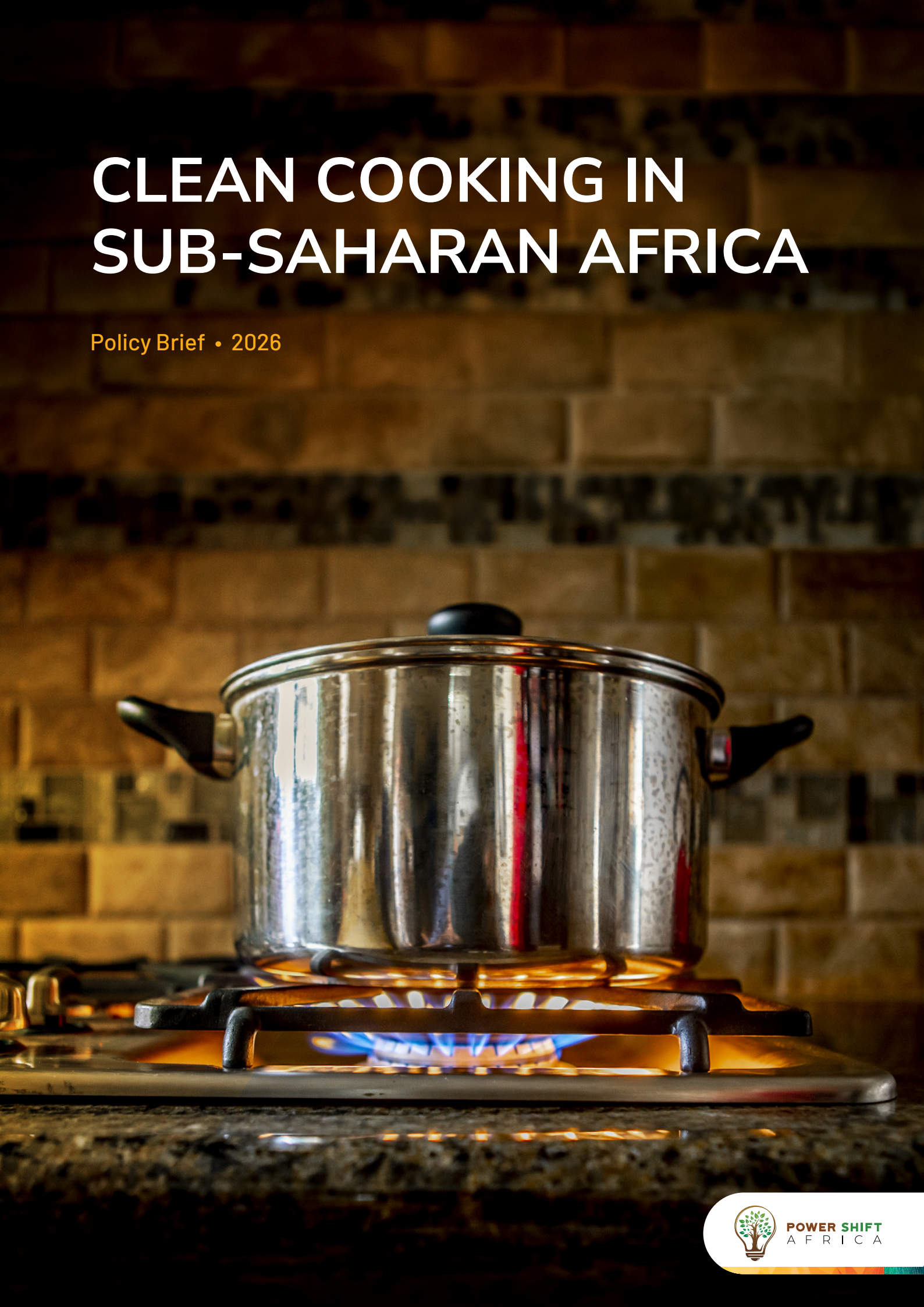
# CLEAN COOKING IN SUB-SAHARAN AFRICA

Policy Brief • 2026



POWER SHIFT AFRICA

# Contents


**Clean Cooking in sub-saharan Africa** **3**

**The challenge of Clean Cooking in Africa** **4**

**What is being done to address the challenge?** **6**

**Current financial support for Clean Cooking in Africa** **8**

**Clean Cooking Options** **10**

**Funding a Clean Cooking revolution** **14**

Policy support from African Governments 15

Carbon Credits 17

Pay-As-You-Go or Pay-As-You Cook models 18

Clean Cooking development opportunities 19

Results Based Finance (RBF) 20

Microfinance Institutions 20

**Other factors which impact the adoption of Clean Cooking solutions** **21**

**Clean Cooking and justice** **23**

**Conclusion** **24**

**Policy recommendations: Accelerating access to Clean Cooking in Africa** **25**

# Clean Cooking in sub-saharan Africa

The following policy brief provides an account of the clean cooking landscape in sub-Saharan Africa (SSA). It highlights the extent of the challenge to provide clean cooking facilities across sub-Saharan Africa, the efforts being made to overcome these challenges, and their limitations, and provides recommendations on how to accelerate the provision of clean cooking in an equitable and just fashion. [1]

## What is Clean Cooking?

BOX 1

**A multi-tier framework conceived by the World Health Organisation categorises types of cooking according to their respective attributes in six areas: energy efficiency; pollution control; convenience in terms of fuel provision; safety; affordability, and availability.**

**Tiers 0 – 2 Poverty Cooking - refers to cooking using open fires and traditional inefficient stoves that burn wood, charcoal, coal, crop waste, dung, or kerosene.**

**Tiers 2-3 Transitional Cooking - refers to cooking primarily with improved cook stoves (ICS) such as energy-efficient biomass stoves. Despite some tier three ICS satisfying some of the six WHO categories, they are not considered to be clean cooking stoves because they do not meet all six categories.**

**Tier 3 Clean Cooking - refers to cooking primarily with electricity, liquified petroleum gas (LPG), natural gas, biogas, bioethanol, solar and very low-emission biomass stoves. Only those tier 3 stoves that meet all six WHO attributes are considered clean.**

**Tier 4 – 5 Modern Cooking – refers to cooking that meets the highest possible standard in terms of the WHO attributes.[2]**

**In short, this means that only cooking solutions that meet all six WHO attributes from tier 3 and above are considered clean cooking.**

# The challenge of Clean Cooking in Africa

While very significant progress has been made in expanding access to clean cooking in Asia and Latin America over the last fifteen years, the number of people without access to clean cooking in sub-Saharan Africa (SSA) continues to grow. Despite the number of people with access in SSA rising by approximately 13 million each year over the last five years, current growth rates cannot keep up with population growth, so much so that every year one million more people lack access in SSA.[3] It is estimated that approximately 960 million people still lack access to clean cooking in Africa, the vast majority of whom are in SSA. In total, only 18% of sub-Saharan households have access to clean cooking facilities, meaning that four out of every five households still lack access to clean cooking.[4]

Greenhouse gas emissions from traditional cooking are also significant. It is calculated that globally, 2% of all GHG emissions come from traditional non-renewables biomass.[5] In terms of Africa specifically, the International Energy Agency (IEA) states that if universal access to clean cooking in Africa occurs by 2040, 540 million tons of $CO_2$ will be avoided, equivalent to the current annual emissions from international aviation.[6]

The lack of access to clean cooking in SSA has a very significant impact on health, the role of women and children in African societies, economic growth, and the wider environment.





**Health Impacts** – The World Health Organisation (WHO) estimated that there were 815 000 premature deaths in SSA in 2023 due to respiratory and cardiovascular diseases caused by the inhalation of particulate matter from traditional cooking methods.[7]



**The Burden of Traditional Cooking on Women and Children** – Women and children make up the vast majority of deaths caused by the inhalation of particulate matter because women are primarily responsible for cooking and childcare, meaning that both spend more time exposed to particulate matter than men do. In addition, the burden of gathering fuel for cooking (largely wood or other forms of biomass) falls on women and girls (child labour), especially in rural areas. Research indicates that on average women and girls spend four to five hours a day collecting fuel which results in chronic 'time poverty', meaning that they often cannot find the time for schooling, for jobs, or for taking on more prominent and participatory roles in society more generally.[8] In addition, the collection of biomass raises serious safety concerns for women and girls when entering forests to collect wood, especially in conflict situations.[9]



**Economic Costs** – The African Development Bank (AfDB) estimates that ill-health caused by traditional cooking alone costs Africa US$526 billion a year. If productivity and education losses endured by women and girls are added, the total cost of a lack of access to clean cooking in Africa is estimated to be in the region of US$791 billion per year.[10]



**Environmental Costs** – It is estimated that upwards of 1.3 million hectares of forest are lost each year in Africa to provide fuel for traditional cooking methods, with losses being particularly acute in East and West Africa.[11] As forest is lost, so women and girls are forced to walk further to access fuels, increasing the burden that falls on them.[12]

The burning of biomass also contributes to the release of greenhouse gases. This burning, combined with forest loss, is equal to a quarter of Africa's current CO2 emissions, or between 1-2% of total global emissions.[13] For example, it is estimated that biomass use in traditional cookstoves produces as much as 120 million tonnes of CO2 annually in Nigeria alone.[14] In total, it is estimated that these environmental costs amount to US$39 billion annually.[15]

# What is being done to address the challenge?

While the issue of clean cooking in Africa is nothing new, considerable progress in highlighting the problem and in formulating actionable responses to it has been made in recent years with several notable international efforts, in which Africa has played a central role, being launched to directly tackle the issue. The following timeline briefly highlights some of the recent major milestones and initiatives:

**2018**

Modern Energy Cooking Services research and delivery programme is launched to scale clean cooking solutions.

**2022**

The International Renewable Energy Agency (IRENA) launches its 'Beyond Food Clean Cooking Platform'.

**2022**

The World Health Organisation launches the 'Clean Household Energy Solutions Toolkit'.

**2023**

The United Nations Energy releases its 'Global Roadmap for Just and Inclusive Clean Cooking Transition'.

**2023**

The Global Electric Cooking Coalition is launched.

**2023**

The IEA in collaboration with the AfDB releases its 'A Vision for Clean Cooking Access for All' report.

**2023**

The Modern Cooking Facility for Africa is launched with donor funds.

**2024**

The watershed 'Summit on Clean Cooking in Africa' takes place co-chaired by the leaders of the governments of Tanzania and Norway, the AfDB and the IEA. The Summit mobilises US$2.2 billion in financial commitments from the public and private sectors for clean cooking in Africa, US$2 billion of which is promised by the AfDB which pledges to allocate US$200 million annually to clean cooking between 2024-34. In addition, the AfDB indicates that it will increase finance for clean cooking from its Sustainable Energy Fund for Africa (SEFA).

**2024**

The African Union (AU) launches the African Clean Cooking Programme (AfCCP) 'to drive the continent's transition toward clean, sustainable cooking solutions'.

**2024**

The African Energy Commission of the African Union publishes its 'Sustainable Scaling: Meeting the Clean Cooking Challenge in Africa' report.

## 2025

As part Mission 300 (an AfDB and World Bank initiative to provide electricity to 300 million people in SSA by 2030), twelve African countries present Energy Compacts which, among other things, set 'targets with timelines' to 'clean cooking solutions as critical elements of the access agenda'. These twelve nations join 18 other African countries that have already done so via Mission 300.

## 2025

Under South Africa's Presidency, the G20 publishes 'Closing the Clean Cooking Gap: A Voluntary Infrastructure Investment Action Plan to Accelerate the Deployment of Clean Cooking Solutions'. The issue of clean cooking is raised to a 'standing discussion item at a G20 summit' for the first time.

## 2025

The 'need for scaling up access to clean cooking, highlighting the many co-benefits of clean cooking in terms of, inter alia, health, gender equality, the environment and livelihoods' was embedded within the Just Transition Work Plan which emerged from COP30 in Belem

## 2026

It is announced that the Clean Cooking Alliance (a major donor funded initiative dedicated specifically to the rollout of sustainable clean cooking solutions) will now be hosted by the IEA as a key multilateral initiative.

Alongside these specific initiatives, Sustainable Energy for All (SEforALL), an organisation hosted by United Nations Office for Project Services works to encourage private sector participation in clean cooking, develop markets for clean cooling solutions and supports clean cooking advocacy.31

The initiatives outlined in the timeline above demonstrate a deeper political commitment to clean cooking in Africa than has been previously seen. The fact that the President of Tanzania, Ms. Samia Suluhu Hassan, the African Commission, the African Energy Commission and the AfDB are now driving policies forward, is a clear sign that the issue is now being taken seriously at the highest political levels and is being done so under the direction of African leaders.

The importance of this high-level political support is clear, with several countries recently launching national clean cooking policies. For example, in 2024, Tanzania launched its ten-year National Clean Cooking Strategy, while Kenya launched its own ten-year National Cooking Transition Strategy. In late 2025, Uganda launched its National Integrated Clean Cooking Strategy. In total, 17 African countries have introduced new clean cooking strategies since 2024, while 13 different clean cooking stove distribution programmes are currently being developed by African governments.32

Despite these critical political interventions, serious challenges remain, most notably how to finance the scale of expansion necessary to meet Africa's clean cooking goals.

# Current financial support for Clean Cooking in Africa

The AfDB's pledge to allocate US$2 billion to clean cooking on the Continent over the next ten years, alongside other financial disbursements to clean cooking in Africa from institutions such as the United Nations Capital Development Fund, the European Investment Bank (EIB) and the World Bank (WB), have resulted in increasing funds being allocated to clean cooking in Africa in recent years. These funds have covered cooking appliances, household installations, fuel subsidisation and enabling infrastructure.[33]

Between 2019 and 2023 direct investments in cooking infrastructure in Africa have risen from under US$500 million to over US$675 million in 2023, which was a ten percent increase over 2022. This includes some US$470 million of the US$2.2 billion pledged at the 2024 Summit.[34]

Despite this increase, the amounts being directed to clean cooking in Africa remains inadequate. The AU estimates that to achieve universal access to clean cooking by 2030, US$4 billion will need to be mobilised annually – six times more than is currently being mobilised. According to the IEA, to achieve universal access by 2040 will cost at least US$2 billion per year.[35] Therefore, as observers note, 'to enable the transition to clean cooking solutions at scale, there is a need for radical shifts in the use of grant-based funding, concessional financing, guarantee mechanisms and private sector business models'.[36]

Efforts to raise more funds for clean cooking in Africa face several challenges. Firstly, most clean cooking solutions require high upfront capital expenditure from consumers with little free capital. Secondly, most clean cooking solutions require infrastructural development, such as fuel storage and distribution hubs, particularly in rural areas. Lastly because clean cooking solutions are widely distributed among millions of customers they are 'less attractive to investors accustomed to centralized energy infrastructure' and reliable returns on investment.[37] This last point draws attention to the limitations of private-sector led solutions to clean cooking in SSA because not all Africans can be reached by potentially profitable clean cooking solutions, thus highlighting the importance of development finance for clean cooking in Africa.



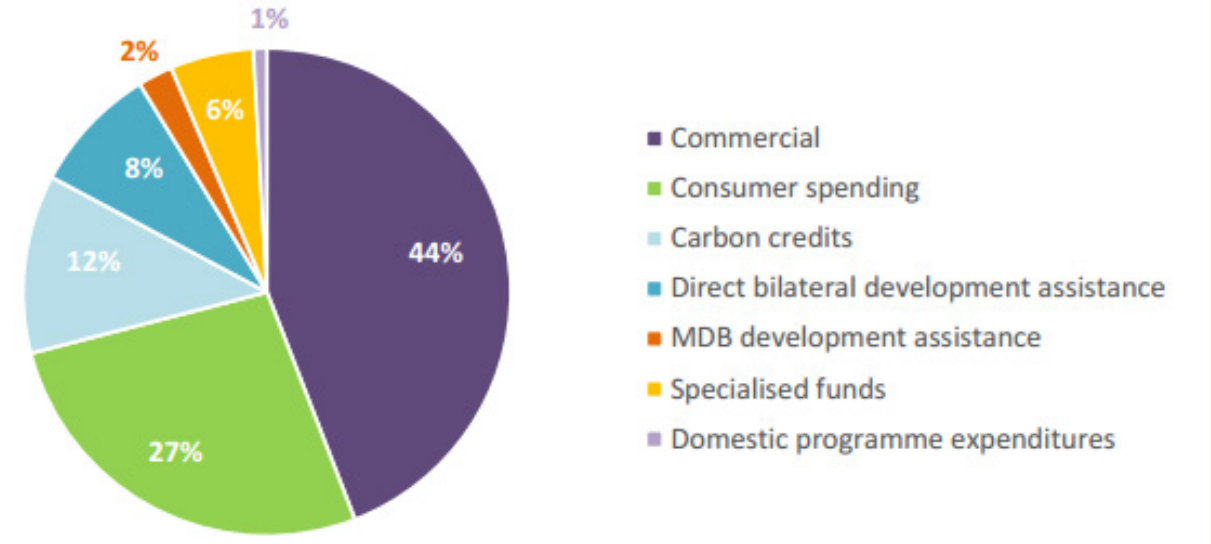



*Figure 1: Share of cooking sector total investment and financial support by source, 2023.*[38]

As figure one illustrates, most investment to date has come from the private sector, either via commercial investments or as consumer spending, reflecting a previous lack of commitment to clean cooking from both international and continental development banks (8%) and African governments (1%). Because it has been dominated by private investment, access to clean cooking has tended to be concentrated in urban areas where demand is greatest, supply can be centralised reducing infrastructure costs, and where incomes are generally higher. This has led to the uneven development of clean cooking solutions, with urban access to clean cooking in SSA standing at 41%, while rural access lags behind at 9%.[39]

In addition, LPG has tended to dominate investments accounting for 85% of all investment in clean cooking in Africa in 2023 alone, driven largely by the private sector. Such investment is 'financed by operators of oil and gas distribution supply chains, often via debt raised on the balance sheet of these companies'. In other words, it tends to be dominated by larger private multinational companies with established networks in urban areas.[40] For example, in 2024, Total Energies promised to invest $400 million in LPG in Africa and India, Puma Energy is aggressively pushing LPG for clean cooking in Africa, while Petradec is funding LPG port facilities in Tanzania.[41] What this reveals, is that the 'market' is willing to supply some urban areas where supply chains and infrastructure are already established, or where concentrated demand exists. The challenge is, therefore, to generate finance for clean cooking in rural areas, especially last mile communities while also addressing affordability more generally in both urban and rural areas.

# Clean Cooking Options

There are various clean cooking options available in Africa all of which have various strengths and weaknesses. The following section briefly describes and evaluates the current options.






**Improved Cookstoves** – While not technically clean cooking in terms of the WHO's categorisation, it is important to acknowledge the significant distribution of ICS. Over the last five years, some 4 million people have moved from traditional cooking to ICS. However, while they are an undoubted improvement over traditional cooking, they cannot be considered more than transitional because, as critics note, they are 'usually not efficient enough to significantly reduce the consumption of biomass and not clean enough to reduce in-door air pollution'.[42]

**Liquid Petroleum Gas** - LPG is being positioned by major international institutions as a key solution for clean cooking in Africa. For example, the IEA, in its modelling for full clean cooking access by 2040, notes that 61% of new clean cooking access will come from LPG – a 500% increase in current consumption levels.[43] Similarly, the United Nations Conference on Trade and Development states that LPG 'is the leading solution' for clean cooking in sub-Saharan Arica.[44] This emphasis on LPG is also being expressed in national clean cooking plans. For example, the Kenyan National Cooking Transition Strategy aims to ensure that half of clean cooking in Keyna comes from LPG by 2028, Sierra Leone aims for 25% by 2030, while Tanzania aimed to distribute 450 000 LPG cylinders in 2025 alone.[45] This emphasis on LPG includes specific plans in African clean cooking strategies to greatly increase LPG infrastructure– including extensively developing ports, storage, and transportation facilities.[46] Analysts note that there is clear evidence that many African governments are primarily focusing on expanding LPG access for clean cooking.[47]

On the face of it, this emphasis on LPG makes sense because of the 13 million Africans who gained access to clean cooking in the last five years, 12 million did so via LPG.[48] Therefore, it seems logical to promote an already successful clean cooking solution. However, this focus on LPG is problematic.

The primary problem is that LPG is a fossil fuel, and, as the UNDP notes, 'promoting LPG should come with a clear recognition of its finite and non-renewable nature'.[49] Aside from being a polluting, non-renewable source of energy, LPG investments exhibit several other serious weaknesses. Firstly, they run the risk of becoming stranded assets once the supply of LPG ceases or becomes too expensive (it is traded globally alongside oil in US$) with obviously has serious implications for

energy security. The conflict in the Middle East in March 2026 witnessed the price of oil spike by 60%, leading to a very significant.[50] In addition, if Net Zero targets are to be reached it is likely that global fossil fuels subsidies will be revoked, meaning that the price of LPG is likely to rise. The threat of stranded LPG assets also looms because international donors are increasingly demonstrating a preference for renewable energy for clean cooking.[51]

Investments in LPG infrastructure also leads to fossil fuel lock-in which crowds out critical grid investments which are a much more long-term solution for Africa.[52] Lastly, LPG has high upfront costs which are beyond reach for many Africans.



**Electric Cooking or E-Cooking** – While 51% of people in SSA now have access to electricity via grids, mini-grids or some solar home systems (SHS), the quality and nature of supply determine how viable e-cooking solutions are. As analysts note, 'E-cooking has great potential if it can be reliably powered'.[53]

At present, evidence indicates that electric pressure cookers (EPC) and, to a much lesser extent, microwaves, have the most potential because of their relatively low power requirements with research showing that EPCs can be cost effective on grid, mini-grids and on some solar home systems (SHS).[54] However, EPCs have their limitations. Like LPG, they have high upfront costs, especially if they are to be part of SHSs, because many existing SHSs would need to be upgraded to provide the necessary power for EPCs and microwaves. In addition, EPCs and microwaves cannot fry food, meaning that many households also need access to electric stoves or, if they cannot access electric stoves, will resort to traditional cooking methods (fuel stacking[55]) to fry food.

Electric stoves are more problematic because of their relatively high-power demands, meaning that even grid connections cannot accommodate electric stoves in many parts of Africa – they consume upwards of 40% more electricity than EPCs.[56] There is also the problem of reliability of supply, with several SSA countries experiencing regular power outages, another factor which leads to a return to traditional cooking methods. Grid access is, of course, also critical to the expansion of e-cooking solutions. In recent years, Tanzania has been forced to curtail energy generation from its hydropower stations because of a lack of grid infrastructure, highlighting again the critical importance of investing in gird expansion.[57]

Solar electric cooking solutions are also, of course, dependent of weather conditions, meaning that alternative cooking methods may occur in sustained poor weather. The viability of electric cooking in Africa is fundamentally tied to the broader performance and structure of national and sub-national power systems. While access to electricity has expanded significantly across sub-Saharan Africa, reliability, affordability, and generation capacity remain critical constraints. In many countries, grid infrastructure is already under strain, with limited reserve margins and frequent outages, raising concerns about the ability of existing systems to absorb additional demand from widespread e-cooking adoption.[58]

Furthermore, tariff structures often do not incentivise productive or household energy use at levels required for cooking, particularly for low-income households.[59]

As a result, scaling e-cooking cannot be treated as a standalone intervention but must be integrated into wider power sector planning, including investments in grid strengthening, decentralised renewable energy systems such as mini-grids, and demand-side management strategies. Aligning clean cooking policies with broader electrification initiatives, such as Mission 300, will therefore be essential to ensure that increased access to electricity translates into meaningful and sustained adoption of electric cooking solutions.

Despite these limitations, the AU estimates that 12% of cleaning cooking in Africa by 2030 will be via electricity.[60]



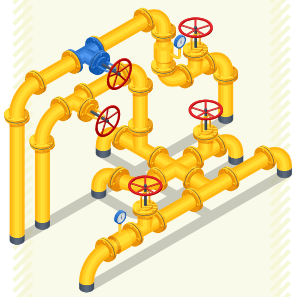
**Biogas** – Biogas, produced by household biodigesters, account for only 0.1% of current clean cooking solutions in Africa, but research suggests that they are a viable option in rural areas where a continuous supply of organic waste is readily available, such as in farming communities. Biogas digesters scale efficiently, meaning that larger digesters can serve whole villages or communities or be used in institutional settings such as schools or health facilities. The potential for biogas is not evenly distributed across the continent, with three countries in particular, Nigeria, South Africa and Ethiopia having the highest potential.[61]

The constant need for organic waste is obviously a limiting factor in the adoption of biogas, as is the high upfront costs associated with the technology. Research also reveals that maintenance and repair of biodigesters remains a serious problem, with as many as 60% of installed digesters being unused because of a lack of repair capacity.[62] Due to these limitations, the IEA estimates that only 4% of people will gain access to clean cooking in Africa by 2040 from biogas.

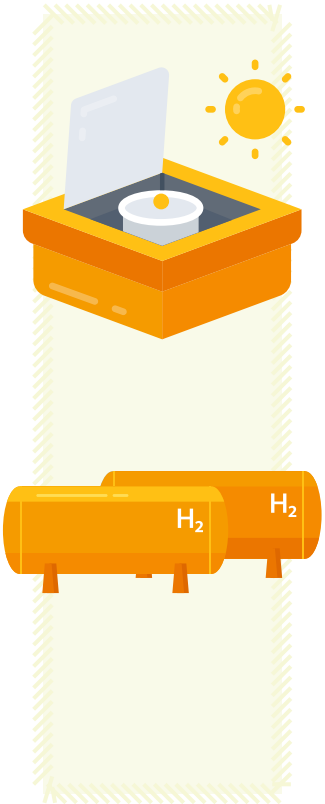


**Bioethanol** – much like LPG but can be stored in ordinary bottles or canisters making it safer to handle and store. Bioethanol can either be bottled at source and distributed to retail outlets, or storage facilities can be in areas of demand where community members can bring their own bottles to be filled (so called 'fuel ATMs'). While it releases carbon when burnt, it is considered carbon natural because of the regeneration of its waste feedstock.

The limitations of bioethanol relate to the seasonal nature of the crop wastes which has the potential to disrupt supply and, more importantly, concerns have been raised with bioethanol competing with food crops which raises serious questions around both food and water security in Africa.[63]



**Natural Gas** – While parts of Africa are rich in natural gas, the considerable costs of creating natural gas distribution pipelines mean that it is of very marginal importance to clean cooking and is likely to remain that way. What limited networks exist (13 in total) serve industrial needs in large cities. The IEA recently stated that due to its very high upfront costs, natural gas 'is expected to remain a niche solution, limited to urban areas where infrastructure already exists or where combined residential and industrial demand can sustain the required investment'.[64]




**Solar Cookers, Green Hydrogen, BioLPG and Advanced Biomass** – Solar cookers are an established means of clean cooking but have serious limitations in that they are entirely dependent on direct sunlight (often unable to heat food in the morning and evening) and can only cook certain food items. Their widespread adoption in Africa is therefore highly unlikely.[65] Green Hydrogen has potential as a clean cooking solutions (if the hydrogen produced in 'green') but faces significant barriers relating to safety, distribution and the significant investments needed in renewables to produce green hydrogen. As the AU acknowledges, 'Green Hydrogen is unlikely to provide a scalable clean cooking solution before 2030'.[66] If green hydrogen is to play any role in SSA's energy future, it should be directed towards the decarbonisation of industry, not clean cooking. BioLPG is still at a very early stage in its development and faces considerable cost issues thus, like green hydrogen, it is unlikely to make a meaningful contribution to clean cooking in Africa before 2030. Advanced biomass stoves, which often use pellets, are also unlikely to make a significant impact on clean cooking in the shorter term given that most of[67]fail to reach WHO clean cooking standards. That said, advanced biomass stoves can be considered a viable transition technology to clean cooking alternatives.

No matter what technological choice is made in terms of clean cooking options, it is obvious that far greater investment will be necessary. The following section highlights the primary means by which additional funds can be allocated to clean cooking in Africa.



**No single solution is likely to be universally applicable. Support should be given to a range of clean cooking technologies, allowing for flexibility and adaptation.**

# Funding a Clean Cooking revolution

**Greater Role for Development Banks** – The AfDB's decision to invest US$2 billion in clean cooking over the next decade is a positive development which must be complemented by similar funds from other development banks and international financial institutions. As the IEA notes, 'scaling clean cooking access requires expanding the range of finance providers and instruments available to clean cooking developers'. Financial instruments should ideally be dominated by grants and highly concessional finance which can be blended with private capital to provide the kinds of 'patient capital' that is needed to bring clean cooking to rural communities (last mile communities).[68] Such 'patient capital' should be used to finance 'frontier' companies which look to invest in previously unserved markets. Development Banks should use the various tools at their disposal, such as guarantees, first loss, payment guarantees and currency and political risk insurance to encourage such investments. In addition, research suggests that development banks need to do more to mainstream gender in their funding priorities to direct more funds to clean cooking.[69]

## Examples of Development Bank Investments in Clean Cooking

BOX 2

**In 2020 the AfDB (US$5 million) and the European Commission (US$12 million) invested in the SPARK+ Africa Fund to deliver clean cooking solutions to over two million households across Africa with a target of raising between US$50-70 million with first-loss equity being taken by the banks. To date, the fund has raised US$64 million for biomass, biogas, ethanol, electric, and LPG cooking solutions in Africa.[70]**

**In 2025 the AfDB's Climate Action Window Fund covered 64% of the US$9 million project costs (with the remainder coming from the British and Ugandan governments) to construct 47 biogas plants for schools, markets and farming communities and provide 77 000 e-cooking stoves in urban areas in Uganda.[71]**

**The World Bank's recently issued 'New Outcome Bond' supporting clean cooking in Ghana is another example of how finance can be blended to accelerate access. Under the terms of the US$200 million bond, which includes US$30.5 million in private capital and is insured by the World Bank, a sizeable upfront payment will be made to UpEnergy to begin distributing 400 000 cleaner cookstoves in Ghana.[72]**

Development banks also need to recognise that many small and medium-sized companies looking to invest in clean cooking solutions may not meet minimum investment thresholds, meaning that development banks should consider lowering their investment thresholds to facilitate the entry of small companies into the sector.

Development banks should also continue to assist African countries in developing clean cooking strategies. This support should cover the whole process from geospatial analysis of need to skills and training, and the monitoring and evaluation of strategy implementation.



## Policy support from African Governments



According to the IEA, only 1% of funds allocated to clean cooking in Africa comes from national government budgets.[73] Given the enormous financial costs associated with traditional cooking, African states clearly need to do more to help finance clean cooking solutions. There are several ways they can do so:

- The quickest way African governments can accelerate clean cooking is via reducing or removing value added taxes (VAT) to clean cooking equipment and fuels. Since 2024, seven African countries have made changes to VAT regimes for clean cooking. Import duty exemptions could also be made in some circumstances. In making such decisions cognisance should, of course, be made of the likely fiscal impacts.[74] Subsidies and incentive schemes for private companies can also be used to facilitate the spread of clean cooking innovations. Tax and subsidy regimes can be used proactively to direct consumers to more environmentally sustainable clean cooking solutions.

- G20 South Africa encouraged governments to directly include including clean cooking in national government budget allocations. It argued that this can be facilitated by elevating clean cooking to a national priority ensuring that it is fully integrated into national energy policies and plans.[75] Research indicates that unless clean cooking is embedded into wider integrated energy planning it tends to be sidelined and not properly considered as a developmental priority.[76] Sierra Leone, for example, has embedded cleaning cooking within national energy planning, including through the Presidential Initiative on Climate Change, Renewable Energy and Food Security.[77] This once again speaks to the necessity for clean cooking initiatives to have high-level political support.

- The integration of e-cooking solutions is particularly important when grid upgrading programmes are initiated to ensure that grids have sufficient capacity to accommodate all e-cooking solutions. Such developments should clearly continue to be considered within the context of Mission 300. In addition, clean cooking policy initiatives should not be considered the sole domain of energy departments given the serious health, gender and education implications of traditional cooking methods. This means that health departments and other social welfare departments should play central roles in clean cooking initiatives.

- Analysts have suggested that delivery can be accelerated by government's creating clean cooking 'Delivery Units' which can help shape funding, implement supportive policies and monitor delivery. To have the necessary economic and political traction, such units should be located at ministerial level.[78] G20 South Africa recommended the establishment of a 'dedicated multisectoral national clean cooking committee within an existing body responsible for clean cooking, energy, or infrastructure that acts as a clean cooking champion and has the mandate to co-ordinate activities and promote clean cooking across ministries'.[79]

- An additional means by which investment can be encouraged is by African countries is by embedding clean cooking targets into their Nationally Determined Contributions (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC). Encouragingly, this is already happening with research indicating that 21 sub-Saharan nations have, or intend to, submit clean cooking information into their NDCs.[80] Those African countries that have yet to do so, should follow suit because setting specific clean cooking targets in NDCs not only reinforces the position of clean cooking as a core part of country climate and energy policies, it also strengthens country calls to access climate finance.[81]

- Governments can also introduce so called 'lifeline tariffs' to include e-cooking, thus reducing electricity costs for e-cooking stoves. Evidence suggests that a lifeline tariff of 100 kWh/month would enable most grid-connected households to cook with EPCs.[82]

- Governments should maintain regular contact with the private sector though established forums to discuss challenges and solutions across the entire clean cooking sector.[83]

- Regional integration of clean cooking policies is vitally important for policies adopted in one country can impact others. For example, a logging ban in Kenya designed to curb charcoal use simply exported the logging problem to Uganda.[84] Thus, regional bodes such as the Southern African Development Community and the Economic Community of West African States, should coordinate their clean cooking initiatives.

- Investor confidence can be encouraged by government's introducing regulations which standardise safety and emissions from clean cooking stoves and fuels as evidence shows that weak governance of standards negatively impacts clean cooking initiatives.[85] Such standardisation would also assist with domestic production of clean cooking equipment (see below). For example, in 2022 Rwanda introduced Ministerial Guidelines on Clean Cooking Technologies.[86]

- Governments can also leverage investment in clean cooking by facilitating its introduction into institutional settings such as schools and health facilities. This has the advantage of adding economies of scale to any potential investments and positively impacts emissions from institutional facilities. For example, schools in SSA currently emit 14 million tons of CO2 annually.[87]

- Despite being more long-term solutions, African governments should continue to explore the potential for both green hydrogen and BioLPG as clean cooking solutions.

## Carbon Credits

Using carbon credits generated by clean cooking to finance the massive expansion in clean cooking that is required is receiving a great deal of attention from both international organizations and from the AU. For example, the UNDP argues that:



**Carbon Carbon markets can enable clean cooking companies to grow faster, drive down costs for consumers and facilitate expansion to new markets. As such, carbon markets represent one form of private climate finance that can be used as an enabler to the adoption of clean cooking.[88]**

The AU states that carbon credits will provide 'a dependable revenue stream' which is 'essential for propelling clean cooking transitions'.[89] The IEA estimates that 8% of capital flows into clean cooking in Africa in 2023 came from carbon credits largely from carbon credit sales from Kenya, Uganda, Malawi, Ghana and Rwanda. The revenue generated from carbon credits from clean cooking has risen from US$25 million in 2020 to US$107 million in 2024.[90] Despite this rise, fundamental weaknesses in the entire carbon credit architecture pose serious questions as to the long-term viability of using carbon credits to finance clean cooking. Because carbon credits are voluntarily reported in Africa, they are open to abuse. Research undertaken in 2024 estimated that carbon credits issued against clean cooking were overstated by 900% across projects throughout the world.[91] In early 2026, a report indicated that upwards of US$5.3 million in carbon credits earnings from a clean cooking scheme in Zimbabwe were not shared with community members as proposed by the project but were rather taken by the developer.[92]

Such research has created a huge credibility problem for the voluntary carbon market sector which has seen the Integrity Council for the Voluntary Carbon Market reject over 60% of all carbon credit claims from clean cooking made in 2024.[93] This ongoing crisis of credibility has seen the price of carbon credits issued for clean cooking falling precipitously since 2022 (the average price of clean cooking credits fell from US$12 in 2022 to US$5 in 2024), calling into question the hope of financing clean cooking from carbon credits.[94]

The recent collapse of KOKO Networks, a very high-profile clean-cooking company in Kenya (it sold stoves fed by canisters of bioethanol cooking fuel made from plant sugars) due to concerns over the validity of its carbon credits raises further questions, especially as the company was supposedly using approved carbon credit authentication processes and was financially supported by the World Bank's Multilateral Investment Guarantee Agency.[95]

Unless properly validated by credible institutions to the highest possible standards within the context of a fully capacitated and functional Africa Action Plan on Carbon Markets, it would appear that using carbon credits to finance clean cooking in Africa is at best likely to be little more than a relatively small additional income stream. This is especially so given that analysts are arguing that the costs of implementing much more robust carbon credit methodologies mean that the price of clean cooking credits needs to be between US$15.30 and US$38.90.[96]

In addition, recent research has called into question the entire global carbon credit market, drawing attention to 'intractable quality issues' throughout the entire carbon credit ecosystem from credit quality to offsetting arrangements.[97]

## Pay-As-You-Go or Pay-As-You Cook models

Pay-As-You-Go (PAYGo) models, whereby community members only buy as much fuel as they want at a specific time via a smart meter attached to a fuel device, have facilitated the spread of clean cooking in Africa.

At present, this sector is almost entirely dominated by LPG whereby customers also gain access to cylinders and LPG stoves on extended credit terms (up to 24 months). That said, the model has been applied to EPCs and biodigesters in some areas.[98] Provision of such services has grown rapidly for LPG in certain parts of Africa, particularly in urban East Africa. For example, MGas had 250 000 customers in Kenya and Tanzania in 2022. Various studies show that PAYGo models have successfully expanded the use of clean cooking stoves and fuel.[99]

There are, however, several limitations with the model. The smart meters are expensive to purchase for the companies rolling out provision, with research indicating that this expense slows delivery because some companies lack the capital to be able to purchase the meters in significant numbers. Another problem is that the meters have a battery which needs to be charged by electricity to function, meaning that homes without electricity cannot use the service, although efforts are being made to introduce solar batteries.[100] The need to charge batteries means that the focus of LPG PAYGo models has been urban rather than rural. In addition, urban areas are preferred because there is a more concentrated market reducing expenditure of storage and distribution infrastructure.[101]

Perhaps the most significant barrier to PAYGo models is related to overall cost. Research indicates that PAYGo LPG costs are higher per unit compared to full cylinder purchases by as much as 7%. This premium sometimes results in users switching back to biomass (energy stacking) when they do not have money to buy LPG. This is a classic example of the so-called 'poverty premium' whereby those with least to spend end up paying more for their energy needs.[102] Ideally, PAYGo contracts should therefore include payment pauses for those times when community members face financial difficulties.[103] These contracts have also faced criticism for their remote automated disabling mechanisms, which cuts off access to light, power, or essential appliances for poor families as a deterrent against non-payment.[104]



## Clean Cooking development opportunities

Another means by which finance can be directed towards clean cooking which has the potential to lead to wider benefits is to promote the localisation of clean cooking technologies in Africa

The IEA's plan for 100% clean cooking in Africa by 2040 states that 460 000 permanent new jobs (of which 280 000 are in LPG) in distribution, manufacture and operation and maintenance will be created to meet the 2040 target.[105]

There are currently only 15 clean cooking manufacturers in Africa, meaning that many stoves are manufactured outside of Africa adding considerably to their costs (transport, tariffs, currency fluctuations etc) presenting a major opportunity for the industry to grow in Africa.[106] Local manufacturing can be encouraged in several ways:

- The localisation of manufacturing should be aligned with national and regional industrialisation strategies, specifically green industrialisation, such as with the Africa Green Industrialisation Initiative. A specific focus on the roles of women in all aspects of stove financing, development, manufacturing, sales, and distribution should be made.
- A regionally integrated approach is necessary for localised manufacturing which acknowledges the comparative advantages countries hold in terms of location, skills and market size. Shared production zones and cross-border supply chains can reduce costs. Such factors should clearly be considered within the wider goals of the African Continental Free Trade Area (AfCFTA). Encouragingly, the AfCCP has already begun mapping job creation and potential supply chains.[107]
- As indicated above, the introduction of certifiable standards for stove manufacturing is key to encouraging the development of trusted localised production. Certification will necessitate skills development and training in the sector both for manufacturing and the long-term maintenance of clean cooking stoves. This is particularly important because previously locally manufactured ICS stoves have sometimes been of poor quality and, as previously noted, projects have been abandoned due to a lack of maintenance capacity.[108]

Attention should also be paid to those who will lose their jobs in the charcoal and wood industries as clean cooking spreads. Such workers should be prioritised with skills training so that they can justly transition into new jobs created within a burgeoning clean cooking sector.



## Results Based Finance (RBF)

Results-based financing, whereby businesses are allocated funds on the fulfilment of outcomes – such as the verified installation of clean cooking solutions – has proven to be an effective way to fund previously difficult to fund sectors such as last mile communities. It does so by focusing on the delivery of outcomes rather than market-driven inputs.[109] RBF can work with donor funds where clean cooking stoves are delivered for free or via PAYGo methods – both of which overcome high upfront costs. Limitations to RBF include the need for companies to be able to generate upfront capital to fund projects, something which tends to exclude new or smaller companies. In addition, verification processes can be burdensome. Lastly, while RBF has delivered clean cooking solutions, the long-term use of those solutions beyond delivery verification is unknown, meaning that there is 'no evidence of its long-term effectiveness'.[110] Although this issue is not unique to RBF.

## Microfinance Institutions

Because the cost of purchasing household clean cooking equipment is too insignificant to be of interest to traditional financial institutions like banks, there is a clear role for microfinance institutions to extend credit to community members looking to transition from traditional cooking methods. Tailored clean cooking plans could be developed to facilitate this process.[111]




Photo credit: [illegible]k Hyseni

# Other factors which impact the adoption of Clean Cooking solutions

It is not, of course, just economic factors which influence the adoption of clean cooking in Africa because social and cultural issues also influence how decisions are made around clean cooking. The following sections briefly explores these non-economic influences.

**Gender and Clean Cooking** – There is conclusive evidence that women need to be much more involved in decision-making around clean cooking innovations in Africa. Research indicates that when women are directly involved in decisions around clean cooking innovations their uptake increases throughout the world, including in Africa. However, women's bargaining position within many African households prevents or limits them from making decisions which are often taken by men (social discrimination).[112] This discrimination speaks to the prevalence and persistence of patriarchal norms in many parts of SSA where women are pro-actively excluded by men from decision-making.[113]

In addition, because they are time poor', women often lack the time to attend information meetings or clean cooking training sessions meaning that they cannot hope to influence decision-making. Evidence suggests that sometimes women are not even invited to such meetings, which is a critical weakness given that studies shows that men tend to view decision-making around cooking from a purely economic basis, for they do not directly experience the negative consequences of traditional cooking methods. As researchers note, 'the effectiveness of technology adoption is dependent on the recognition of the central role of women as primary users'.[114]

An overwhelming amount of research indicates that all stakeholders involved in clean cooking need to position women not just as benefices of new technologies, but as central actors in all policy developments. This can be facilitated by: financing being specifically targeted at women (to facilitate the greater entry of women into clean cooking businesses); forming alliances with local women's group and women leaders; making their participation in all decision-making a condition of project acceptance and the delivery of clean cooking solutions and by senior political figures highlighting the role of women in clean cooking. Encouragingly, the head of the AfDB, Akinwumi Adesina, noted in 2024, that 'access to clean cooking is about more than cooking, it is about dignity ... it is more than about lighting a stove, it is about life itself. It is about fairness, justice and equity for women'.[115]

This argument needs to be extended because it can be contended that women and children want more than just access to clean cooking because they seek the general improvements to life that come with greater access to energy. For example, they want regular access to light and the ability to charge items such as phones which will only come with grid access. It is important, therefore, to acknowledge the relative weakness of focussing simply on ameliorative clean cooking solutions such as LPG at the cost of losing sight of generally transformative energy access that comes from electrification via grid expansion.

## Examples of the inclusion of women in Clean Cooking initiatives

BOX 3

**In 2023, the President of Tanzania launched the 'Women Clean Cooking Support Programme' in Tanzania which raises awareness of the challenges that women face in clean cooking, while seeking to create partnerships and raise funds specifically for women.[116]**

**In 2024, a two-year Canadian funded project, 'Unlocking climate finance for women and girls in Africa', was initiated in Ghana and Kenya specifically targeting women and clean cooking.[117]**

**In late 2025, a 'Dialogue on Pathways for Women's Economic Empowerment and Entrepreneurship through Clean Cooking Solutions' was convened in South Africa which looked at the roles of women in clean cooking, specially focussing on pathways for women entrepreneurs. Importantly, the meeting was attended by a Senior Energy Negotiator from the South African Department of Electricity and Energy.[118]**

In addition, there is clear evidence that initiatives such as gender quota, and enabling institutional changes that stimulate the engagement of women in politics and society at all levels will deepen the voice of women in clean cooking debates because wider socioeconomic inclusion 'positively influences the adoption of clean cooking solutions in sub-Saharan Africa's as well as obviously having much wider positive net benefits to society more generally.[119]

**Fuel Stacking** – In any debate around clean cooking in SSA, it is critical to understand and develop appropriate plans to account for the phenomenon of fuel stacking which refers to the common household practice of retaining multiple types of fuel for cooking. In both rural and urban settings, households often retain multiple types of fuel even when they have access to clean cooking solutions for several reasons. Firstly, clean cooking solutions can be unreliable, for example, e-cooking solutions fail when electricity delivery fails, or LPG solutions fail when payments are not made. In these circumstances, households resort to traditional cooking methods. Fuel stacking is also driven by economics, whereby some households cannot afford to access clean cooking for foods that require longer cooking times, such as beans. Cultural factors are also important, with some people believing that certain foods taste better cooked in traditional ways like a braai.[120]

**Culture and Education** – Traditional cooking practises and norms associated with these practices are culturally embedded in many African societies. These norms relate to the way in which food is eaten, its flavour, how it is eaten (sitting, kneeling etc), and the role that eating pays in social cohesion as a communal activity. For example, in Ethiopia large pots and relatively high temperatures are needed to cook injera, while in Uganda research indicates that many believe that food tastes better cooked on an open fire, which is also considered a point of social cohesion and is used to deter mosquitoes.[121] Evidence also suggests that it some contexts, relative levels of formal education, concerns about safety, age of household heads (generational preferences)[122]

Cooking solutions are also associated with social status with evidence from SSA indicating that LPG is often seen as the aspirational choice for people wanting to transition to clean cooking.[123] There are also common misconceptions around relative costs of clean cooking solutions which need to be overcome, especially in areas where firewood

remains easily accessible.[124] Risk aversion is also a problem, with households fearing that fuels may not always be available, that they may be dangerous, that they may be subject to price volatility, or they may not live up to expectations (low trust). Such factors can contribute to fuel stacking.[125]

These and other social and cultural determinants need to be fully considered when promoting clean cooking solutions meaning that it is critically important to target clean cooking solutions that are appropriate to each situation as there is no one size fits all cooking technology. It is, therefore, essential that promoters of clean cooking understand local preferences (traditions, fuel availability, gender roles etc.) by including local people in projects from their very start, something that is sometimes lacking in clean cooking initiatives.[126] As analysts note, 'there is a lack of community involvement in project planning and decision-making. Therefore, building trust through transparent communication, local consultations, and community ownership is essential'.[127] What this means, is that inclusive bottom-up, rather than top-down approaches need to be taken if sustainable transitions to clean cooking are to be realised. Building trust can take place via campaigns that encourage community dialogue, involve cooking demonstrations and training, include peer-to-peer learning and that use various forms of accessible information dissemination (radio etc.) to inspire conversations about clean cooking.[128]

# Clean Cooking and justice

What the previous analysis reveals is that above all else, access to clean cooking in SSA is an issue of justice which should be embedded within the wider context of the various justice principles which should guide just transitions in SSA. Therefore, clean cooking innovations and programmes should, as a minimum, consider distributive, procedural, and recognitional justice principles.

**Distributional Justice** – For distributional justice to be realised, the people of SSA should be able to access clean cooking with the same ease as those in the developed world. Given that clean cooking is an essential component of just transitions, Article 9 of the Paris Agreement makes it incumbent on the countries of the developed world to finance clean cooking in SSA to realise both distributional and wider restorative justice principles. In addition, distributive justice demands that previously unserved communities, such as last mile rural communities, gain access to clean cooking solutions.

**Procedural Justice** - The process of developing, implementing and monitoring clean cooking solutions must be procedurally fair, meaning that those most affected by household energy decisions must control the entire process. This means that decision-making must be inclusive, locally based, with all participants being fully informed of the pros and cons of transitioning to clean cooking.

**Recognitional Justice** - Critically, effective mechanisms must be provided by which previously excluded groups, such as women and those in other marginalised communities such as refugees, can fully participate in all processes. Recognitional justice demands that policies and practises that have previously driven clean cooking vulnerabilities are rectified.

# Conclusion

There is a considerable tension in the clean cooking landscape between pressure to end unhealthy traditional clean cooking methods – in line with Sustainable Development Goal 7 which aims to ensure access to affordable, reliable, sustainable, and modern energy by 2030 – and the most environmentally sustainable means to do so. This tension revolves around the role of LPG in the clean cooking industry. While research indicates that it is the most effective means by which to transition towards clean cooking in the shorter term (certainly between now and 2030), LPG is not a sustainable source of energy and accordingly does not provide a long-term environmentally sustainable solution.

The question of the role of LPG is, however, complex. It can be argued that LPG is the dominant option because it is an established part of the oil and gas industry and consequently has entrenched support within the private sector and within African governments. As one commentator notes, 'for oil and gas, you have an entire stakeholder group … in the ministries' in contrast to other clean cooking alternatives.[129] How much influence this preexisting relationship has on issues such as subsidy support and the kinds of reforms that are needed to promote all clean cooking solutions in Africa is currently unclear and warrants further research.

Conversely, a strong argument can be made that transitioning Africans away from harmful traditional cooking is an absolute imperative and, in terms of wider issues of climate justice and current and future emissions from gas globally, 'if any population group has a just claim to use a fossil fuel that offers substantial health benefits as the world decarbonises, it is Africa's poor'.[130] In addition, given the enormous long-term task of electrifying unserved communities in Africa to be able to accommodate the mass rollout of clean e-cooking options, the ongoing trend to support LPG is understandable.

There is undoubtedly a 'complex interplay' between the various clean cooking solutions in Africa.[131] Which solutions are preferred are ultimately related to which timescales are being considered and what priorities are being pursued. There is no doubt that the long-term vision for clean cooking in Africa should be one based entirely on a mix of genuinely sustainable energy sources, ranging from grid and mini-grid solar PV, wind, hydro, and geothermal to different forms of bioenergy (highlighting the critical importance of initiatives such as Mission 300). In the shorter term however, especially in light of 2030 deadlines and the ongoing health and social costs of traditional cooking methods, the expanded use of LPG seems inevitable. It's use must, however, be part of a multi-facetted approach that sees LPG as no more than a transitional fuel.



# Policy recommendations: Accelerating access to Clean Cooking in Africa

Achieving universal access to clean cooking in Africa will require coordinated action across multiple sectors, with approaches tailored to different national and local contexts. The following priority actions are recommended:

### 1. Adopt a context-specific and phased approach to clean cooking transitions

Governments and development partners should adopt flexible, context-specific transition pathways that reflect differences in infrastructure, income levels, and energy access. Planning should consider both short-term access needs and long-term sustainability objectives, ensuring that investments remain adaptable as technologies and systems evolve.

### 2. Scale public and concessional finance for underserved communities

A significant increase in grant-based and concessional financing is required to support clean cooking access, particularly in rural and last-mile communities where market-driven approaches are less effective. Financial instruments such as blended finance, guarantees, and results-based mechanisms can help mobilise additional investment while reducing risk.

### 3. Integrate clean cooking into national energy and development planning

Clean cooking should be fully integrated into national energy strategies, electrification plans, and broader development frameworks. This includes aligning clean cooking policies with initiatives such as grid expansion, decentralised energy systems, and wider infrastructure planning to ensure coherence and long-term viability.

### 4. Strengthen electricity systems to support the growth of e-cooking

Investments in grid reliability, generation capacity, and decentralised energy systems will be critical to enable the expansion of electric cooking solutions. Tariff structures and demand-side planning should also be designed to support household energy use for cooking, particularly for low-income consumers.

### 5. Promote a diverse portfolio of clean cooking solutions

Given the diversity of cooking practices and energy systems across the continent, no single solution is likely to be universally applicable. Policymakers should support a range of clean cooking technologies, allowing for flexibility and adaptation to local conditions while avoiding over-reliance on any single pathway.

### 6. Centre women in clean cooking policy and implementation

Women should be recognised as key stakeholders in clean cooking transitions, with policies designed to enhance their participation in decision-making, access to finance, and involvement across value chains. Targeted interventions can help address existing barriers and improve adoption outcomes.

### 7. Strengthen regulatory frameworks and standards

Governments should establish and enforce clear standards for safety, emissions, and performance of clean cooking technologies and fuels. Strong regulatory frameworks can enhance consumer confidence, support market development, and encourage investment.

### 8. Support local manufacturing and regional value chains

Promoting the local production of clean cooking technologies can reduce costs, create jobs, and strengthen regional supply chains. This should be aligned with broader industrialisation strategies and supported through skills development, certification systems, and regional cooperation.

### 9. Exercise caution in the use of carbon finance

While carbon markets can provide an additional source of funding, their use should be approached with careful consideration of transparency, credibility, and long-term sustainability. Strengthening oversight and accountability mechanisms will be essential to ensure that benefits are equitably distributed.

### 10. Invest in behavioural change and community engagement

Sustained adoption of clean cooking solutions depends on user trust, awareness, and cultural alignment. Governments and development partners should invest in community engagement, education, and demonstration initiatives to support long-term behavioural change.

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