers and electric stoves can lead to additional strain on the existing grid network (IEA, 2023b). To minimise the impact on grid supply and reliability, extensive network and resource planning for communities should be implemented as countries expand their grid infrastructure.

4. Conclusion

The quest for clean cooking and clean energy solutions in Sierra Leone is anchored by some progressive policies and initiatives. Key among them are the Clean Cooking Compact of 2019, the Renewable Energy Policy of 2016 and the Renewable Energy Action Plan of 2015. These frameworks collectively seek to address energy security issues, improve public health and improve environmental sustainability. However, despite these policies, several barriers still hinder the widespread adoption of clean cooking technologies, particularly in informal settlements and among low-income households.

Affordability is one of the major barriers to the increased uptake of clean cooking technologies across all population groups in Sierra Leone. The high initial cost of purchasing cookstoves and refuelling them is prohibitive for many households, particularly in areas where incomes are lower and more irregular. Inadequate support from financial institutions compounds this issue, and very few financial institutions offer loans for clean cooking products. Cultural habits and preferences also pose a challenge, as traditional cooking methods are deeply entrenched in cultural practices, and modern stoves often do not align with communal cooking activities or the types of meals prepared.

There is also a low level of awareness, which necessitates comprehensive awareness campaigns to educate users. Robust enforcement of environmental regulations is also crucial, as weak enforcement of wood logging laws and protected zones worsens the status quo. These are just a few of the many challenges and barriers impeding transitions towards clean cooking and energy in the country.

Several recommendations are proposed to overcome these barriers and enhance the adoption of clean cooking technologies. While there is progress at the policy level on tax incentives, implementing these incentives and subsidies for clean cooking products can make them more affordable and available for end users. Facilitating access to low- or zero-interest loans for both consumers and private sector players involved in the clean cooking value chain is also equally critical. Similarly, comprehensive awareness campaigns that emphasise the benefits of clean cooking fuels and educate users on proper usage and storage are crucial. Additionally, supporting research initiatives through grants to innovate and enhance clean cooking technologies is vital and cannot be overstated.

Several factors can be leveraged to improve access and promote clean energy and clean cooking in Sierra Leone. Increasing synergy and collaboration between relevant ministries can ensure that policies promoting clean cooking do not conflict with other sectoral objectives and strategies. For example, it is essential to balance tax policies to prevent raising the cost of imported clean cooking products. In addition, support from development partners through initiatives like ENACT, and GOAL SL's waste-to-energy projects provides essential financial resources, technical expertise, and policy support to help scale up clean cooking solutions.

Similarly, high population density in urban areas facilitates economies of scale, reducing the per-unit cost of energy infrastructure and attracting investment. These factors, together with other enablers outlined in this report, collectively create a conducive environment for enhancing the affordability and sustainability of clean energy interventions in Freetown and Sierra Leone.

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Annexes

Annex 1 – Policy recommendation questionnaire for the private sector

1. What challenges are you facing as a clean cooking business in Sierra Leone?
2. What government support do you think can help address these challenges and enable you to scale your clean cooking work in Sierra Leone?
3. Are there any innovation financing mechanisms being explored to make clean cooking energy solutions more affordable to marginalised populations?
4. How can partnerships between government agencies, private sector stakeholders and community organisations help overcome logistical challenges in the last-mile delivery of clean cooking products? (What infrastructure is available, what gaps must be addressed, and who needs to do what?)
5. Are there any regulatory reforms needed to foster a more efficient, inclusive and diverse market for clean cooking technologies?
6. Apart from awareness campaigns, what other methods can be employed or policies proposed to ensure the safety of clean cooking products, especially within urban informal settlements?
7. What is your take on the use of subsidies in the country's clean cooking sector?
8. Are there any policies that should be enacted to reduce the cost of clean cooking stoves and fuels and make the products more affordable?
9. What opportunities are available for the local authorities to facilitate and scale up the adoption of various clean cooking solutions, and what policy interventions are urgently needed to facilitate unlocking these opportunities?
10. What policies need to be in place to improve the situation?
11. What continuous coordination mechanism do you see to improve cooperation between the government and the private sector?
12. What other barriers exist for clean cooking energy providers to enter and compete in the market? Any policy recommendations?

Annex 2 – Questions for stakeholders at the panel discussion at the MLG dialogue workshop (May 2024)

A panel discussion around policy recommendations was held at the MLG dialogue workshop at Country Lodge Hotel, Freetown, on May 30, 2024. Ms Carine Buma moderated the session, which included the following panellists whose contributions were included in developing these policy recommendations for Freetown and Sierra Leone.

Panellists:

Ms Nthabiseng Mosia – Chief Commercial Officer, EasySolar (Sierra Leone & Liberia)

Mr Sahid Swaid – General Manager, Afrigas SL

Mr Sallieu Kanu – Consultant-Senior Manager Youth Engagement and Campaigns, Freetown Co-Chair’s Office

Ms Sarah Jeneba Kamara – Chief Executive Officer, Teranga Cookstove

Mr Shebora Kamara – Director of Policy, Research, Planning, Monitoring and Evaluation, Ministry of Energy

	Speakers	Questions
	Moderator	ICLEI Africa
1	Afrigas	<p>The discussion will focus on unpacking some of the challenges you have faced as a business in scaling clean cooking in the country and the policy instruments needed to address some of the challenges. As such, summarised below are the questions that I will be asking each of the speakers from the private sector:</p> <ul style="list-style-type: none"> i. Please introduce yourself and tell us a bit more about your business or the work you are doing in the clean cooking space in Sierra Leone ii. What are some of the challenges that you have faced as a business in the clean cooking space in Sierra Leone, including its informal settlements if you have worked there iii. What are some of the policy instruments that can help you address these challenges? iv. What are some of the ways in which your partnership with government sectors can be strengthened and what support do you need from development partners like ICLEI and E4I to make this happen?
2	Westwind energy	
3	Teranga stoves	
4	EasySolar	
5	Ministry of Energy	<ul style="list-style-type: none"> i. Please introduce yourself and tell us a bit more about the work your institution is doing (directly or indirectly) in the clean cooking space in Sierra Leone ii. What are some of the policy and regulatory approaches being developed/implemented by your institution to a) promote clean cooking access in the country and b) support companies working in this clean cooking space to scale their work and create more impact iii. What challenges do you face as a government authority developing or enforcing some of these policies? iv. What are some of the ways in which your partnership with the private sector can be strengthened and what support do you need from development partners like ICLEI and E4I to make this happen?
6	Freetown City Council	
7	Ministry of Environment and Climate Change	