

CENTER FOR ENVIRONMENTAL MANAGEMENT AND SUSTAINABLE ENERGY

CLEAN COOKING FUELS IN GHANA

Progress, Targets and Roadmap

Abstract

This article examines Ghana's progress toward clean cooking fuel adoption by comparing data from the 2021 Population and Housing Census and the 2016/17 Ghana Living Standards Survey Round 7. The analysis focuses on liquefied petroleum gas (LPG) penetration, biomass fuel reliance, and regional disparities in clean cooking access. Key findings indicate LPG usage increased from 24.5% to 36.9% between 2016/17 and 2021, while significant urban-rural and regional inequalities persist, with rural areas remaining heavily dependent on wood (57.6%) and northern regions showing LPG adoption rates as low as 4%.

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Introduction

Access to clean, safe, and affordable cooking energy is one of the most essential dimensions of sustainable development as indicated in SDG 7. In Ghana, as well as many sub-Saharan Africa Countries and other regions of the globe, there is an association between cooking fuel usage and indoor air quality, the health burden on households, the deforestation rate of the environment, and the country's capacity to fulfill its climate commitments or obligations. Consequently, the promotion of clean cooking energy sources has emerged as a significant intervention for public health, gender equity, and environmental sustainability.

Ghana has formulated and implemented a significant number of strategies to decrease the usage and reliance on polluting cooking fuels and promote clean cooking practices in households. Key initiatives, including the Renewable Energy Act (Act 832, 2011), Renewable Energy Master Plan, National LPG Promotion Policy, the Cylinder Recirculation Model (CRM), and the National Energy Transition Framework (2022–2070) have been enacted or implemented to facilitate the adoption of clean cooking fuels, especially LPG. Nonetheless, the data indicate that the penetration of clean fuels remains at 31%, and uneven across the country. Although progress has been observed in urban areas, reliance on biomass and polluting fuels persists in rural regions.

This article compares the data from the Population and Housing Census 2021 (PHC 2021) and the Ghana Living Standards Survey Round 7 (GLSS 7, 2016/17) to provide the first comprehensive assessment of Ghana's clean cooking transition using the most recent national census data. These data sources enable granular regional and urban-rural analysis not previously available, allowing for evidence-based targeting of policy interventions.

Fuels sources used by households for cooking in Ghana

Ghana recognizes four main cooking fuel sources used by households including LPG, charcoal, and wood. Alternative fuel sources, including kerosene, biogas, and electricity, are used by less than 1% of households for cooking purposes. LPG is predominantly used with single burners, table-top two or three-burner stoves, and gas cooking stoves equipped with ovens. Charcoal is utilized either in traditional coalpots or improved charcoal stoves, whereas wood is employed in various forms, including three-stone stoves and mud stoves in open spaces, LPG is mostly used with either a single burner, table-top two or three burner, and gas cooking stoves with oven. Charcoal is used in the either the traditional coalpoat or improved charcoal stoves, while wood is used in several forms such as the three-stone stove, and mud stove in open space. Electricity, one of the least utilized fuels, is utilized with hot plates, induction cookers, and various electrical appliances including rice cookers and pressure cookers (EPC).

Various Sources of Fuel used for Cooking in Ghana



Charcoal



FIRE WOOD



Kerosene

Electricity



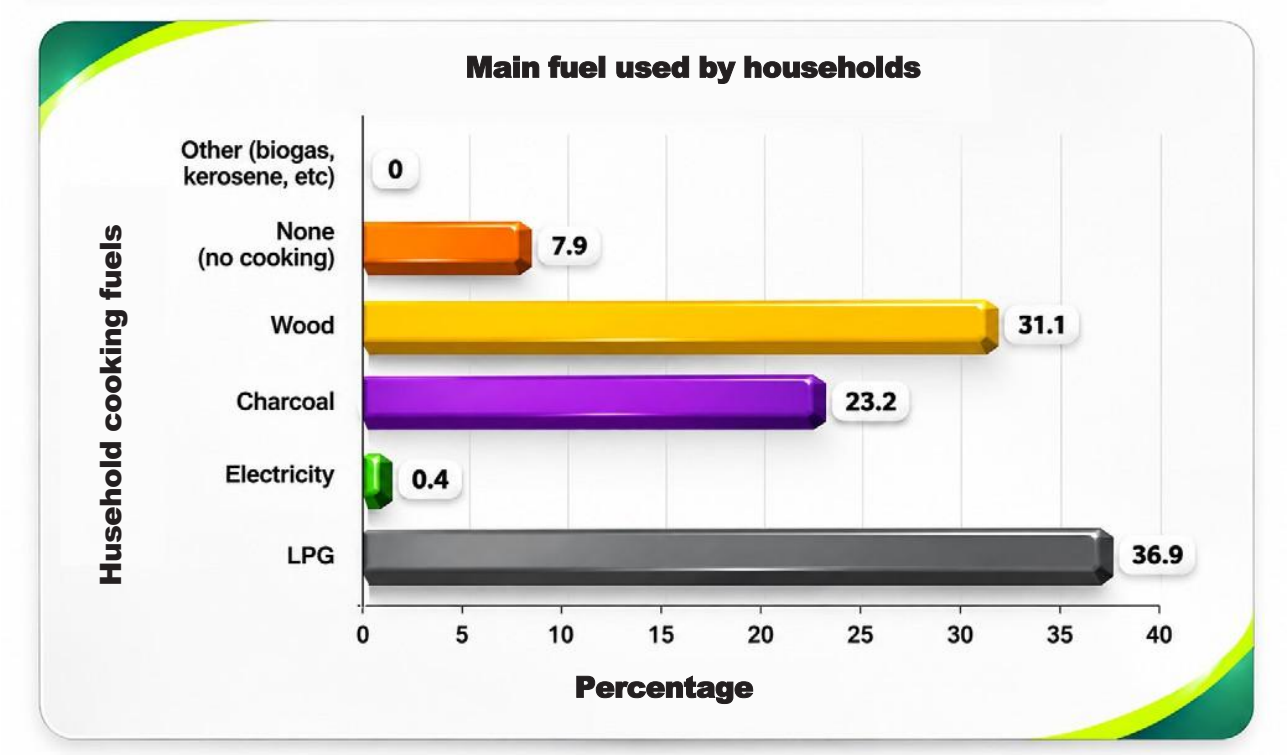


LPG

Source: Google Images

Figure 2 reveals the national distribution of primary cooking fuels utilized by households in Ghana, as published by the 2021 Population and Housing Census (PHC 2021). Liquefied petroleum gas (LPG) remains the dominant cooking fuel, used by 36.9% of households. This is followed by wood at 31.1%, charcoal at 23.2%, and electricity at 0.4%. Other fuels, including biogas, kerosene, crop residue, sawdust, and animal waste, collectively constitute less than 1% of household fuel consumption. These findings suggest that Ghana has made significant strides towards adopting cleaner cooking fuels. However, the share of polluting fuels, such as charcoal and wood, is greater than that of clean fuels, such as LPG and electricity, concluding that a considerable proportion of households continues to depend on biomass sources for cooking.

Figure 2: Main fuel used by the household for cooking in Ghana (percent)

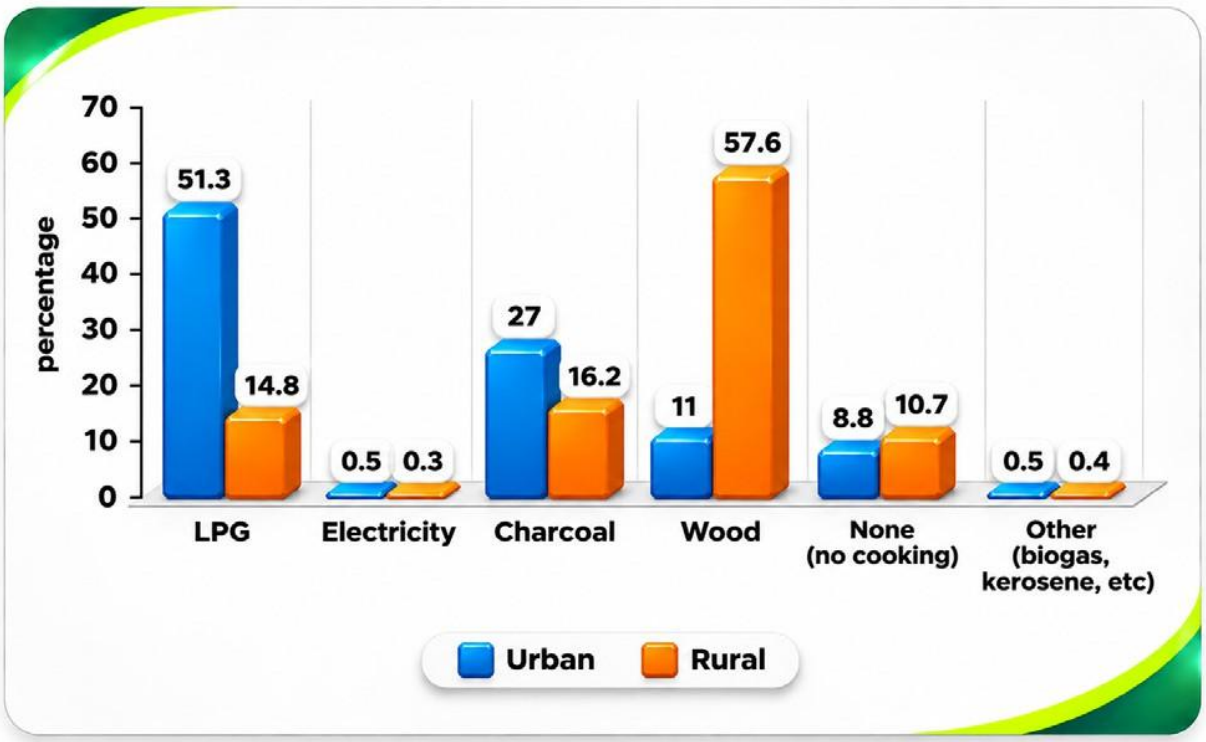


Source: GSS (2022)

Figure 3 illustrates a significant disparity in the use of cooking fuels across different localities, particularly concerning LPG, charcoal, and wood. Urban households predominantly utilize LPG, accounting for 51.3%, whereas rural households primarily depend on wood, with a usage rate of 57.6%. This data highlights a distinct urban-rural divide in the adoption of clean cooking fuels.

The pronounced reliance on LPG among urban households (51.3%), in contrast to the 14.8% usage in rural areas, underscores the uneven transition to clean cooking fuels in Ghana. Consequently, national initiatives and programs aimed at promoting clean cooking should be specifically designed to address the unique challenges and obstacles hindering LPG adoption in rural regions, thereby narrowing the gap between the urban and rural populations.

Figure 3: Main Source of Cooking Fuel Used by Households by Locality **(Rural/Urban)**



Source: GSS 2016/2017, 2021

According to the data presented in Table 1, liquefied petroleum gas (LPG) experienced the most substantial increase among fuel sources between 2016/17 and 2021, rising from 24.5% to 36.9% of all households in that time. This growth indicates that millions of households have gained access to clean cooking options. Conversely, the use of charcoal, a polluting fuel, decreased from 34.1% to 23.2%, suggesting that a significant portion of households previously reliant on charcoal transitioned to alternative fuel sources, likely LPG, during this period of time.

The use of wood fuel declined slightly from 33.3% to 31.1%. In contrast, the change in electricity usage during the same period was minimal, which is concerning given Ghana's relatively high electrification rate in the subregion and Africa. Biogas, kerosene, and other alternatives collectively constituted less than 1% of total usage.

Table 1: Main Cooking Fuel Source used by households

Cooking Fuel	PHC 2021 (%)	GLSS 2016/17 (%)
LPG	36.9	24.5
Electricity	0.4	0.3
Charcoal	23.2	34.1
Wood	31.1	33.3
None (no cooking)	7.9	7.2
Other (biogas, kerosene, etc)	<1	<1

Source: GSS 2019, 2022

Table 2 highlights the differences in percentage points and changes in percentages for the various sources of cooking fuel in Ghana between 2017 and 2021. In four years, the LPG penetration at the household level increased by 50.6%, with an average annual growth of 12.66%. Ghana could reach its 50% target by 2030 if the annual LPG penetration rate of 12.66% observed between 2017 and 2021 is sustained, assuming no major affordability or supply disruptions. However, rural adoption challenges and price volatility introduce significant uncertainties. The decline in wood fuel consumption at a rate of 1.7% per year is insignificant and would likely derail Ghana's efforts to achieve its Sustainable Development Goal 7 target by 2030.

Table 2: Percentage change in cooking fuel usage from 2016/17 to 2021

Cooking Fuel	Difference in percentage points	%Change	Average annual %change
LPG	12.44	50.6	12.66
Electricity	0.1	33.3	8.3
Charcoal	10.9	-32.6	-8.15
Wood	2.2	9.7	-1.7

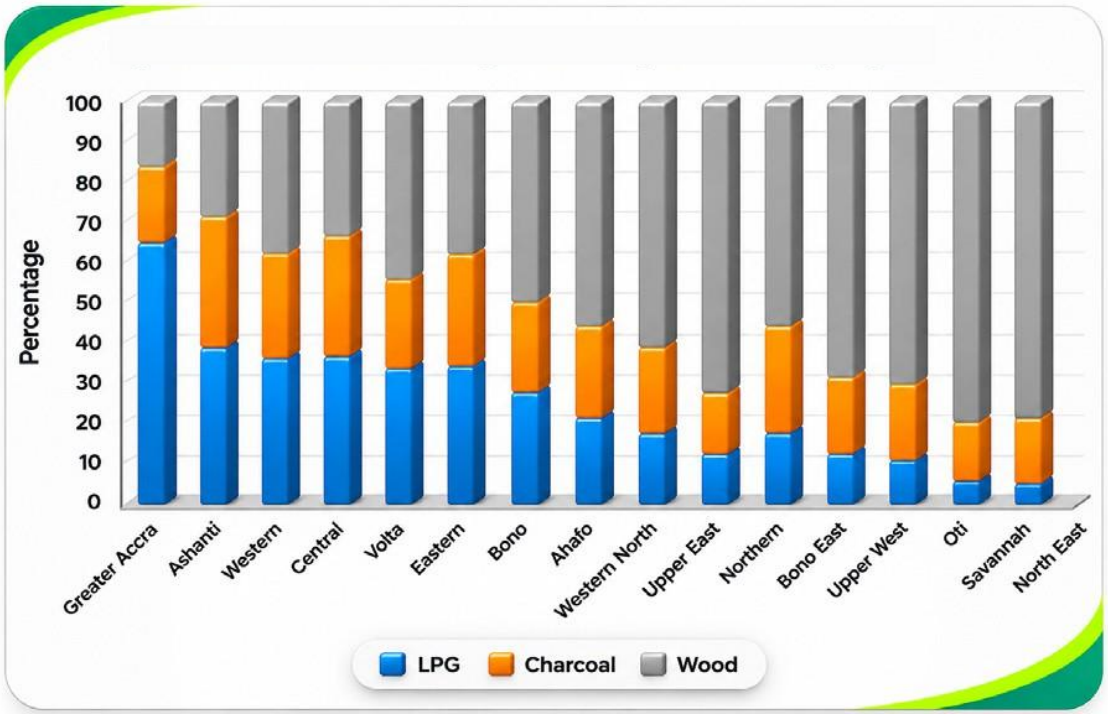
Source: GSS 2019, 2022

Regional Representation of Cooking Fuels used by Households

The regional distribution of household cooking fuel use reveals substantial geographical differences in the use of LPG, charcoal, and wood across the country. Figure 4 shows that LPG is mostly used in Greater Accra, while wood is also mostly used in many regions, particularly in the Northern part of the country. Charcoal on the other hand remains important across almost all the regions.

Greater Accra (68%) recorded the highest proportion of LPG users, followed by Ashanti (38%), Western (37%), Central (37%), Volta (33%), and Eastern (33%) regions, and comparatively low in Savannah and North East (4% each), Upper East (13.8%), and Northern (10.45). Wood usage was dominant outside Greater Accra and was high in Savannah, North East, Upper East, Northern, and Oti regions, accounting for over 60% of usage. The results show an uneven transition in Ghana's clean cooking targets geographically. This pattern indicates differences in access to clean cooking and adoption at different levels and regions. However, the proportions of adoption suggest regions that require particular attention and interventions that target the local fuel used.

Figure 4: Main Source of Cooking Fuel Used by Households by Region



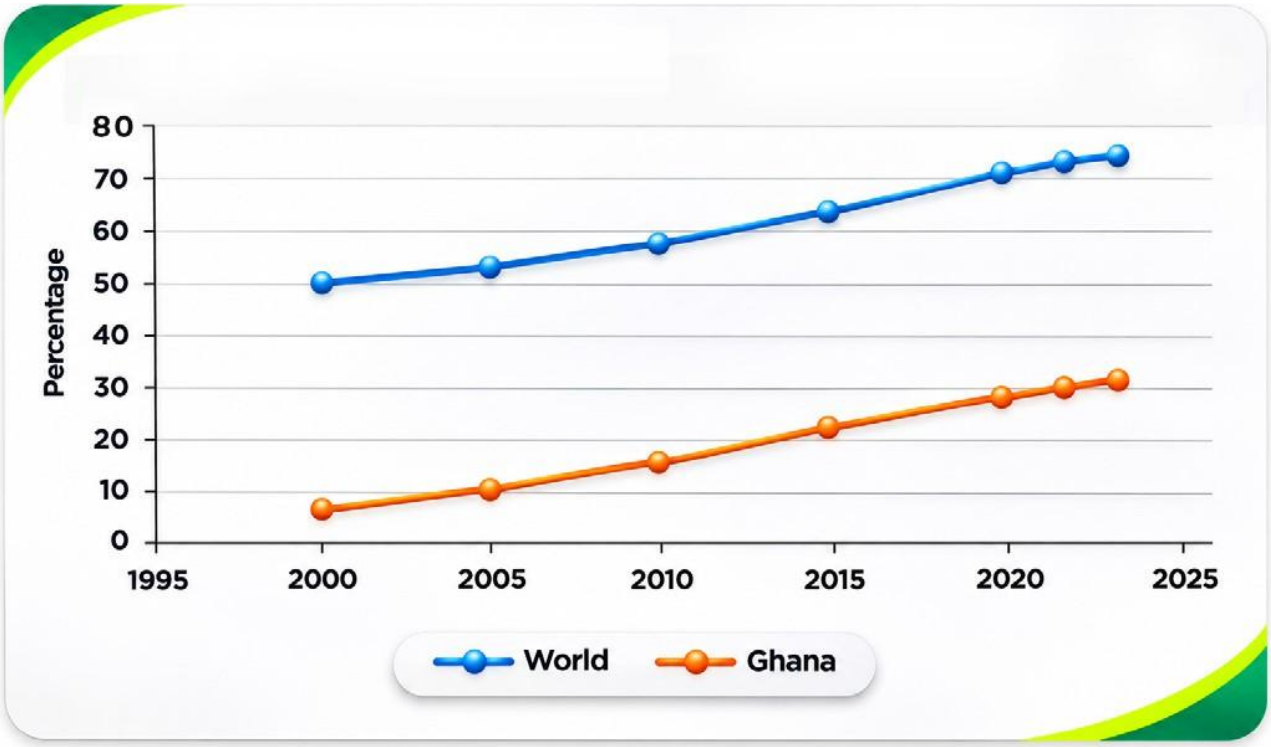
Source: GSS (2021)

Ghana and Clean Cooking Strategies

Ghana since the 1990s has formulated various clean energy policies and enacted various laws to scale up penetration of clean cooking fuels. The National LPG Programme was introduced in 1990 to increase LPG usage among rural and low income households. However, its primary aim was to eliminate flaring at Tema Oil Refinery, and for that matter needed infrastructure was not deployed to achieve its secondary objective of LPG usage at the household level. Later in 2002, government implemented the policy of Gyapa Improved Charcoal Stove Programme to improve utilization of charcoal. Ghana has formulated and enacted about six energy sector programmes and laws including the Renewable Energy Act, Sustainable Energy for All Agenda and Renewable Energy Master Plan between 2006 and 2019 in order to improve the share of clean cooking fuels at the household level. The various strategies implemented improved the clean cooking access and utilization by 31% in 2022 as shown in Figure 5.

Figure 5 shows the trend in access to clean cooking fuels and technologies as a percentage of the population in Ghana compared with the global average from 2000 to 2022. Access to clean cooking increased steadily from 49% in 2000 to 74% in 2022 globally, and from 6% in 2000 to 31% in 2022 in Ghana. Although there was consistent improvement in Ghana over this period, it remained considerably lower than the global average. Additionally, the data show that only one-third of Ghanaians had access to clean cooking fuels and technologies in 2022. This result indicates the need for sustained investments and policy interventions to improve access in Ghana to be closer to the global averages.

Figure 5: Access to clean fuels and technologies for cooking (% of population)



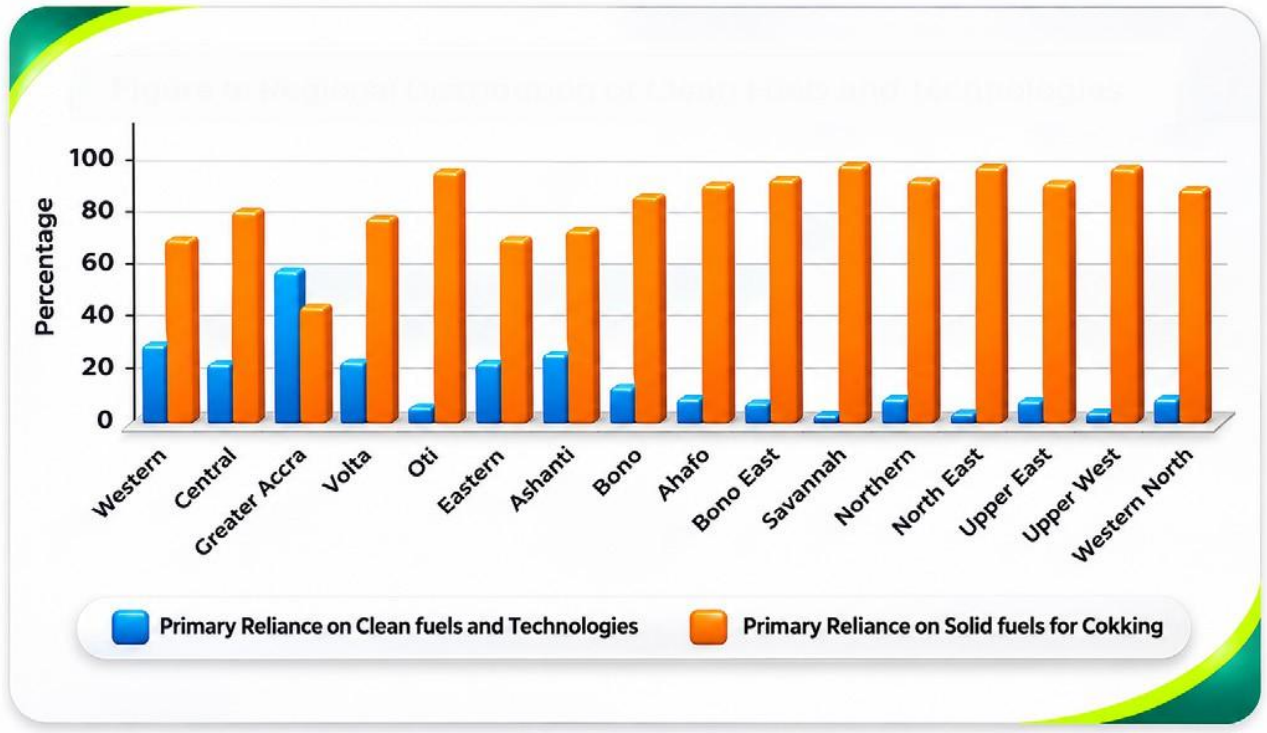
Source: Sustainable Energy for All, Sustainable Energy for All (SE4ALL); International Energy Agency (IEA); World Bank (WB).

Regional Distribution of Clean Cooking Fuels and Technologies

Figure 6 highlights the significant regional disparities in access to and use of clean cooking fuels and technologies. As illustrated in the figure, Greater Accra (56.8%) had the highest primary reliance on clean fuel, followed by Western (29.7%), Ashanti (26.5%), Volta (22.5%), Eastern (21.9%), and Central (21.2%), with the highest clean fuel reliance, while regions with the lowest clean fuel reliance were Savannah (1.4 %), followed by North East (2.0%), Upper West (3.3%), Oti (4.7%), Bono East (6.7%), and Ahafo (7.9%). The data show a clear inverse relationship between clean fuel and solid fuel reliance because regions with higher clean fuel use have lower solid fuel use, and vice versa.

Most regions fall below the 31% clean fuel and technologies threshold, with only Greater Accra (56.8%) exceeding it, and Western (29.7%) is slightly below. This means that the vast majority of regions require targeted policy interventions, such as subsidies for LPG cylinders, stoves, and refills, to make clean cooking affordable for low-income households.

Figure 5: Regional Distribution of Clean Fuels and Technologies



Source: GSS, 2022

National Targets on Clean Cooking in Ghana

Ghana has set different and ambitious targets to eliminate/reduce the use of dirty fuels for cooking and increase access to clean cooking alternatives, which can be identified in the National Energy Transition Framework's 2030 and 2070 targets. These include achieving 50% LPG penetration by 2030. Beyond LPG, the framework set a much broader ambition of achieving universal access to clean cooking energy, including LPG, improved biomass cookstoves, biogas, electric cooking, and solar thermal, by 2030 for the urban population and by 2040 for the rural population, with a complete phase-out of traditional biomass cooking by 2070 and reduction of reliance on firewood and traditional charcoal for cooking to below 30% of total usage by 2030.

The 50 Percent LPG Penetration Target by 2030

As noted earlier, the focus on clean cooking in Ghana is on LPG. Currently, the country is committed to ensuring that 50% of Ghanaians have access to LPG for cooking by 2030. This target is embedded in the 2021 Nationally Determined Contributions (NDCs) to reduce greenhouse gas emissions produced from the household sector. As of 2021, Ghana had achieved 36.9% LPG penetration, which was a 12.44% increase compared to 2017. To achieve the 50% penetration target by 2030, the Ministry of Energy and Green Transition introduced the Cylinder Recirculation Model through its implementation authority. The aim of the model is to establish the pricing mechanisms, safety standards, distribution criteria, and infrastructure required to expand access to and availability of LPG across the country.

At face value, Ghana's potential to achieve its 50 percent target by 2030 appears promising. Nonetheless, more vigorous campaigns and initiatives are necessary to advance the country towards this goal. The promotion of existing initiatives, such as the NLPGPP and CRM, should be intensified, not only in urban areas, where the majority already use LPG, but also extended to rural and peri-urban communities to bridge the gap between rural and urban residents.

Improved Biomass Cookstoves

Ghana aims to enhance the efficiency of biomass utilization and mitigate pollution by transitioning from traditional charcoal use in coalpots and wood on three-stone fires to more advanced biomass cookstoves (ICS). These improved cookstoves act as an intermediary step towards cleaner fuels. Although not entirely clean, the combustion of biomass fuels in these improved stoves significantly reduces fuel consumption and PM2.5 emissions compared with coalpots and three-stone fires. To facilitate this transition, the Ghana Standards Authority (GSA) has established national standards for ICS performance that guide domestic manufacturers in mass-producing these cookstoves. Additionally, the government has set a target to distribute two million ICS and three million biogas cookstoves by 2030.

Electric Cooking

Electric cooking (e-cooking) is recognized by the World Health Organization as one of the cleanest cooking methods. The utilization of electricity as a primary cooking fuel through devices such as induction stoves, electric hotplates, and electric pressure cookers represents a promising long-term opportunity for clean cooking in Ghana. Despite over 87% of the population having access to the electrical grid, less than 1% of the population utilizes it for cooking. This is concerning, as the country has traditionally prioritized liquefied petroleum gas (LPG) and improved cookstoves (ICS) as clean cooking strategies. Although e-cooking is included in the nation's energy transition agenda and has been a topic of recent parliamentary debates, a more defined roadmap with specific strategies is necessary to increase the adoption of electricity for cooking in households nationwide.

Conclusion

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Ghana's trajectory towards universal clean cooking access demonstrates significant but incomplete progress. Data from GLSS 7 (2016/17) and PHC 2021 indicate that liquefied petroleum gas (LPG) has become the predominant primary cooking fuel among households, increasing from 24.5% to 36.9% over approximately four-year period. This increase in LPG usage, alongside a reduction in charcoal use from 34.1% to 23.2% during the same period, confirms that the period of government initiatives coincided with measurable changes in fuel adoption patterns nationwide.

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Nevertheless, national statistics across various localities and regions highlight substantial disparities in Ghana's clean cooking transition. The rural-urban divide is pronounced; while 51.3% of urban households utilize LPG, only 14.8% of rural households do so. Regionally, 68% of households in Greater Accra use LPG, compared to merely 4% of households in both the Savannah and North East regions. The use of wood also declined marginally, from 33.3% to 31%, indicating that the LPG transition has not substantially reached the rural and northern populations, who depend heavily on wood. Furthermore, more than half of households (54.3%) still rely primarily on biomass (charcoal and wood), with associated health, environmental, and economic consequences. A missed opportunity exists in e-cooking, one of the cleanest cooking fuels, which remains negligible at 0.4% uptake despite Ghana's 87% national grid connectivity rate. Although Ghana's clean cooking targets are ambitious, the country remains on the right trajectory. The challenge that the government must overcome is to sustain and accelerate progress at the appropriate pace to meet health and climate commitments equitably across all areas, localities, and regions.

Additionally, addressing the regions below the national average requires a mix of affordability support, infrastructure investment, education, and region-specific strategies to accelerate the transition to clean cooking and reduce the health and environmental burdens of solid fuel use.

Recommendations

Intensify and extend the CRM into Rural and Northern Ghana

The current CRM is being implemented in regions that already have a higher adoption of LPG use. Regions with low penetration rates such as Northern, North East, Savannah, Upper East, and Upper West should be prioritized. Annual targets should be set for new exchange points in low-penetration areas, and a dedicated budget should be allocated to expand CRM to these areas as well as rural areas. In Addition, the government should establish regional targets for CRM and develop monitoring framework to track progress in order to ensure accountability and allow for adaptive policy adjustments.

Different Policy Targets for Regions

Government should differentiate policy targets based on regional contexts. Forexample, urbanregionslike Greater Accrashouldhavestricterregulations on solid fuel use and promotion of electric cooking, while rural northern regions should have supply-chain development and community-based distribution models as well as investment in LPG distribution networks, refilling stations, and electricity accessibility in underserved regions.

Awareness and behavior change campaigns

Education on the health and environmental benefits of clean cooking, along with demonstrations of clean cookstoves, can help shift preferences away from solid fuels.

Accelerate the Distribution and Quality Control of Improved Biomass Cookstoves

The government's target of distributing two million ICS by 2030 requires significant acceleration of procurement and distribution of ICS. The Ghana Standards Authority should also rigorously enforce standards to prevent low-quality ICS that will undermine the confidence of users.

Develop a National Electric Cooking Strategy with a Clear Roadmap

The lack of a dedicated roadmap for e-cooking penetration in Ghana is a policy failure that must be addressed. The Ministry of Energy should develop a national e-cooking strategy to increase the adoption of e-cooking.


Expand Access to Clean Fuels (e.g., LPG)
LPG
Promote Efficient Cooking Technologies
Reduce Reliance on Biomass (wood & charcoal)
Strengthen Policy, Financing & Incentives
Drive Awareness & Behaviour Change
LPG
FREEDOM AND JUSTICE