DRAFT NATIONAL STRATEGY FOR THE POPULARISATION OF LIQUEFIED PETROLEUM GAS (LPG) IN THE GAMBIA

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Figure 4: Effect of smoke produced by firewood during cooking

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AfDB	African Development Bank
APPO	African Petroleum Producers Organization
ARE	Economic Regulatory Agency
BDC	Bulk Distribution Company
BERP	Biomass Energy Regional Programme
BRV	Bulk Road Vehicle
EAGL	Euro African Group Limited
ECOWAS	Economic Community of West African States
ECOWGEN	ECOWAS Programme for Gender Mainstreaming in Energy Access ECREEE ECOWAS Centre for Renewable Energy and Energy Efficiency
EEEP	ECOWAS Energy Efficiency Policy
EREF	ECOWAS Renewable Energy Facility
EREP	ECOWAS Renewable Energy Policy
EU	European Union
GBOS	Gambia Bureau of Statistics
GDP	Gross Domestic Product
GNPC	Gambia National Petroleum Corporation
GREC	Gambia Renewable Energy Centre
GSB	Gambia Standards Bureau
LPG	Liquefied Petroleum Gas
MOPE	Ministry of Petroleum and Energy
MT	Metric tonnes
NAWEC	National Water and Electricity Company
NEA	National Environment Agency
NLNG	Nigeria Liquefied Natural Gas
OMC	Oil Marketing Company
PREDAS	Programme for the Promotion of Household and Alternative Energies in the Sahel
REAGAM	Renewable Energy Association of the Gambia
SE4ALL	Sustainable Energy for All
UEMOA	West African Economic and Monetary Union (French)
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organisation
US	United States
USD	United States Dollars
VAT	Value Added Tax
WACCA	West Africa Clean Cooking Alliance
WAEMU	West African Economic and Monetary Union
WB	World Bank
WHO	World Health Organisation
WLPGA	World Liquefied Petroleum Gas Association

1. Executive Summary

Energy is required for the daily essential functions of cooking and heating at household level. A third of the world's population today (2.6 billion people) lack access to clean cooking solutions and rely on biomass for cooking. This includes 900 million Africans who are without access to clean cooking and 88% of the Gambia's households (GBOS 2023).

The consequences of these practices are dire and disastrous as smoke inhalation from the use of solid fuels for cooking is harmful to the health and safety of users (mostly women and children) contributing up to 4 million premature deaths worldwide each year (UNDP, 2022) and increased air pollution. A study by the Ministry of Health in the Gambia has alluded to a correlation of recent increases in the prevalence of childhood pneumonia in households where biomass is utilised for cooking as cooking areas become more cramped.

The supply of charcoal and wood in particular increases forest loss and degradation costing trillions of dollars in damage to the climate and local economies (IEA, 2021). The Department of Forestry of the Gambia in the Gambia reports10,000 ha loss of forest cover over a 10-year period. Most urban areas are becoming increasingly sparse as trees get cut down for fuel wood.

Policy: Within context of addressing these challenges, the Government of the Gambia has formulated policy options that create the enabling environment for the sustainable use of clean affordable domestic fuels such as LPG. The Ministry of Petroleum and Energy's National Energy Policy 2014 and the National Action Plan for Clean Cooking Energy 2015 both had the promotion and popularisation of LPG usage as sector objectives. The Gambia's short-term economic development strategy, known as NDP 2018-2021 also recognizes that clean and renewable energy sources are crucial for transformation of the Gambia. It is noteworthy that the Gambia government exempts dealers of LPG from paying tax and income duties on LPG and its related equipment (cylinders and tankers). Overland importers are subjected to a 1.5% processing levy that has been recently revised to 1.0%. Special Investment Certificates (SICs) are facilitated via the Gambia Investment Promotion and Export Agency (GIEPA) to private investors in the value chain.

An analysis of the historical use of LPG during this study shows that it slowly emerged as a substitute for fuel wood with demand initially very restricted due to the previous abundance of firewood and charcoal at extremely cheap prices. Recognising this price imbalance as a structural disincentive for the adoption and usage of LPG, the Gambia government committed in the Gambia Energy Policy of 2014-2018 to formulate a price structure for imported LPG and set reasonable retail prices. This however still remains to be done. It is therefore difficult to say that the Gambia Government's LPG policy has succeeded in ensuring increased access for all Gambians and preserving the integrity of the sector.

When it comes to upholding norms and standards and, most crucially, safeguarding the interests of the people and operators in the LPG sector, government interventions have fallen short of expectations. It is essential to have a better LPG policy framework that encourages the development of the LPG infrastructure (availability/accessibility) and provides practical steps to encourage private sector investment. The policy framework should take a value chain approach to deal effectively with supply-side constraints highlighted in this report.

Current Rate of Usage: Usage analysis stems from data obtained from the Gambia Bureau of Statistics Integrated Health Studies, 2021 and data obtained from the consultant's stakeholder interviews. As at 2020, there is a national average of 12% of households owning at least 1 bottle of LPG, however, only 1.9% of households nationwide use LPG as the main cooking fuel. 97.5% of rural households use bio mass as their main cooking fuel (94% firewood and 3.5% charcoal). In the urban areas, 31% and 52% of households use firewood and charcoal as main cooking fuels respectively. Only 2.8% of urban households use LPG as main source of cooking fuel. In terms of population weights, less than 1% of the national population can be said to be using LPG as a main source of cooking fuel. Fuel stacking explains the significantly higher statistics of cylinder ownership over actual use as most households use LPG for the minor tasks of making tea, boiling a quick pot of water or reheating quick single meals.

Modest increases in national usage were noted for the period of 2016 to 2020 and is primarily due to two major policy interventions by government via the introduction of a price regulation guideline in 2016 that was adhered to until 2021 and a removal of the importation monopoly given to a private company (Euro African Group Ltd) in 2016. Consumer analysis trends of both fuel wood and LPG prices in the past 5 years showed a sharp decline in the availability of both fuelwood and charcoal. Rapid population growth has led to increased demands for household energy and this has put further strain on the Gambia's rapidly decreasing national forest cover. As a result, prices for charcoal significantly increased while LPG prices remained largely stable after a government directive in 2016 that set LPG prices until 2022 when there were major price hikes for LPG.

Changes in urban housing, the rise of single-family households and increase of rental properties with smaller living spaces and courtyards have pushed urban fuel wood preferences to charcoal over firewood particularly for households using local cooking stoves. This had changed the realities on the ground for the price imbalance between the use of LPG vs fuel wood.

Affordability: The poor have limited access to LPG due to a multitude of obstacles. Financial limitations are a significant one of them. The Gambia's multi-dimensional poverty index (MPI) for 2019/20 shows about 41.7% living below US $2.15 a day (UNDP 2023). Poor people's access to LPG is hampered by the high initial cost of end-use equipment like cylinders and stoves as well as the high ongoing costs of refilling bigger cylinders.

The current high cost of acquisition of LPG and recent price hikes after a period of relative stability in refill prices from 2016-2021 due to the lack of a pricing structure for LPG in the Gambia are significant barriers to the popularization strategy embedded in this document.
In order to help the poor buy LPG end-use appliances, targeted subsidies on LPG equipment and financial support mechanisms will be necessary. It will also be necessary to promote smaller cylinder sizes in order to lower the price of frequent refilling. Prior to the sharp hikes in prices which importers attributed to the Russian-Ukraine War, the cost of cooking with LPG was seen to rival the cost of cooking with fuel wood particularly charcoal as the main fuel wood of choice in urban settlements.
In fact, in an experiment conducted as part of this study and anecdotally verified by consumer interviews with exclusive users of LPG, **the cost of cooking with LPG even with the recent price hikes can be cheaper than the cost of cooking with charcoal**.
This shows that if government follows up on its commitment to put in a price structure in place for LPG, government will be able to significantly minimise if not outrightly eliminate the price advantage that fuel wood is perceived to have over LPG.
Interviews with the LPG directorate of the Senegal Ministry of Energy confirm this assumption as the country has had sustained success with LPG use and adoption due to the population's realization of how much cheaper it is to cook with LPG over charcoal.

Regulation: The sector has only ever been regulated insofar as license applications are concerned. Due to the regulators' low logistical and human resource capabilities, monitoring LPG facilities to guarantee conformance and compliance with safety standards and regulations has been very inadequate. The GSB, which is tasked with ensuring compliance with end-user safety and regulations, is unable to carry out this duty successfully due to a lack of end-user safety standards and rules. Thus, in order to formulate and enforce the necessary laws and regulations for the efficient operation of the LPG business, the regulators' capacity must be increased.

Safety/Image: At household and consumer level, the biggest challenge seems to be safety concerns foremost, stemming from a pervasive fear of fatal accidents borne by lack of awareness of the conditions for safe usage and management of the cylinders followed by price concerns then availability, accessibility bottlenecks, and finally cultural preferences.

Supply Infrastructure: To facilitate end-user access to the product, considerable investments will be needed in the LPG supply/distribution infrastructure. Offering financial incentives to the private sector to invest in the LPG business and promoting PPPs are two potential funding sources for the LPG sector. The current storage facility for LPG in the Gambia is wholly inadequate and unable to keep up with prevailing national demand. There are marked and frequent incidences of LPG shortage in the Gambia experienced by both retailers and consumers due to the limitation of the current storage facility (1000MT which for operational reasons cannot be filled to full capacity).

Overland importation of LPG of much smaller volumes at a maximum of 20MT at a time is carried out by the smaller scale retailers (there are technically only 2 sea freight importers of LPG in the Gambia) who have no storage facilities at their disposal. They utilise 20–30-ton tanker trucks which they then offload at their filling facilities and fill up in bottles. These amounts are usually only sufficient for 2-4 weeks supply of LPG at retailer level depending on LPG availability at the depot.

The Gambia must as a matter of urgency prioritise both the expansion of the current storage facility and the development of new storage facilities that can store LPG to meet current and future national demands for LPG. As of 2021, there is one other storage depot in the Gambia, privately owned called GPS with 30,000 MT combined light fuel oil capacity. It however does not have LPG storage within its facilities. It is understood that there are plans underway to develop more storage depots including from the state-owned corporation, Gambia National Petroleum Corporation. It is imperative that the government of the Gambia requests investors in this sector to include LPG storage tanks in their plans. Some suppliers have claimed that the average importation of LPG from neighbouring Senegal overland exceeds the refills done from the national storage depot. These claims are however yet to be substantiated by tax data received from GRA (though the data received has proven to also not match the depot importation data that formed the basis of consumption calculations).

Local market players have declined to share sales and purchase data to quantify and substantiate these claims. It can therefore be reasonably adduced that while there are many instances of proven LPG shortage, the amount imported overland remains statistically insignificant at about 10% or less of the volumes of over-sea importation. Tankers available for overland importation are also of minimal volumes (10-30MT) and mainly these imports are shared by a consortium of 3 or more local players.

The low capacity of central storage for LPG is also seen as a contributing factor for the high cost of LPG imports into the country. The inability of the country to accommodate larger volumes LPG means that larger ships skip the Gambia for other neighbouring countries.
Even smaller ships also often stop at the Gambia as a last port of call after offloading greater amounts elsewhere. As a result, Gambia is unable to benefit from the economies of scale that come with the purchase of large quantities and the sea freight supply is effectively monopolized by those ships that are able to dock and the two importing companies that have long-standing business relations with these suppliers.

Cylinder Management: On the cylinder availability side, there is a lack of empirical data to determine approximately how many cylinders are currently in circulation in the country as dealers were unwilling to share statistical data. Given that statistics from the IHS 2020 show that 12.6% of households own at least 1 LPG cylinder, one can assume that there are at a minimum over 35,000 cylinders in circulation. It could be seen from both dealer and consumer interviews and surveys that there is an even more acute shortage of cylinders than there is of the LPG that the cylinders are filled up with.

Dealers decried the upfront cost of acquiring new cylinders and consumers spoke of many weeks and months of awaiting cylinder availability.
Consumers particularly expressed concerns about the old age, safety and unhygienic looks of gas cylinders prevalent in the market. It has been established that there is a high prevalence of cylinders in the market dating back to the first influx of LPG cylinders in the country (from the 70s). There seems to be no government incentive or policy to phase out extremely old cylinders in circulation. The resolution of these challenges will enable the Gambia to meet the ambitious targets set out in this report for the adoption and use of LPG.

Accessibility: For the poor to have better access, there must be more LPG retail shops in rural and peri-urban regions. There is little to no variety of stoves designed for LPG usage in the market. There is therefore a need to improve the technology for locally designed stoves to make them compatible, cheaper and more efficient as has been done with improved cook stoves. Adaptation of the existing stoves to meet local needs at home will help improve the acceptability of LPG among Gambians.

Road is the primary means of transportation for LPG that is imported and distributed overland. The risk of carrying the product by this route is increased by the poor quality of the road network. The construction of LPG storage depots at key sites around the nation will increase road transportation's effectiveness and lower danger. In the near future, additional means of transportation, such as pipelines, will have to be taken into consideration to supplement the product's current road transit. Many countries in the ECOWAS sub-region benchmarked for the purposes of this study have experienced sustained growth through the deployment of impactful LPG popularization policies, fiscal and non-fiscal incentives and sound regulatory frameworks underpinned by strong political will. There is a need for both immediate and short-term measures to address the present supply and storage constraints to mitigate LPG shortages and steeply rising prices.

The production of LPG in West Africa has increased over 10-fold between the 90s and early 2000s (from 0.4 million tonnes to over 5 million tonnes). This figure is also expected to double over the next ten years on a conservative level (ECOWAS 2020).
Furthermore, the Gambia lies within the prime Mauritania-Senegal-Gambia-Bissau-Conakry geological basin which has been home to major gas discoveries in recent years. The proximity of the Gambia to the recent major gas discoveries of trillions of cubic ft of gas in the Greater Tortue Anhymeim discovery and the Yaakar-Teranga discoveries in Senegal has not only given rise to increased exploration interest in the Gambia for gas resources but also augur well for increased subregional LPG production that the Gambia can leverage on to meet its current and future domestic gas needs.

The speedy development of these gas fields, expected to come on-stream in 2023 demands for increased infrastructure to store, transport and deliver natural gas from neighbouring countries.

As a long-term measure, the country should consider the building of traditional pipeline infrastructures, and the use of modern and unconventional infrastructures such as virtual pipelines for the delivery of LPG for household use.

The Gambia could also leverage its unique port access to consider the set-up of regasification and storage units offshore to process natural gas from neighbouring countries into various constituents like LPG.

The Government of The Gambia has taken steps for involvement in the West African Gas Pipeline Initiative, the Nigeria-Morocco Gas Pipeline Project and Trans-Saharan Pipeline Network, which are part of the ECOWAS West African Regional Energy Project which seeks to define the sub-region's integrated energy resources to meet energy needs within the community and to develop a network to market the product. It is important to keep these commitments ongoing.

This popularization strategy recommends to solve the abovementioned challenges via a multi-faceted approach that focuses on policy and regulatory formulation; supply chain investment and management; private sector participation; and massive consumer sensitization and awareness drives.

The following clear actions need to be taken along these lines:

a. **Define the use of LPG** as a substantial policy towards meeting clean cooking goals in the upcoming National Energy Policy Document. The current National Energy Policy Document (2014-2018) in use does not center LPG for household cooking. Previous government interventions in this area have been half-hearted, covering the distribution of (insert number) LPG cooking stoves nationwide with greater focus placed on the development of improved cookstoves which scientific data has shown to be not as energy efficient nor as effective in combating environmental, health and climate change concerns as LPG (insert study and conclusion).

b. **Pursuant to a) above, set a national target** to increase the LPG penetration in households from 12.6% to 50% by 2030 and to achieve a per capita consumption of at least 3.7kg. This will be done through a holistic and comprehensive program which addresses both the supply and demand-sides of LPG subsector of the Gambia through strategic changes. These strategic changes will promote and popularize the use of LPG as a clean and sustainable alternative to charcoal and firewood.

c. **Establish a regulatory framework** dealing with the The LPG market and sub-sector through amendment of the current Petroleum Products Bill to include and define LPG as a product. Pursuant to this, develop, deploy and monitor LPG specifications and cylinder standards. Consider developing an encompassing regulation governing the LPG industry as a matter of priority.

This regulation should clearly set and specify industrial safety specifications and standards and be enforced to ensure cylinder safety, consumer satisfaction and the wellbeing of citizens. PURA as a regulatory enforcement agency must be empowered, equipped and strengthened to supervise and enforce compliance with the above-mentioned regulation.

d. **Implement direct initial subsidies.** Government should also go a step further beyond the zero-tax incentive on LPG and introduce direct initial subsidies to influence LPG as a household fuel of choice given the price sensitivity of consumers. Gambia government will have to consider the implications of these subsidies on the national budget and against the fuel subsidies it is currently struggling with. The subsidies can be on the products through either paying part of the cost of cylinders, or subsiding the product directly as in the case of current fuel subsidies. These subsidies can take on various forms and may be equipment focused (to mitigate the initial cost of LPG cylinders); targeted by refill capacity (for low-income users of LPG) or both. These can be introduced with the intention of scaling up adoption and then phasing them out later once consumers (use better phrase 'get hooked onto LPG for household cooking and heating needs).

The development of an effective and uniform price structure for LPG (one that is both implemented and ensures the same prices across all urban and rural areas) and the improvement of current pricing structure for light fuels will help government to better assuage the costs of these subsidies. Government will also improve affordability by either rolling out or encouraging pay as you go financing, availability of micro-credit and/or part-financing of the acquisition costs of LPG cylinders and accessories in order to encourage new user adoption of LPG for cooking and other household energy needs such as seen in Senegal, Cape Verde, and Ghana.

e. **Endeavour to establish the Gambia as a mini-hub** for LPG and natural gas deployment to take advantage of gas discoveries in the MSGBC basin. In a similar vein, prioritise the continued exploration of natural gas resources in the Gambia with a view to positioning the Gambia as a producer nation.

f. **Improve access to finance for LPG operators** and leverage the state-owned corporation to establish public private partnerships both to build a much larger LPG storage facility and meet a significant importation quota for LPG in order to increase affordability, accessibility and availability.

g. **Develop mass sensitization programs** to improve consumer awareness and safety management of the LPG usage in households. Mass and targeted information campaigns to raise consumer awareness of these incentive schemes and user educations that focuses on improvements in the safety management and increased confidence in the usage of LPG cylinders must be taken up by the government. There is the need for continuous sensitization, safety briefings, and capacity-building programmes alongside a robust regulatory environment that ensures minimum safety standards are met during the sale, distribution, installation and disposal of LPG cylinders and refills.

Quite aside from the obvious environmental benefits such as the stemming of forest degradation, substantial increase in the adoption of LPG by 50% of the population and increased private sector participation will lead to improved health and productivity in the population as cooking times and smoke exposure is vastly reduced; increased economic activity in the creation of more jobs along the entire value chain, develop feeder industries that build new and improved local cooking appliances to accommodate LPG over bio mass usage since the efficacy of improved cookstoves using biomass are in question (WLPGA 2015).

Once the convenience, environmental, health and economic benefits of utilising LPG cylinders for household energy needs are made clear to the general public; (i.e. little to no hours spent collecting firewood or illegal burning and transporting charcoal, less smoke inhalation by women and children, shorter cooking times, maintenance of the forest cover, and ultimately cheaper to use than charcoal when the right national frameworks are put in place); there will be notable increases in demand which will directly impact upon the already inadequate supply-side.

Beyond the consumer targeted incentives and subsidies, an enabling investment environment for private sector participation in the development of LPG storage and supply system infrastructure must be targeted and prioritised. A significant increase in usage will be predicated on the growth of private sector initiatives in cylinder distribution, management and accessibility.

Overall, the achievement of the above will require sustained national effort and coordination of the various stakeholders within government, the private sector, donor and funding agencies (regional and international) to ensure a continuous stream of investment required to achieve the afore mentioned national targets of making LPG the primary household energy in use in the Gambia by 2030.

In the medium-to-longer term, policies could build resilience to shocks through structural change by improving access to finance and value addition, tapping into innovative financing instruments, investing in the development of supply-side infrastructure and heavily promoting LPG usage while improving LPG safety awareness.

2. Introduction

The most important activity in Gambian household is cooking, which accounts for also the largest consumption of energy derived from fuel wood. It represents the biggest demand for energy accounting for more than 85 percent of the final energy demand. This high percentage contribution has remained consistent for more than three decades. The Gambia is heavily reliant on biomass and the Gambia's natural vegetation and forest cover cannot support current demand. Fuelwood is cheap and used for daily cooking in the Gambia. More than 95% of households in The Gambia use fuelwood for cooking. As at 2020, there is a national average of 12% of households owning at least 1 bottle of LPG, however due to fuel stacking, only 1.9% of households nationwide use LPG as the main cooking fuel. 97.5% of rural households use bio mass as their main cooking fuel (94% firewood and 3.5% charcoal). In the urban areas, 31% and 52% of households use firewood and charcoal as main cooking fuels respectively. Only 2.8% of urban households use LPG as main source of cooking fuel. In terms of population weights, less than 1% of the national population can be said to be using LPG as a main source of cooking fuel. (GBOS, 2021).

The sources of charcoal and firewood in the urban areas are mostly from retailers. Firewood is normally bought split into small sticks whilst charcoal is sold in bags of between (15 -20 kg) or in small nylon bags of about a kilo (1 -1.5kg) each.

Significant amounts of charcoal are produced in the West Coast region, despite the legal implications. Apart from minor and clustered production of charcoal in the Gambia in the Western region, the importation of charcoal and firewood in the Gambia is mostly from the southern Senegal region and the Guineas and it involves middlemen who buy it from other producers at the sources. The main driver has been the relative ease of transportation following the development of the major highways such as the coastal road and the Brikama- Soma highways.

It is clear that unless alternative sources of energy are promoted, increasing reliance on foreign importation of a major fuel source like fuel wood could raise key energy security issues. Further, most wood comes from Casamance forest, which forms an ecosystem around the Gambian border with Senegal. Therefore, exploiting such ecosystem will as well negatively affect the biodiversity of resources in The Gambia.

2.1. Significance of LPG

LPG has several health and environmental advantages over other cooking fuels, which justifies it use; it is noted that the most effective way of reducing or removing Indoor Air Pollution from homes and saving the majority of these lives is to switch to a cleaner fuel, such as LPG.

The environmental benefits of switching to LPG from traditional fuels (and most other fossil fuels) can be considerable. Reducing the demand for wood and charcoal by switching to LPG has the added environmental benefit of slowing down the rate of deforestation, estimated at 3% per annum. LPG produces virtually no soot (particulate matter, PM) and, relative to most other non-renewable fuels, low emissions of carbon monoxide (CO), unburned hydrocarbons (HC), and oxides of nitrogen (NOx) - the principal precursors of ozone which produces smog. In addition, there are low but potentially damaging emissions in wood fuels of toxic gases that can cause serious health problems if breathed in close to the point of combustion. These are absent in LPG, which makes that fuel highly suitable for household cooking.

LPG is particularly well suited to residential cooking and heating because of its clean-burning attributes and practical advantages over traditional fuels. It is more convenient, safer and easier to cook with LPG. LPG is also portable and has a high calorific value by volume and mass. Fuel-cycle emissions of CO2, a greenhouse gas and the primary source of global warming, are also lower than those of most other fossil and traditional fuels.

Figure 1 and Table 1 below illustrate the relative efficiencies and emissions levels characterizing various household cooking fuels. From the health, time-saving, and environmental perspectives, there is widespread agreement that the choice of LPG is desirable even though it is a fossil fuel. Intensive public education will be required to raise awareness and sensitise households of these benefits.

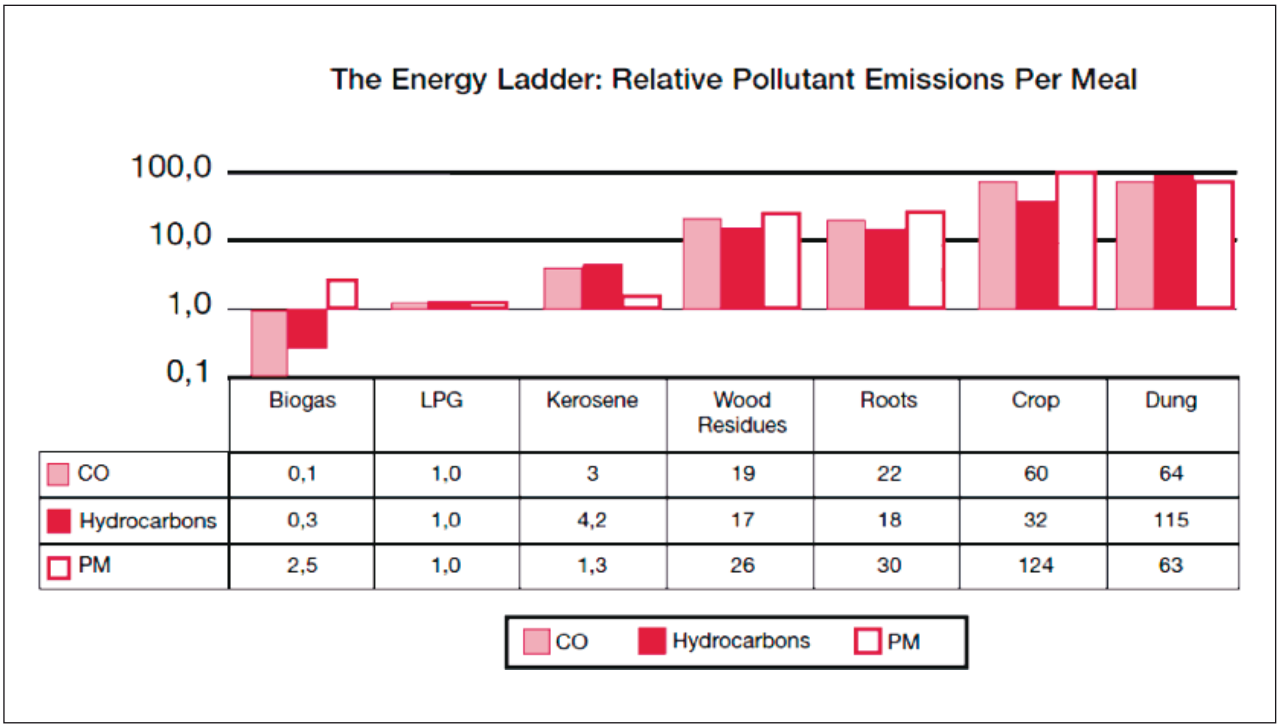


Figure 1: Energy Ladder Relative Pollutant Emissions Per Meal (Smith, K.R et al (2005)

Fuel		**Overall, Stove**		**Emissions (g/MJ Delivered Energy)**		
	Thermal Efficiency	**CO2**	**CO**	**Methane**	**TNMOC***	**N20**
LPG	53.6	126	0.61	Neg.	0.19	0.002
Biogas	57.4	144	0.19	0.10	0.06	0.002
Kerosene	49.5	138	1.9	0.03	0.79	0.002
Wood Fuel	22.8	305	11.4	1.47	3.13	0.018
Crop Residues	14.6	565	36.1	4.13	8.99	0.028
Charcoal	14.1	710	64.0	2.37	5.60	0.018
Dung Cake	10.0	876	38.9	7.30	21.80	0.022

Table 1 Efficiencies and Airborne Emissions for Household Cooking Fuels

3. Background of the Strategy

This strategy document is part of a larger ECOWAS LPG project that endeavours to implement a holistic and comprehensive program which addresses both the supply and demand-sides of the LPG Industry in member countries. The strategy seeks to promote and popularize the use of LPG as a clean and sustainable alternative to charcoal and firewood drawing on from the ECOWAS regional strategy developed and validated in 2018.

Despite the significant energy resource potential of the Economic Community of West African States (ECOWAS) region, 80% of total consumption energy consumption in the region is predominated by biomass (ECOWAS, 2018). More than a third of a household's budget is utilized for fuel costs in many countries in the region and the Gambia is no exception with over 95% of the population relying on solid fuels for cooking and heating needs. (GBOS, 2021). The World Health Organization (WHO) projected in 2007 that switching half of the world's population from solid fuels to LPG could increase productivity and improve health by more than $900 billion over ten years. (New African Oil and Gas Special 2007).

Drawing on the United Nations' 2030 Agenda for Sustainable Development which provides a global "blueprint for action" on an urgent range of sustainable development imperatives, ECOWAS has policies such as the ECOWAS renewable energy policy and the ECOWAS Bioenergy policy all of which recognise LPG as a clean burning and energy efficient fuel that contributes regional renewable energy goals and the Sustainable Development Goal (SDG) 7 which focuses on affordable and clean energy. However, the rate of access to LPG in West Africa remains poor at 10% with 90% of usage concentrated in urban cities of the region (ECOWAS, 2014). The picture is even worse in Gambia, where 96% of households still use fuel woods as main energy source with 12% of households having ownership of at one gas bottle.

With less than 8 years to 2030, the world, in particular the Gambia is far off from meeting SDG7 unless some urgent and radical actions are taken at both regional and national level to ensure access to affordable, secure, safe, reliable, sustainable and modern energy for all at the household level.

The success stories in Senegal, Cape Verde and elsewhere in the region have been predicated on political will of the respective governments to provide policy frameworks that strengthen institutional frameworks and collaboration in order to ensure household energy access, energy security and promote sustainable private investment.

3.04 billion people worldwide did not have access to clean cooking in 2014. This number has increased since 2012, mostly due to Africa, where the population grows by 25 million each year while the number of people having access to clean cooking increases by only 4 million. Only 12% of Africans in Sub-Saharan Africa had access to clean cooking fuels and technologies in 2014, which was the largest access deficit relative to population in the continent. As a result, Africa has a relatively low adoption and penetration of cleaner options like liquefied petroleum gas by international standards and as a result of the region's substantial reliance on solid fuels and kerosene.

3.1. Objectives of the Strategy

This strategy intends to popularize Liquefied Petroleum Gas (LPG) in order to contribute to increasing household access to modern and clean fuel within the context of sustainable energy development. More specifically, the Strategy aims to:

- ✓ Create an environment conducive for the LPG penetration in households by removing all potential barriers;
- ✓ Increase private investment in the LPG value chain;
- ✓ Foster the use of LPG in households through availability, accessibility, affordability and safety management.

3.2. Scope of Work and Deliverables

The scope of work entailed an in-depth diagnosis of the LPG sub-sector in the Gambia which would involve a review of the policy, institutional, legal and regulatory framework governing LPG activities; as well as analysis of the market structure, existing infrastructure, equipment and accessory usage, safety rules, pricing structure, gaps and barriers, the evolution of LPG usage over a 5-year period and the impacts of growth on infrastructure and supply and distribution system. A national strategy is designed from this information based on a vision, strategic objectives and a relevant action plan with national participation. The consultant has thoughtfully submitted an analysis over the past seven years (instead of 5) to capture the seismic shifts in the market and pricing environment that occurred due to the resultant effects of Covid-19 and the Russian-Ukraine War.

3.3. Methodology

The strategy was informed by primary and secondary sources through a combination of desk research and structured interviews, meetings and surveys with identified stakeholders. The primary research included data collection on prices of LPG nationwide, consumer focus group discussions, one on one open-ended interviews with the importers, wholesalers and a cross section of retailers.

Stakeholder consultations for supply-side insights covered both state (government ministries, agencies and departments) and non-state actors such as the private sector, consumer groups and civil society through focus group discussions where feasible and one on one semi-structured interview where applicable.
To this end; three sets of interview questions are prepared for state actors, non-state (business) actors and consumers (see Appendix). This provided the necessary background information about individual stakeholders.

The research included data collection on prices of LPG, one-on-one interviews with the importers, wholesalers and a cross-section of retailers and consumers.

For demand-side insights, significant data was obtained from the Gambia Bureau of Statistics' recently completed 2021 Integrated Household Survey which included a comprehensive assessment on Household Energy Usage and Consumption. In addition, tax information from the Gambia Revenue Authority proved particularly helpful in painting a picture of consumer usage and demand of LPG in The Gambia.

Secondary data was sourced from data from ECOWAS, WB, ECOWAS publications, journal papers, news articles, textbooks, unpublished materials, and recognized websites about the LPG industry globally with particular reference to countries in the sub region, market structures and dynamics, prices and how they are determined.

This enabled a comparative analysis and best practice recommendations from Senegal. other countries within the subregion. In the case of Senegal, the consultant was able to secure phone interviews with the regulatory authority in Senegal and the national refinery and main importer S.A.R.L which is tasked with meeting 40% of import requirements. The survey instruments, evaluation questionnaires and list of stakeholders consulted can be found in Appendix 3.

The approach was broadly divided into four phases:

- Phase 1 consisted of researching and reviewing existing policies strategies, projects and programmes
- Phase 2 consisted of stakeholder engagement and a comparative analysis of policies and strategies affecting the LPG Industry in ECOWAS member states
- Phase 3 involved a survey of LPG users and consultation with non-users of LPG
- Phase 4 is the submission of the draft strategy; comprehensive validation and final report drafting.

3.4. Limitations

While there was willingness to speak to the Consultant, retailers and wholesalers declined to share data regarding sales, purchase figures and frequency of supplies. The Consultant consequently was unable to develop an accurate view of market shares and establish the true volume of over-land importation.

4. The LPG market in the Gambia

4.1. Evolution of the The LPG market

The Liquefied Petroleum Gas (LPG) market in the Gambia is still very underdeveloped. Like all petroleum products, LPG is imported and sold in different sized cylinders. Early 1980s Butane project introduced LPG to the Gambia; a regional butane initiative under the CILSS Gas Project introduced it in 1990. Due to a lack of its own refinery, The Gambia bought LPG primarily from Senegal through Musa Njie & Sons, M&C LPG, Touba Gas Mineral and Oil Holding, Ndey Bambi Enterprise, Gam Gas, and Banjul Oxygen, up until 2009 (none of these players are currently in the market). Citing the need to mitigate frequent LPG shortages, high transit costs, sporadic shortages, and currency weakness encountered, The Government of the Gambia placed an embargo was placed on importation from other companies and the Gambia began importing LPG through Euro African Group Ltd (EAGL) in 2009 giving EAGL a monopoly on importation.

The law assenting to the liberalisation of LPG importation signed in 2016. Retailers and distributors are now free to import LPG from any nation they choose. For the years 1996 through 1999, The Gambia's yearly LPG usage was predicted to be 1,350 tons, and for the year 2000, it was around 2,000 metric tons. Despite a 48 percent increase from 1,350 MT to 2,000 MT per year between 1996 and 2004 in the Gambia's annual LPG consumption, the penetration of LPG is still very low.

After a high of about 3500 tons in 2009, annual consumption reached an equilibrium of between 2000 MT yearly remained until 2016 when the Ministry of Petroleum and Energy did a policy intervention by conducting price benchmarking within the sub-region and publishing a pricing guideline to bring down sky rocketing LPG prices. Consequently, annual consumption of LPG increased by an average of 13-14% over the previous year for two consecutive years.

In 2017, the full effects of a market liberalisation policy to remove the monopoly by EAGL on LPG imports championed by the Gambia Consumer Rights and Competition Protection Commission took effect and a consumption increase of 30% to 4400 tons was registered due to positive market forces caused by the liberalization and entrants of new companies creating new business areas and access points. National consumption volumes remained the same in 2019.

2020 registered a 12% increase in LPG consumption due to the effects of the Corona virus lock down which saw an increase in household energy consumption and usage. In 2021, a modest 6% increase was registered to an all-time high of 5343 tons.

Subsequently, LPG use per capita in country has increased from 1.5kg in 2016 to 2.0 kg in 2020. The number of offloads/sea imports registered at the depot was 6 importations in 2015, 7 in 2016 and 2017, 10 imports in 2018, 8 in 2019, 9 in 2020 and 11 in 2021. A maximum of 800 tons and a minimum of 200 tons are offloaded per consignment. From market research and surveys undertaken by the consultant, there have also been instances of overland importation of LPG from 2019 when government lifted the ban on overland importation that was previously enforced due to safety concerns. The ban was lifted to mitigate frequent shortages of LPG refills given the relative infrequency of sea imports every 6-8 weeks. households and in the tourism industry (GCCPC, 2016).

Year	National Consumption (MT)	Vol Increment (MT)	% Increase	No of Imports
2015	2255			6
2016	2600	345	13.27	7
2017	3050	450	14.75	7
2018	4400	1350	30.68	10
2019	4400	0	0	8
2020	5000	600	12	9
2021	5343	343	6.42	11

Table 2 National LPG Consumption of the Gambia (GamPetroleum Depot, 2021)

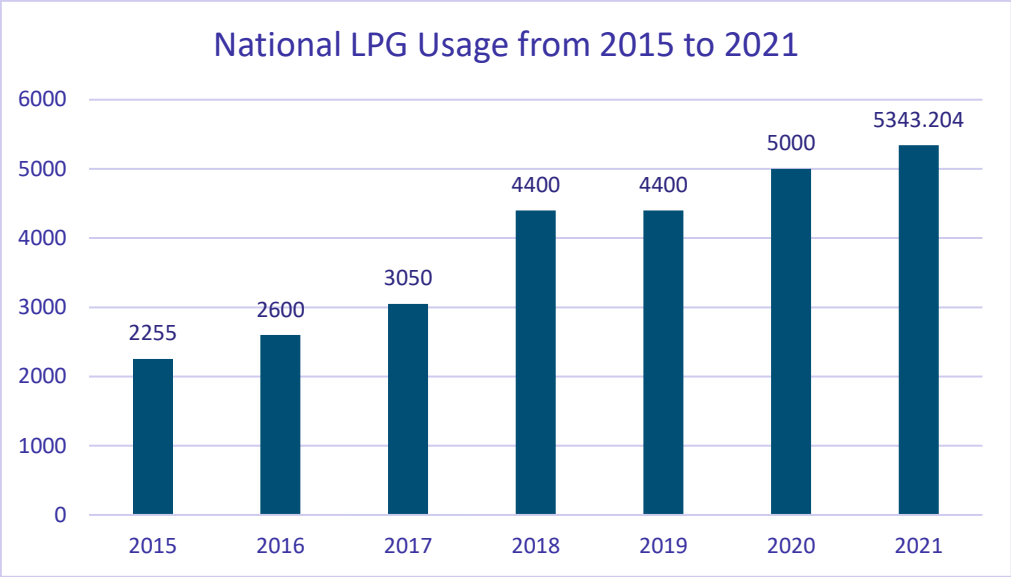
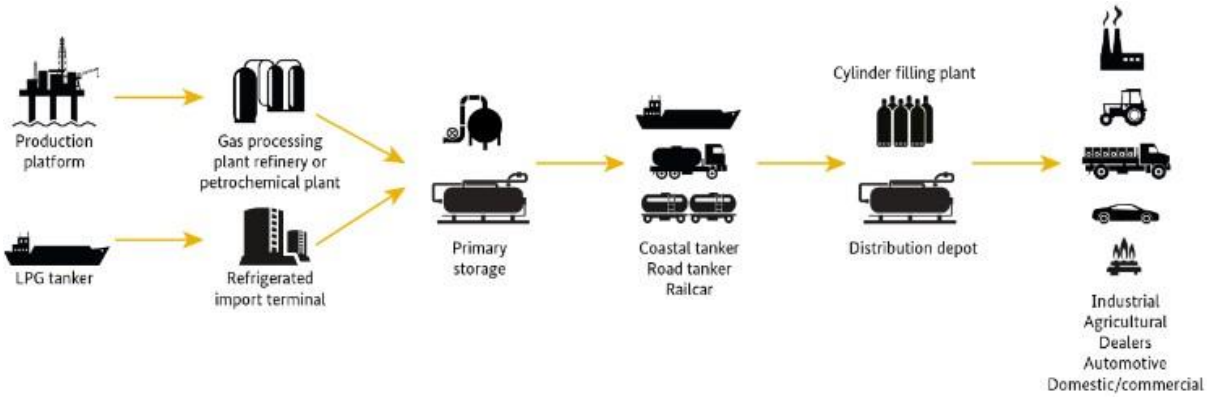


Figure 2 Gambia's LPG Usage 2015-2021 (GamPetroleum Depot 2021)

4.2. The LPG market Structure in the Gambia

The global LPG value chain illustrated in Figure 3 belownshows the various activities involved as well as the process/network through which LPG is made available for consumption by end users.

Figure 3: LPG Global Value Chain



In the Gambia due to the lack of a refinery/production plants and manufacturing plants, the LPG value chain is much more simplified as seen in Figure 4 below

Figure 4: Gambia LPG Value Chain

Oryx Energies, TOTAL, and Vivo Energy are a few of the major companies controlling the LPG industry in West Africa. Oryx has a sizable operation and is currently active in the Gambia having taken over the Atlas license and portfolio.

There are about 11 LPG licenses maintained by the Public Utilities and Regulatory Agency (PURA) (see Table 15) with nine (9) LPG operators or distribution companies in the country and the majority of them are small local companies. PURA clarified that the list below is of some of the companies that have been issued importation and re-export licenses and that an importation license does not restrict one to only one product in the oil and gas value chain, it covers all product types.

Table 3: LPG Licenses in the Gambia

	LPG GAS SUPPLIER LIST							
S/N	Company Name	Location	3kg	6kg	9kg	12kg	30kg	50kg
1.	Njegan Gas	Sankung Sillah Road, Kanifing	✓	✓	✓	✓	✓	✓
2.	Amina Holding	Kanifing Industrial Estate, Kanifing	✓	✓	✗	✓	✓	✗
3.	PETROGAS	Independence Drive, Banjul	✓	✓	✗	✓	✓	✗
4.	Native Gas	AU Highway, Sukuta	✓	✓	✗	✓	✓	✗
5.	Hadim Enterprise	Kanifing Industrial Estate, Kanifing	✓	✓	✗	✓	✓	✗
6.	ATLAS	Jeshwang	✓	✓	✗	✓	✗	✗
7.	Tida Gas	Mandinary Industrial Area	✓	✓	✗	✓	✓	✓
8.	Jah GAS	Kanifing Industrial Area	✓	✓	✓	✓		✓
9.	Castle	1 KAiraba Avenue	✗	✗	✗	✓	✗	✗
10.	BAYE CEESAY OIL & GAS CO. LTD							
11.	STAR OIL GAMBIA LTD							

Some of these players are not actually importing LPG nor do they all have an LPG bottling plant. All the operators receive their LPG supplies from the depot and transport them to their refilling plants to refill the cylinders, there are different sizes of LPG cylinders—3kg, 6kg, l2l‹g, 25kg, 38kg and 55kg in the Gambian market.
The market can broadly be divided into Importers, Middlemen and Retailers

Importers
Currently, three (3) of the Downstream Operators with a license namely **PETROGAS, ATLAS (now Oryx Energies)** and **CASTLE**, import LPG into the country even though there are more operators with the same license.

The number of offloads/sea imports registered at the depot was 6 importations in 2015, 7 in 2016 and 2017, 10 imports in 2018, 8 in 2019, 9 in 2020 and 11 in 2021.
A maximum of 800 tons and minimum of 200 tons are offloaded per consignment. The origin of these consignments varies from West and Central Africa to Europe and USA.

The consultant found it extremely difficult to obtain sales and invoice data from the market players to compute an adequate representation of the prevailing market shares as at 2021. However, based on some sales figures and invoices obtained from July – December 2017 from the Gambia Consumer Rights and Competition Protection Commission (GCCPC), which correlated with the total amounts of imports at the depot; the table below shows the percentage each dealer holds in terms of total metric to retail for the period under review.

	Jah Gas	Njegan	Atlas	Amina	Hadim	Native	Total
MT	449	260	174	245	139	236.736	1503.736
Market share	30%	17%	12%	16%	9%	16%	100%

Table 4: Market Shares in Gambia The LPG market

Source: GCCPC.

The table above depicts the market shares of all major LPG retailers in The Gambia for the period obtained in 2017. There seems to be a slight monopoly situation in these two quarters as defined by section 31 of the Competition Act 2007**,** which states that "*a firm with 30% or more market share in a particular sector is deemed to be in a monopoly situation*".

Major Wholesalers

These are primary gas companies that purchase gas from the importers and fill cylinders weighing 25, 12.5, 6, and 3 kg. The gas is supplied by the wholesalers to different retailers, most of whom deal in other goods. The retail locations for most of the wholesalers are found in its cylinder parks. The other businesses make use of their own locations as well as retail establishments like community supply stores.

Middlemen

The middlemen acquire LPG cylinders from significant wholesalers and offer them for sale to retail establishments. Some of the middlemen receive commission on sales. The majority of middlemen operate in the unregulated, unregistered, and are exceedingly challenging to find. Major wholesalers who supply retailers directly do not always use the services of middlemen.

Retailers

These are usually small neighbourhood corner shops that purchase supplies from either large wholesalers or middlemen, and then they sell them to the general population. They are supplied by the wholesalers on a cash or credit basis. All the large distributors/wholesalers also engage in retail sales.

Oryx Energies set up 28 service stations in November 2017 when it acquired a 75% stake in Atlas Energy Limited, Gambia. Through these stations, Oryx supplies LPG, fuels and lubricants to its portfolio of customers. The major wholesalers in The Gambian market are Petrogas Energia, Njegan, Hadim, Amina's Holdings and Native Gas. They buy LPG in bulk and re-sell/distribute, each using their own vehicles or services of middle men. The LPG truck tankers used by retailers vary in size between 10MT to 30MT.

There are an estimated 200 people employed between the 9 active wholesalers. All wholesalers, except PETROGAS, are members of the LPG dealers' advocacy group/association, but it is not as effective as one might expect. The main role of wholesalers is to buy LPG directly in tonnes from an importer in the depot and resale it in cylinders to retailers, middlemen, or occasionally even end consumers.

*The growth of the The LPG market has been hindered by several factors including the high capital cost to obtain cylinder and also the high cost of refilling cylinders. There are also issues of health and safety concerns, as there have been a number of fire accidents linked to the use of LPG. There are concerns among households about the standards on the exact weight of the refilled cylinders. All these issues, together with the LPG pricing structure need to be addressed to ensure a viable LPG promotional program***.**

4.3. State of LPG Infrastructure in the Gambia

LPG imported by freight is stored in the only storage facility in the country – the Gam Petroleum depot in Mandinary. It has 17 gasoline tanks and was constructed to meet international standards with SGS certification.
The facility has a total storage capacity of 51,000 metric tons of heavy and light fuel oils as well as liquid propane gas which has a storage capacity of 1,000 MT. It also has 19 loading bays for tanker trucks, cutting-edge gauging and metering equipment, a fully functional LPG bottling plant, and three offshore pipelines, each measuring 2.5 km, which provide access to the draft for launching large fuel tankers.

25% of the major wholesalers surveyed lamented that the national storage capacity of 1000 MT at the depot is much too small and causes frequent shortages forcing them to often go overland to Senegal to buy amounts of up to 20 ton at a time. Lack of access to adequate storage capacity was cited by 25% of wholesalers as one of their top worries regarding prospective importation. Since the majority of them only have a maximum of 30 tonnes of storage space on-site, they claim they would need access to the depot for storage if they imported. The government has liberalised access to the depot so that all players would be able to store petroleum products there for a specific price or charge.

100% of market players surveyed believe that the depot with an effective storage capacity of 750-800 metric tons (as the entire 1000 tons cannot be filled up due to the expansion qualities of gas) is not big enough. As a result of the limited storage space in the depot, importers claim that the freight cost per metric ton is quite high since importation volumes are low. Because of these high freight costs, LPG is relatively expensive in the Gambia. There are inadequate LPG storage facilities within the country to store excess LPG and this results in a waiting list of LPG cylinders and affects user enthusiasm. Inadequate refilling stations with some refilling/retail stations being spaced far out causes low patronage as consumers will have to incur higher transportation and car hire costs to refill their cylinders. There is a lack of cooking stoves designed to be compatible with LPG cylinders in the Gambia apart from the Western cooking stoves which are outside the income level of most even in the urban areas.

4.4. LPG Cylinder Management in the Gambia

Smaller cylinder sizes are used by the households with 6kg and 3kg being most popularly used by 90% of the households using LPG as part of their mix. The larger ones are generally used in the industries.

There are two main models of LPG dissemination in West Africa, and based on the methods of cylinder ownership – company-owned or customer-owned.

Company-owned cylinders operate the Recirculation (or Exchange) model, while customer-owned cylinders operate the Mini- filling plant model. Almost all ECOWAS states including the Gambia use the Recirculation Model. Two notable exceptions are Liberia and Nigeria.
In this model, the cylinder is loaned or leased to customers at the point of filling at a centralized location sited away from congested commercial and population centres. Customers exchange their empty cylinders for a full one, paying only for the gas (Figure 5). The company is responsible for procuring, branding, maintaining, filling and supplying safe cylinders; as well as the investment, replacement and working stock costs of cylinders. In order to ensure that these costs are recovered, the company will often charge a refundable deposit to the customer, the amount of which will be adequate to finance the initial investment and the subsequent maintenance activities for the remainder of the cylinder's life.

The purpose of the deposit is to encourage the customer not to lose the cylinder, recover the cost of continuing cylinder investment, and recover the cost of inactive cylinders. The level of refundable deposit, if established fairly and the system administered properly, should provide the LPG company a level of assurance that it will not incur a loss on cylinder replacement and the consumer the assurance that the company is not making a significant profit on cylinder replacement.

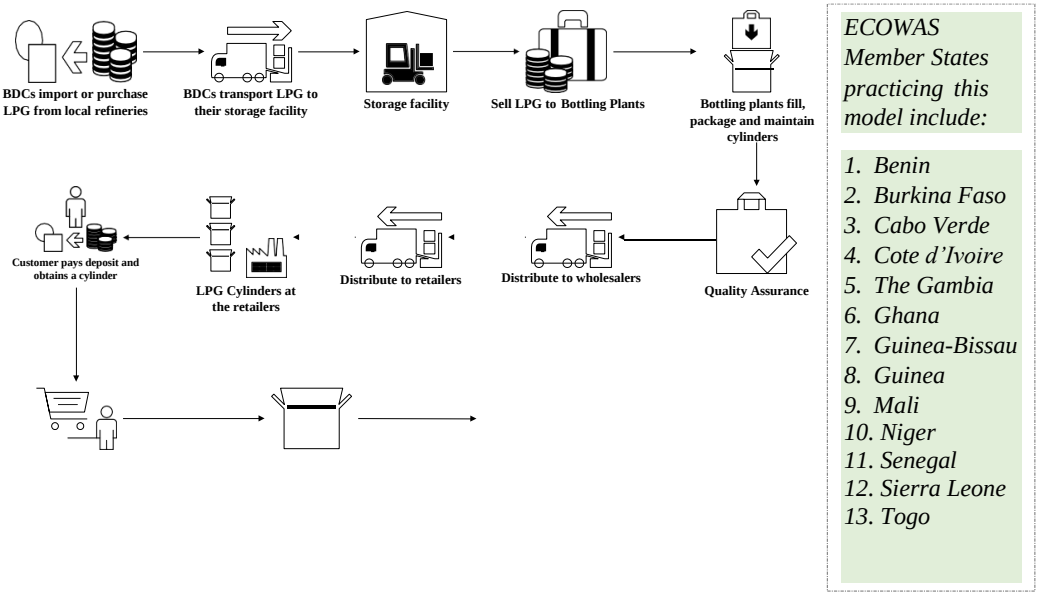


Figure 5: Recirculation Mode of LPG Dissemination, Source: Okunrinboye 2018

The lifespan, maintenance schedule, and handling of cylinders, safety valves, and other LPG appliances and fittings are all largely unknown to the public. As a result, the general public is ignorant of the safety precautions needed when handling and using LPG.

End consumers do not fully understand the safety precautions that should be followed since there is a lack of public education and sensitization about how to install, use, and generally maintain LPG appliances. In the Gambian setting, end-user safety precautions are therefore limited.

There are claims along the entire value chain that many businesses were selling under-filled LPG cylinders and this made/makes it very difficult to compete fairly and/or trust purchases. Retailers seem to utilize defective filling heads regularly. Many cylinder valves and regulatory mechanisms have been seen to be defective while refilling at retail plants. Another issue to be concerned about is the lack of a procedure to systematically certify or decommission active cylinders. Since customers are allowed to refill at any refilling facility of their choice, defective cylinders that are rejected by one refilling plant are occasionally accepted by another. There is no clarification of accountability and obligation at the retail and end-user level when it comes to safety issues.

4.5. LPG Household Usage Analysis

The tables and graphs used in this section were obtained by analysing data from the Integrated Household Survey 2020, using the 1-month consumption module and the variables, “Sex of head of Household” and “Household weights” from the household member module. *This data is confidentially released by GBOS to the Consultant pending national publication and validation.*

LGA	*Average*
Banjul	*32.0%*
Kanifing	*21.8%*
Brikama	*14.8%*
Mansakonko	*2.5%*
Kerewan	*5.8%*
Kuntaur	*2.6%*
Janjangbureh	*0.9%*
Basse	*1.7%*
National	*12.3%*

Table 5 Purchase of Gas Bottles by LGA

Table 5 above shows the ownership (purchase) of gas bottles at the LGA level and nationally (on the last row). While 32% of Banjul households and 21.8% of Kanifing households own at least one LPG bottle, only 14.8 percent of households in the Brikama LGA own at least one LPG gas bottle.

LGA	LPG 3Kg	LPG 6Kg	LPG 12.5Kg	LPG 22.5Kg	LPG Other
Banjul	15.6%	16.6%	1.1%	0.0%	0.0%
Kanifing	10.2%	10.1%	1.7%	0.5%	0.2%
Brikama	6.6%	7.7%	1.1%	0.2%	0.0%
Mansakonko	1.1%	1.0%	0.4%	0.1%	0.1%
Kerewan	2.3%	3.3%	0.4%	0.0%	0.0%
Kuntaur	1.1%	1.0%	0.3%	0.2%	0.0%
Janjangbureh	0.3%	0.4%	0.2%	0.0%	0.0%
Basse	0.8%	0.7%	0.2%	0.0%	0.0%
Total	5.6%	6.1%	0.9%	0.2%	0.1%

Table 6 LPG Ownership by Type and LGA

Table 6 shows the ownership of LPG bottles by type of bottle and LGA. Only 2.3 percent of households in Kerewan own a 3 Kg gas bottle. Just under 17 percent of households in Banjul own a 6Kg gas bottle.

Figure 6 Graph Illustration of Ownership of Bottle Type by LGA

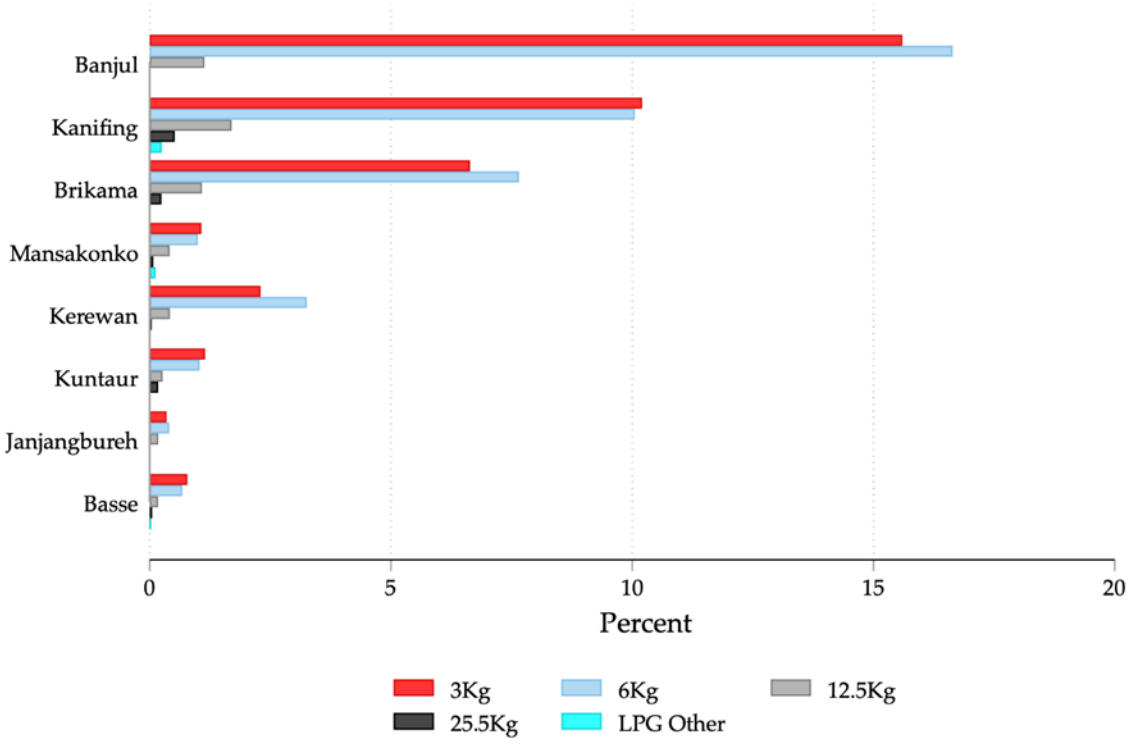


Table 7 Ownership of LPG Bottles by LGA and Gender

LGA	Female	Male	Total
Banjul	42.3%	29.3%	32.0%
Kanifing	23.6%	21.2%	21.8%
Brikama	16.3%	14.4%	14.8%
Mansakonko	1.8%	2.7%	2.5%
Kerewan	6.9%	5.6%	5.8%
Kuntaur	1.3%	2.7%	2.6%
Janjangbureh	2.4%	0.7%	0.9%
Basse	1.6%	1.7%	1.7%
Total	15.5%	11.6%	12.3%

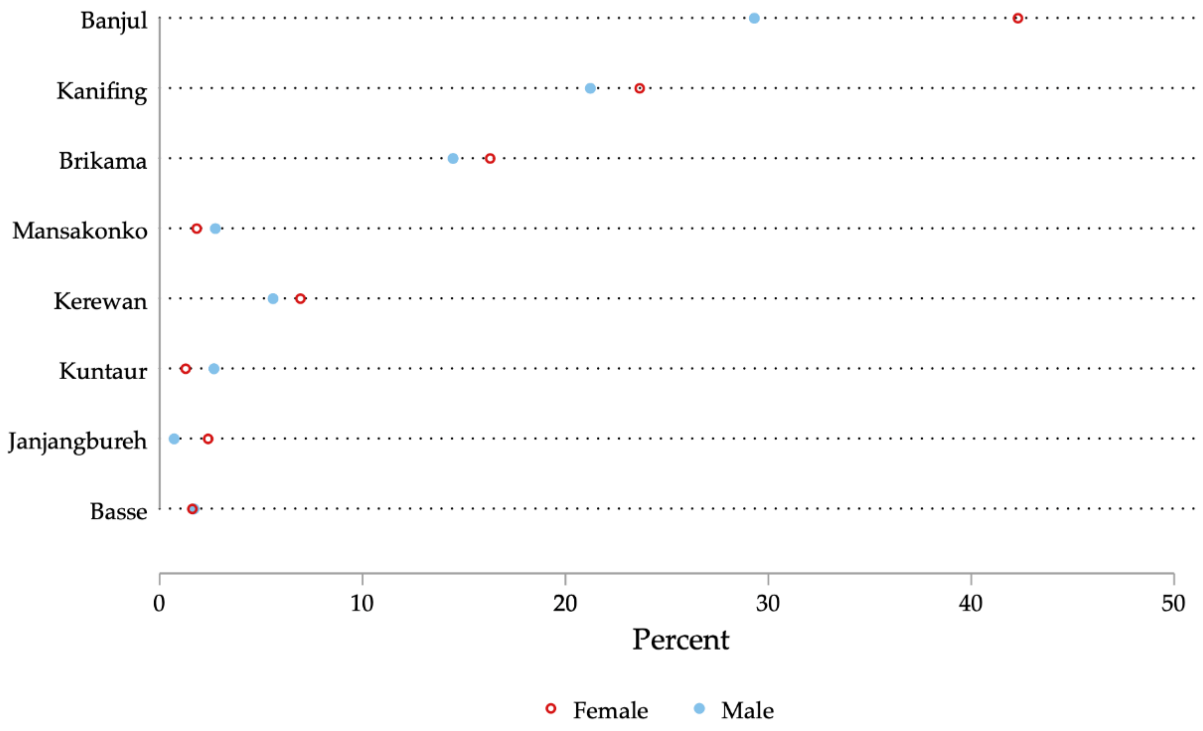
Table 7 shows the ownership of LPG bottles by LGA and the head of household's gender. The third column is the total, and as expected is equal to that in proximate columns above. Less than 3 percent of households in Kuntaur own a gas bottle, whilst 21.2 percent of households in Kanifing own a gas bottle. 15% percent of female-headed households have a gas bottle, whilst 11.6 percent of male-headed households have a gas bottle.

Table 8 Bottle Type Ownership by Gender of Household Hear

Gender	LPG 3Kg	LPG 6Kg	LPG 12.5Kg	LPG 22.5Kg	LPG Other
Female	5.5%	8.1%	1.9%	0.5%	0.0%
Male	5.7%	5.6%	0.7%	0.2%	0.1%
Total	5.6%	6.1%	0.9%	0.2%	0.1%

Table 8 shows the ownership of gas bottles by the type (weight) at the level of LGA. Eight percent of female headed households own 6 Kg gas bottle and 5.7 percent of male headed households own a 3 Kg gas bottle.

Figure 7: Ownership of bottle by head of household gender at LGA level



All mean calculations in this document are weighted averages (using household weights from the IHS 2020; *wta_hh*). We can interpret results as the purchase of LPG bottles or demand for LPG bottles or ownership. In this instance all 3 interpretations are interchangeable, given how sampling and data collection was done in the IHS 2020 (see IHS 2020 Report). This is evidence of fuel stacking with Liquefied Petroleum LPG (LPG) becoming a complement to traditional fuels like firewood and charcoal throughout the years, particularly in the urban areas. Less than 1% of the population have it as a sole fuel of choice citing convenience and environmental friendliness.
Estimates place home consumption at 85% of total imports, with consumption accounting for the remaining 15%.

Wood and charcoal remain the more common fuel type used even in more prosperous areas and this poses one of the greatest hindrances to LPG adoption in the West African region and Gambia in particular. There are no significant indicators of kerosene use in the Gambia for household cooking and energy needs, however kerosene has been subsidized in many countries for the residential sector, as a means to encourage users of solid fuels, to climb the energy ladder.

A lack of awareness and proper safety standards has shown kerosene to be perceived as an even more dangerous household fuel due to a few incidents of explosions in the region. New research has also connected kerosene usage to a variety of respiratory illnesses, including tuberculosis.

Despite the fact that electricity seems to be the most environmentally friendly cooking fuel, it is less effective than LPG since many locations do not have a reliable supply of electricity and still depend on fossil fuels to power up electricity supply. A household's total wattage can also be significantly increased when cooking demand is high having a negative effect on energy efficiency targets.

The advantages of using LPG are quite obvious; it is portable, has a better heating and calorific value and efficiency, allowing you to heat your home and cook for longer periods of time at a lesser cost, and doesn't contain sulphur, so it burns much cleaner than other energy sources like oil. Since LPG burns constantly, it is more dependable than other energy sources. It is also ideal for people and countries without access to natural gas pipelines such as the Gambia because it can be transported simply and even kept in cylinder bottles without any risk once a basic level of safety awareness and measures are in place. (EIA 2015; ECOWAS 2016). LPG is therefore considerably less harmful to the environment than other types of energy.

In 2004, cooking represented the most energy-intensive household activity with fuelwood representing 95% of the household energy consumption with charcoal being the second most used fuel. LPG for cooking represented only 0.51% of national household energy demand. 0.5% of the rural population and 6.6% of the urban population used LPG as a household cooking fuel. (Census 2003; SE4ALL, 2014). However as per the Gambia Bureau of Statistics (GBOS) Integrated Household Survey (IHS) 2020, there is an increase in the national average of household LPG usage with 12% of households owning at least 1 bottle of LPG (a significant increase from 4% in 2003).

When it comes to the use of LPG as the main cooking fuel, the number drops to 1.9% of households nationwide. 97.5% of rural households use bio mass as their main cooking fuel (94% firewood and 3.5% charcoal). In the urban areas, 31% use firewood and 52% of households use firewood and charcoal as main cooking fuels respectively. Only 2.8% of urban households use LPG as main source of cooking fuel with at least 13% of households not doing any cooking. In terms of population weights, less than 1% of the national population can be said to be using LPG as a main source of cooking fuel.

With fuelwood contributing more than 80% of the country's energy demand in the urban areas and over 98% of energy demand in the rural areas, the objective of promoting and popularizing LPG access by the poor can only be achieved if policy, regulatory, infrastructural, and financial constraints facing the LPG industry and inhibiting access by the poor is addressed. Streamlining the LPG industry

through the removal of the existing bottlenecks is therefore vital for the attainment of the set objective of extending LPG access by the poor to all parts of the Gambia.

Table 9: Household Weights of LPG Usage

Household Weights											
Main source of cooking fuel		Rural/Urban		LGA							
	National	Rural	Urban	Banjul	Kanifing	Brikama	Masakonk	Kerewan	Kuntaur	Janjangbu	Basse
Firewood	52.67	94.18	31.34	3.94	11.13	45.7	91.2	83.65	96.51	88.87	88.62
Charcoal	35.72	3.5	52.28	63.84	67.07	42.03	6.83	13.74	1.8	6.53	7.04
Gas	1.93	0.18	2.84	2.83	4.49	2	0	0.45	0.37	0.17	0.07
Electricity	0.05	0.04	0.06	0.34	0	0.09	0	0.06	0	0.11	0
Solar power	0.04	0.07	0.02	0	0	0.04	0	0.12	0	0	0.08
Animal/plant waste	0.1	0.03	0.13	0	0.21	0.12	0	0.03	0	0	0
Does not cook	9.31	1.89	13.13	28.84	16.99	9.76	1.73	1.95	1.27	4.27	3.91
Other (specify)	0.17	0.11	0.2	0.22	0.11	0.26	0.24	0	0.05	0.05	0.27

Table 10: Population Weights of LPG Usage

Population Weights											
Main source of cooking fuel		Rural/Urban		LGA							
	National	Rural	Urban	Banjul	Kanifing	Brikama	Masakon	Kerewan	Kuntaur	Janjangb	Basse
Firewood	68.06	97.27	44.18	8.31	16.92	57.81	95.33	88.98	98.69	94.53	95.68
Charcoal	29.15	2.22	51.18	80.01	75.74	38.91	4.03	10.27	1	4.68	3.77
Gas	0.89	0.04	1.59	2.39	3.14	0.95	0	0.08	0.12	0.02	0.01
Electricity	0.04	0.04	0.05	0.42	0	0.07	0	0.06	0	0.11	0
Solar power	0.08	0.13	0.03	0	0	0.06	0	0.29	0	0	0.09
Animal/plant waste	0.09	0.03	0.15	0	0.16	0.18	0	0.06	0	0	0
Does not cook	1.63	0.26	2.75	8.74	4.03	1.96	0.31	0.25	0.19	0.65	0.42
Other (specify)	0.05	0.02	0.07	0.13	0.02	0.06	0.33	0	0	0.01	0.03

Figure 8: Overall Household Shares of Main Source of Cooking Fuel

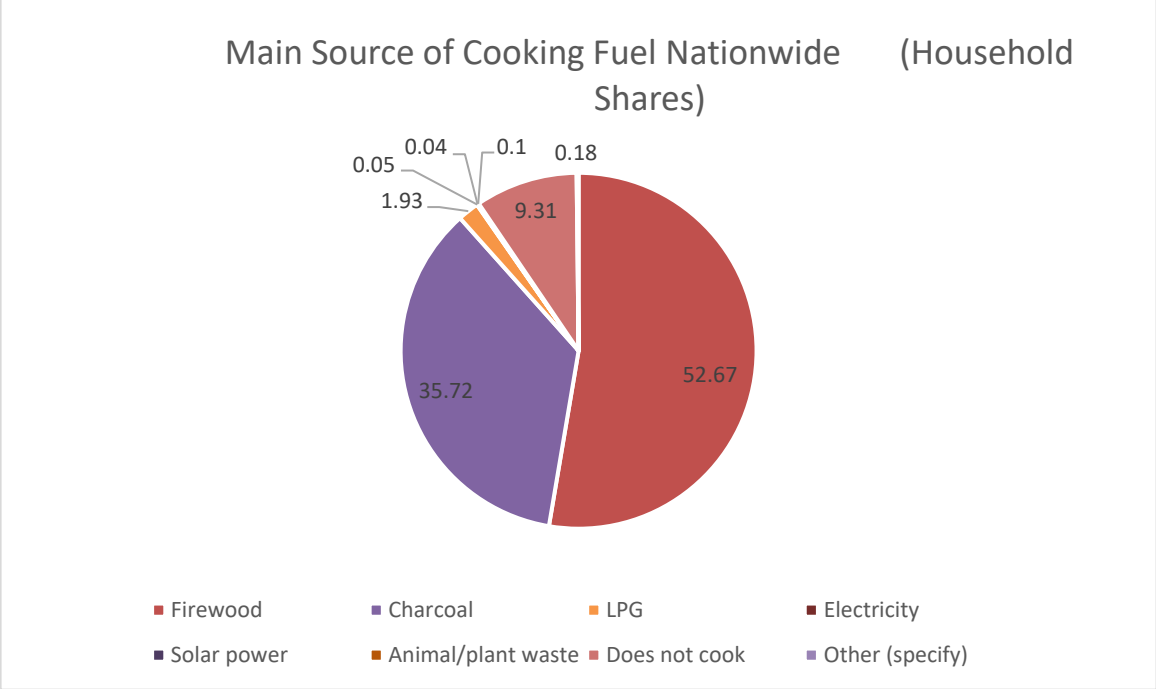


Figure 9: Main Source of Cooking Fuels Urban vs Rural

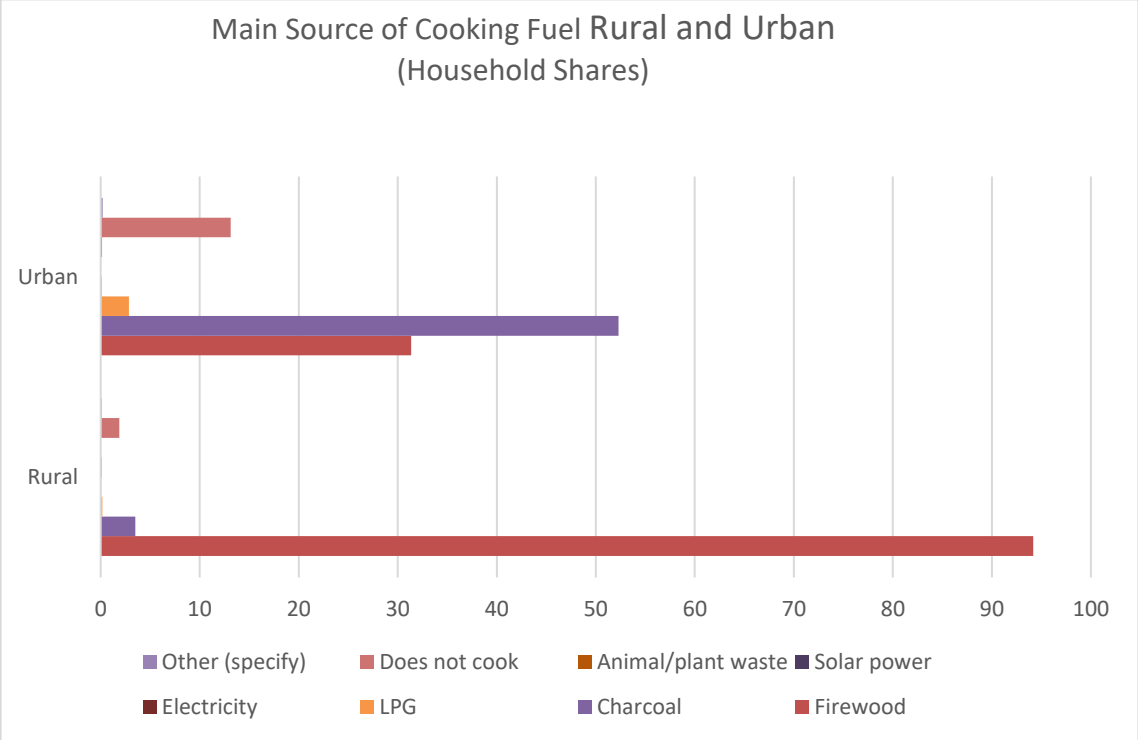
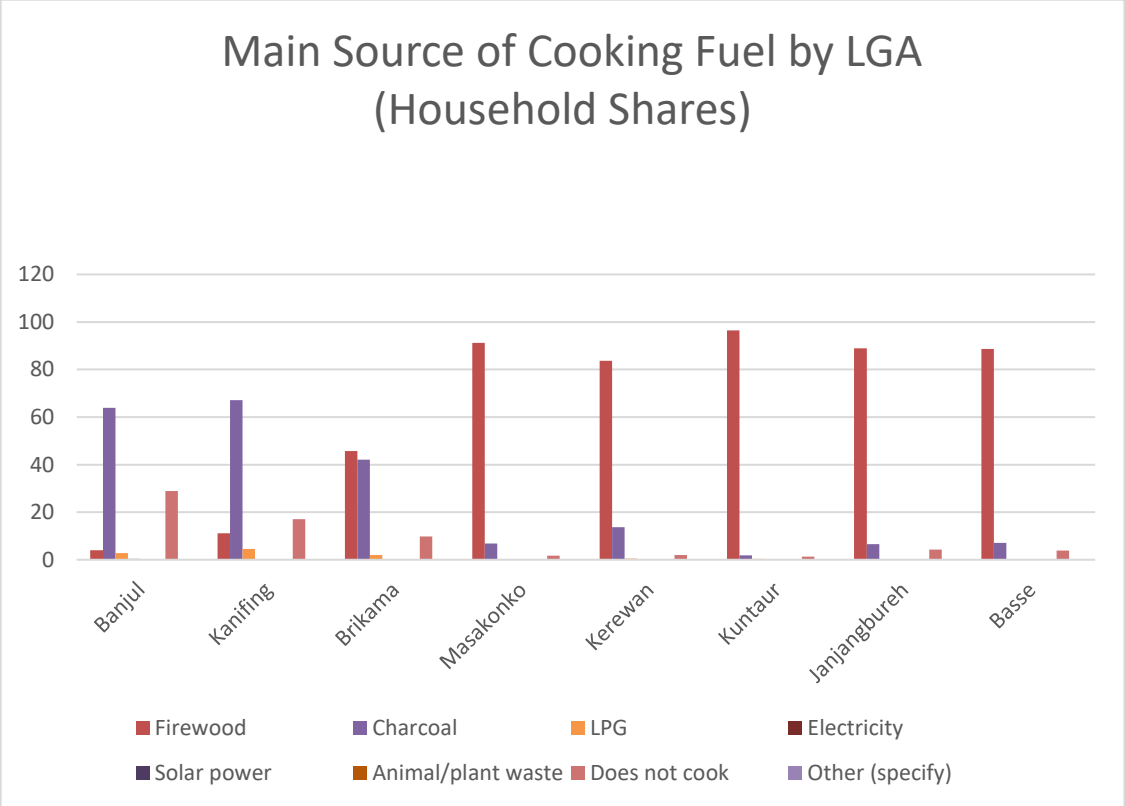


Figure 10: Main Source of Cooking Fuel by LGA



4.6. LPG Consumer and Consumption Trends Analysis

Consumer surveys conducted by the Consultant showed that most who own LPG gas bottles restrict it mainly for very minor household energy tasks such as making tea, reheating a quick meal and sometimes boiling water for early morning showers during the colder harmattan months. Many claimed to go many weeks without making use of the LPG gas bottles.

Fuel stacking explains the significantly higher statistics of cylinder ownership over actual use as most households use LPG for the minor tasks of making tea, boiling a quick pot of water or reheating quick single meals.

An analysis of the historical use of LPG shows that it slowly emerged as a substitute for fuel wood with demand initially very restricted due to the previous abundance of firewood and charcoal and extremely cheap prices. Recognising this price imbalance as a structural disincentive for the adoption and usage of LPG, the Gambia government committed in the Gambia Energy Policy of 2014-2018 to formulate a price structure for imported LPG and set reasonable retail prices.

The modest increases in national usage from the period of 2016 to 2020 are primarily due to two major policy interventions by government via the introduction of a price regulation guideline in 2016 that was adhered to until 2021 and a removal of the importation monopoly given to a private company (Euro African Group Ltd) in 2016.

This evidence is supported scientifically by data from the independent statistics and analysis from the Energy Information Administration of the US below which shows the significant advantages of LPG over Firewood, Charcoal and Improved cookstoves both in terms of energy content, cooking efficiency and carbon dioxide emissions.

It can be seen that 1kg of LPG has 2.5 times the energy content of a simple charcoal stove, 2 times the energy of improved and advanced biomass cooking stoves and 3 times the energy content of firewood making it that much faster and more efficient in cooking. Also, a single kg of LPG is equivalent to 21.2 kg of firewood, 3.6 kg of charcoal in advanced cook stoves and 2.5 kg of charcoal in improved cooking stoves (EIA 2016).

Table 11: Fuel Type Comparison

Fuel Type	Energy Content (MJ/kg)	Unit cost of technology (USD)	Cooking efficiency	Amount of alternative energy (in kg) replaced by 1 kg of LPG	Co_2 Emission ($KgCo_2/GJ$) Per Kg
LPG	50	45-60	0.55	1	63.1
Fire wood	16	0 - 5	0.05	21.2	109.6
Advanced stove (biomass)	25	30 -100	0.25	6.5	102
Simple Charcoal stove	20	5 - 15	0.12	3.6	106.6
Improved Charcoal stove	22	20 - 30	0.2	2.5	100
Kerosene	46.3	15 - 25	0.35	1.7	71.5

From anecdotal evidence, the consultant found that the usage derived from a 12kg gas bottle was equivalent to usage obtained from 3-4 bags of charcoal when a user switched exclusively to LPG for her household energy needs. This experiment is of course subject to varying results based on household sizes and frequency of energy needs and usage.

Interviews with the LPG directorate of the Senegal Ministry of Energy confirm these findings as they emphasized that they have had sustained success with LPG use and adoption of over 60% (second highest in the ECOWAS region after Cape Verde) due to the population's realization of how much cheaper it is to cook with LPG over charcoal.

As a price structure for LPG is yet to be instituted by the Government of the Gambia as recommended in the Gambia Energy Policy 2014-2018, it can be adduced that when a price structure and some policy interventions in the forms of purchase incentives are put in place for LPG, government will be able to outrightly eliminate the price advantage that fuel wood is perceived/seen to have over LPG.

These scientific and anecdotal evidence show that LPG usage is not just significantly more convenient, healthier, time efficient and cleaner to use LPG for cooking but also much cheaper than charcoal.

4.7. Pricing of LPG in the Gambia

LPG pricing in the Gambia consists separately of cylinder/equipment cost and refill costs. In the Greater Banjul area and surrounding urban centres such as Kanifing Municipality and the West Coast Region, LPG has grown to be a very significant fuel.

Access to LPG use continues to be hindered by high capital cost to obtain cylinders ranging from D1800-D5000 (as at 2023) and also high refill costs which currently is about D83-D92/kg depending on the cylinder size of refill up from D62 per kg (as at 2022). Foreign exchange fluctuations have highly impacted gas pricing and market contraction. Inexplicably, the higher the cylinder size, the more expensive the cost of refill per kg.

3kg	**D1800**
6kg	**D2800**
9kg	**D3500**
12kg	**D5000**

Table 12: January 2023 Cost of LPG Cylinders and Equipment

Being a regulated market like other countries in the ECOWAS, the Gambia government first attempted to intervene and establish a uniform pricing for both wholesale and retail prices in 2015 specific to refill costs. The Ministry of Petroleum and Energy set up a meeting with government entities and wholesalers and the meeting's outcome was subsequently approved by the Government. These national prices were anticipated to be applicable throughout The Gambia's administrative Regions, however, it was concentrated in the Greater Banjul Areas (GBA) and the West Coast Region as the monitoring mechanism did not cover other regions (WCR). As a result, the cost of LPG became more expensive in the provincial districts than it is in the GBA and WCR except for border towns such as Amdalai and Farafenni in the North Bank which get their supplies from Senegal at much cheaper prices than can be found in the Gambia.
The 2016 regulated prices are captured below.

Table 13: 2106 Regulated LPG Refill Prices

CATEGORY (Kg)	GOVERNMENT APPROVED RETAIL PRICES (D)	GOVERNMENT APPROVED WHOLESALE PRICES (D)	DIFFERENCES (D)
3	**200**	**180**	**20**
6	**375**	**360**	**15**
12	**730**	**710**	**20**

The regulated prices were largely adhered to and in effect. However, price increases started to take effect in 2020 and by 2022, prices had climbed steeply. Presently, free market conditions determine the cost of LPG in The Gambia, at roughly 65% more costly than in neighbouring Senegal. Table 15 below shows LPG Refill costs as at 2022

CATEGORY (Kg)	AVG RETAIL PRICES (D)	AVG Price per Kg (D)	DIFFERENCES (D) from 2016 Price Guideline
3	250	83	50
6	500	83	140
9	700	78	N/A
12	1100	92	400

Table 14 2022 LPG Refill Prices

Suppliers cost price varies between $1000-$1170 per MT wholesale, reflecting a 52% price increase between October 2021 to June 2022. An interesting fact to note with the recent price increases is that unlike the government regulated prices, which made it cheaper to buy in larger quantities, wholesalers and retailers, did not follow a pattern and made it most expensive to buy the highest refill quantity.
The price per kg for a 9kg bottle was cheapest at an average of D78.00 per kg. 3 and 6 kg bottle averages D83 per kg while the 12kg bottle was the most expensive purchase at D92 per kg.

Both importers and retailers claimed that the effects of the Corona virus and Russia Ukraine war on gas prices and freight costs were what necessitated the price hikes.
It could be observed from the data made available to the consultant that market players had capitalized on the absence of government intervention or price regulation to heighten their profit margins over the period from October 2021 to June 2022 as follows:
Importers: 17-27% to 57% for the 6kg bottle; and from 8-9% to 57% for the 12kg bottle
Retailers: moved from reported margins of 10-30% to 23% for all sizes 3kg,6kg,9kg and 12kg.
Consumer analysis trends of both fuel wood and LPG prices in the past 5 years showed a sharp decline in the availability of both fuelwood and charcoal (particularly in urban areas).

Rapid population growth has led to increased demands for household energy and this has put further strain on the Gambia's rapidly decreasing national forest cover. As a result, prices for charcoal have significantly increased while LPG prices remained largely stable up to 2020 after a government directive in 2016 that set LPG prices (see Table 13). At the time, charcoal and fire wood prices were D150 per standard bag of charcoal (50kg bag of rice generally expected to weigh 20kg when filled up to the brim) and firewood cost D5 and D10 per bundle respectively.

However, in 2022, charcoal prices had reached D400.00 while firewood became less scarcely seen and used in urban areas and cost D25 and D50 per bundle.
Average nuclear households claim 10-14 days usage of a bag of charcoal and 1–2-day usage of a bundle of firewood. Larger families have reported that the bag of charcoal generally lasts 5-7 days while the larger bundle of firewood lasts a day.

Changes in urban housing, the rise of single-family households and increase of rental properties with smaller living spaces and courtyards have pushed urban fuel wood preferences to charcoal over firewood particularly for households using local cooking stoves.
This had changed the realities on the ground for the price imbalance between the use of LPG vs fuel wood. Prior to the sharp hikes in prices which importers attributed to the Russian-Ukraine War, the cost of cooking with LPG is seen to rival the cost of cooking with fuel wood particularly charcoal as the main fuel wood of choice in urban settlements. In fact, in an experiment conducted as part of this study and anecdotally verified by consumer interviews with exclusive users of LPG, the cost of cooking with LPG can be significantly cheaper than the cost of cooking with charcoal.

5. Perceptions about LPG in the Gambia (Limitations and Barriers)

5.1. Wholesale/Retail Level Barriers and Limitations to The LPG market Expansion

The top three potential entry barriers to the wholesale/retail selling of LPG in The Gambia, according to respondents, were financial requirements (50 percent), inadequate storage facilities and lack of importation capacity (25 percent), and lack of adequate government support/intervention in times of crisis such as the pandemic, fire outbreak, implementation of the duty-free incentives, subsidies on consumer equipment or refills, land allocation for the set-up and expansion of filling plants, and; increasing the general population's awareness on the superiority of LPG (25 percent).

There were some complaints about market players holding onto cylinder bottles of their competitors when exchanged for full refills. According to a few respondents, some players underfill the cylinders, which allows them to reduce the amount of LPG in each cylinder without the customers knowing. This makes it difficult for others to compete when they are filling at full capacity.
Market players cited consumer safety concerns and lack of awareness on how to safely handle LPG cylinders as the single main reason behind the infrequent use of LPG as a household fuel even for those with gas bottles in their possession already. This barrier also stops new consumers from overcoming the mental block to go for LPG as a household fuel.

The regulatory/licensing requirements were not seen as a market barrier as there are very minimal regulatory interventions and little to no standards enforcement. Insufficient market size/demand was also not seen as a bottle neck since players noted that they frequently experienced shortages of cylinders and refills and were unable to meet public demand for particularly gas cylinders.

A. Capital Requirements

Almost every respondent mentioned the capital requirements of the industry as a barrier to both entry and ongoing investment/expansion. A significant issue for the Gambia over time has been finding affordable sources of funding for the private sector. Most of the big wholesalers have found it challenging to enter the LPG industry due to borrowing rates that can occasionally reach 30% and strict bank collateral requirements.

The LPG industry is capital-intensive since distributors need to have enough acreage, equipment, and tank trucks. Market players decried the high costs of cylinders and tankers to meet consumer demands. Some of the larger wholesalers claimed in interviews that they could find it challenging to import LPG due to a lack of suitable funding. In general, importing via shipment necessitates the purchase of a minimum quantity, which is frequently a large one. Small enterprises could encounter entrance barriers as a result of this since it may be challenging for them to achieve quantity requirements. To make this possibility a reality, the majority of the main wholesalers declared that they were prepared to look for additional investors.

Due to the huge potential of the Gambia's LPG industry, new investments (both public and private) will be needed to expand the LPG infrastructure at the depot and to construct storage depots and refilling plants across the country. Other funding requirements for the LPG sector include capacity building for the regulatory authorities, public education for LPG stakeholders, the establishment of a cylinder management system for the country and stimulating demand for the product among the poor.

Both external and internal commercial and non-commercial sources of financing will have to be explored to meet the investment requirements for the sector. Grants and public investments will be needed in areas such as institutional capacity building and public education, since they may not meet commercial investment criteria. Potential funding options for the Gambia's LPG sector include public investments (by the government), private investments and public-private collaborations. This mix of potential funding options is considered suitable.

According to the major wholesalers, the main exit barrier in their path if/when they wanted to leave the market is also the high cost of investment, as they are yet to fully recover their cost of investment, and thus would incur major losses if they were to exit market at this point.

They consider the costs of market exit to be higher than those incurred if they continue competing in the market.
The introduction of effective incentives by the government and the establishment of an effective regulatory and safety environment will help attract the interest of private investors to invest in the industry. It is worth noting that the deregulation of the petroleum sector has opened up the LPG sector to private actors. As a result, the private sector currently dominates the distribution link of the The LPG market in the country.

B. Inadequate Storage Capacity and Lack of Depot Access

25% of the major wholesalers lamented that the national storage capacity of 1000 MT at the depot is much too small and causes frequent shortages forcing them to often go overland to Senegal to buy amounts of up to 20 ton at a time. Lack of access to a depot was cited by 25% of big wholesalers as one of their top worries regarding prospective importation. Since the majority of them only have a maximum of 30 tonnes of storage space on-site, they would need access to the depot for storage if they imported. The government has been attempting to liberalize the depot over the past year so that all players would be able to store petroleum products there for a specific price or charge.

100% of market players believe that the depot with an effective storage capacity of 750-800 metric tons (as the entire 1000 tons cannot be filled up due to the expansion qualities of gas) is not big enough. As a result of the limited storage space in the depot, importers claim that the freight cost per metric ton is quite high since importation volumes are low. Because of these high freight costs, LPG is relatively expensive in the Gambia.

The liberalisation of that market has been a good step in eliminating barriers to entry. However, unless the storage capacity is expanded, it wouldn't completely overcome the storage barrier. Potential importers will find the market more appealing as a result of this expansion because they may now import in greater numbers, enjoy cheaper freight costs, and lower consumer pricing. Consumer benefits will improve and the market will be more competitive.

C. Lack of Adequate Government Intervention and Support

Respondents decried the lack of government intervention in the The LPG market in the Gambia comparative to other countries in the subregion such as Senegal. They strongly believe that government support to the market in the form of subsidies and price control will help encourage LPG adoption and popularization in the country. They have also indicated awareness of the high costs of first-time cylinder acquisition and even upfront refills. Some respondents were willing to suggest post-payment and cylinder financing mechanisms if the government were willing to step in to help offset some of the costs. At least one major player who suffered a major fire outbreak (that had no human casualty) decried the lack of government support both morally and financially to help their business get back on its feet.

Market players also complained that the Gambia Revenue Authority processing fees of 1.5% were still too high as such; costs are passed onto consumers and requested for zero tax on the product to encourage the adoption of LPG in households. They also spoke of the bureaucracy and frustrations encountered when trying to get land for the expansion of filling plants or even the possible construction of an additional LPG storage plant; and obtaining the duty-free waivers and exemptions on equipment they were assured of with the result that they often just give up and pay import duties and taxies which add substantial costs to the business.

Most respondents seemed passionate about maintaining old customers and winning new ones. They pointed to a few times where they significantly lowered their margins and or accepted a negative margin during high supply prices in order to maintain clientele. Market players thus requested government intervention on the wholesale supply prices of LPG.

D. Under Filling of Cylinders

Some major wholesalers claim that there were many businesses selling under-filled LPG cylinders and this made/makes it very difficult to compete fairly.

5.2. Consumer Level Barriers and Limitations to LPG Adoption and Usage

5.2.1. Fear Factor- Lack of Safety Education on LPG usage

Most consumers have an inherent fear of LPG at the back of their minds as they fundamentally see it as unsafe. This is actually the number one barrier to widespread LPG usage and the reason behind the minimal usage of LPG for the households that own at least one bottle.

Genuine safety concerns exist around the handling of LPG by end users as well as the supply/distribution chain. Interviews with the Gambia Fire and Rescue Services show that the statistics of fire accidents from LPG usage have been extremely low in the past decades but widespread media coverage has made them fresh in people's minds. The widespread adoption of LPG continues to be hampered by the absence of suitable legislation and regulation. The regulatory authorities' attempts to regulate the sector are additionally hampered by the absence of norms and regulations supported by legislation.

Retailers seem to utilize defective filling heads on a regular basis. Many cylinder valves and regulators have been seen to be harmed while refilling at retail plants. Another issue to be concerned about is the lack of a procedure to systematically certify or decommission active cylinders. Since customers are allowed to refill at any refilling facility of their choice, defective cylinders that are rejected by one refilling plant are occasionally accepted by another. There is no clarification of accountability and obligation at the retail and end-user level when it comes to safety issues.

The lifespan, maintenance schedule, and handling of cylinders, safety valves, and other LPG appliances and fittings are all largely unknown to the public. As a result, the general public is ignorant of the safety precautions needed when handling and using LPG. End consumers do not fully understand the safety precautions that should be followed since there is a lack of public education and sensitization about how to install, use, and generally maintain LPG appliances. In the Gambian setting, end-user safety precautions are therefore limited.

Safety education involves systematic education and the growth of consumer handling skills. Both risky situations and unsafe behaviour must be avoided. Improved knowledge, skill, attitude, and morale within the consumer population will be the results of such safety education. The number of accidents and fatalities, property damage, legal liability, sicknesses, and compensation claims can all be minimized to near zero with an efficient user and handler community training program.

5.2.2. Affordability- Cost of LPG and its Accessories

The ongoing increase in the price of LPG and its accessories is a significant obstacle to LPG use in Gambia. Since the beginning of the LPG use, prices have fluctuated. The cost of LPG changed significantly in 2020.Most prospective consumers do not have a sophisticated awareness of the cost advantage of LPG and take the comparably lower prices of alternative fuels like firewood and charcoal at face value without taking into consideration the quicker usage rate of an equivalent expenditure on charcoal and firewood.

Additionally, most potential consumers have little interest due to the high expense of buying and maintaining LPG and its accessories, such as gas cylinders, gas stoves, and rubber tubing, as they may not have the money to buy such products or even to maintain and repair their appliances. The upfront pre-paid cost of refills at a bulk amount compared to the ability to buy daily amounts of charcoal/firewood is also another affordability barrier.

5.2.3. Accessibility: Sporadic Shortages of LPG and Lack of Cooking Stoves Adapted for LPG Use

There are inadequate LPG storage facilities within the country to store excess LPG and this will result in a waiting list of LPG cylinders and affects user enthusiasm. Inadequate refilling stations with some refilling/retail stations being spaced far out will cause low patronage as consumers will have to incur higher transportation and car hire costs to refill their cylinders. There is a lack of cooking stoves designed to be to be compatible with LPG cylinders in the Gambia apart from the Western cooking stoves which are outside the income level of most even in the urban areas.

5.2.4. Preconceived Notions about Cooking with LPG

A fair number of consumers believe that food cooked with LPG will be less tasty than food cooked over traditional fire stoves. Consumers also tend to be sceptical of their ability to adapt and understand the temperature regulation of LPG stoves in order to get the same effects as from local cooking energy sources. Some consumers also worried about the adaptability of traditional cooking pots to LPG stoves.

6. Policy, Legal and Regulatory Gaps

6.1. Policy Review

LPG was first introduced as a project in the Gambia in the early 1980s and then in 1990 as Regional Butane Project under CILSS Gas Project. There have been some key policy highlights and achievements in the Promotion of LPG in the country. These are:

1. Implementation of the recommendation to Construct a Bulk Storage Facility for LPG in the Housing Energy Strategy of 2007 to increase the security and reliability of LPG supply in the Gambia when the Gam Petroleum Depot was commissioned to include 1000 MT for LPG under a joint public-private partnership.
2. Temporary reduction, stabilization and harmonization of LPG prices nationwide in 2016 following a Ministry of Petroleum and Energy intervention to regulate and price caps/limits on the refill costs of different LPG cylinder sizes which was largely adhered to by sector players. This policy achievement was short-lived as LPG prices have recently climbed steeply.
3. Granting of duty-free concessions to LPG imports to help sustain its use as a viable option to fuel wood.
4. Proliferation of trade marked cylinders for improvement in the standards of cylinders to assist in compliance, testing and tracking purposes.

However, policy interventions have not achieved the mass popularization and promotion of LPG as a viable and affordable alternative of solid fuels as the Gambia has failed with respect to achieving all the LPG Penetration targets set in the Gambia Action SE4ALL Agenda (2014), National Renewable Energy Action Plan (2015) and upheld in the National Clean Cooking Energy Action Plan (2015).

The more recent LPG specific policy interventions of the Gambia Government are summarized below:

6.1.1. The Gambia National Energy Policies 2010-2014 and 2014-2018

In the National Energy Policy Document of 2014-2018, Gambia government classifies LPG under alternative energies and *pledged to evaluate the imported LPG price structure and establish retail LPG prices as part of its energy program*. Government also recognised the potential of the West African Gas Pipeline Initiative, a component of the ECOWAS West African Regional Energy Project that aims to define the subregion's integrated energy resources to fulfill community energy needs and establish a network to market LPG.

The document also recognises home and transportation sectors in The Gambia are the largest consumers of energy, according to the UNDP RIO + 20 Report (2010). The balance indicated a rise in petroleum products for energy generation and transportation, an increase in household fuel wood use, the proportion of wood fuel in total energy consumption, and an increase in electricity demand. Consumption of LPG has also been increasingly replacing wood energy as a fuel.

As firewood was far less expensive than LPG at that time, the demand for LPG was restricted to high-income individuals who preferred it due to its convenience.

Ministry of Energy's Energy Action Plan for the period 2010-2014 had 9 key objectives, of which one of them was:

a) To popularize the use of LPG by making the price affordable.

LPG specific Sector Objectives in the document outlined the need to:

i. Encourage the private sector to build new port terminals for petroleum and LPG as appropriate;
ii. Regulate and monitor the pricing structure of petroleum products;
iii. Adopt a regional approach for the popularisation of LPG as cooking fuel in the urban areas;
iv. Encourage research and development of innovative appropriate technologies for household application in the use of LPG in both rural and urban areas;
v. Regulate and monitor the pricing structure for LPG;
vi. Encourage private sector participation in the provision of infrastructure to improve storage capacity and popularise the use of butane gas as an environmentally-friendly source of fuel.

Further within the overall objectives, strategic objectives were to:

- Reduce the unit cost of LPG to promote its use and reduce dependence on Fuel wood.
- Popularise the use of LPG Nationwide;
- New regulatory and licensing framework for The LPG market;
- Improve standards of cylinders; and

In the 2014-2018 Action Plan, the Ministry of Petroleum and Energy did not have LPG promotion listed as an overall sector objective but did specific development objectives devoted to LPG as follows:

a) Encourage private sector participation in the procurement, supply, bulk storage and distribution of the product;
b) Reduce the cost of LPG fuel and promote it as an alternative to charcoal and other un-sustainable wood fuels;
c) Enforce occupational safety at LPG processing plants, during transportation and distribution storage;
d) Develop new regulatory and licensing framework for the The LPG market;
e) Adopt a regional approach for popularisation of LPG use, countrywide;
f) Ensure environmental and safety standards for storage, transportation and distribution.

Specific LPG policy objectives in the National Energy Policy 2014-2018 were:

b) Encourage private sector participation in the procurement, supply, bulk storage and distribution of the product;
c) Reduce the cost of LPG fuel and promote it as an alternative to charcoal and other un-sustainable wood fuels;
d) Establish and Enforce Health, Safety and Environment standards and regulations for bulk storage, refilling, transportation and retail of LPG;
e) Develop a licensing framework for the The LPG market;
f) Adopt a regional approach for the popularisation of LPG use, countrywide;

The Policy proposed incentives for the reduction of the unit cost of gas to promote the use of LPG. Other proposed measures included the re-introduction of start-up subsidy, for a limited period of time, (through donor assistance) to overcome one of the major constraints to the use of LPG - the relatively high cost of initial investment (the cylinder, burner and stand); and the creation of mechanisms for providing interest-free loans as well as other fiscal incentives for acquisition and use of LPG as a substitute fuel.

6.1.2. The Gambia SE4ALL Action Agenda Report (2014)

In the Gambia's SE4ALL Action Agenda report (2014), it was recognised that a little over 80% of the nation's energy supply and more than 90% of household energy consumption—up to 97 percent in some rural areas—came from biomass, including fuelwood.

Targets relevant to this study were:

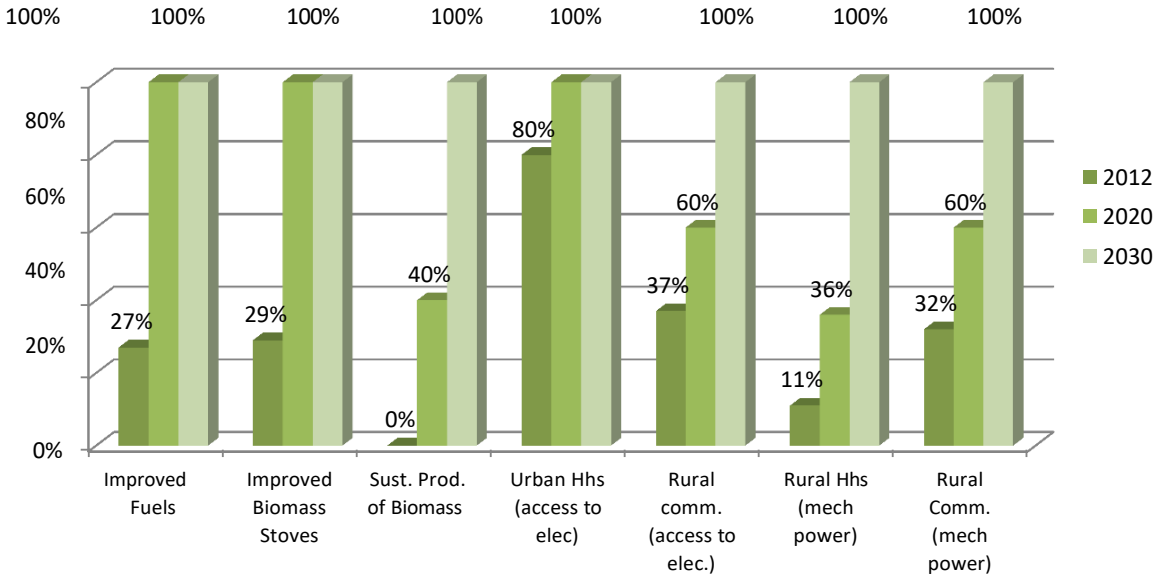
1. The total population has access to modern cooking fuel in full;
2. At least 60% of rural residents have access to energy services that are productive, (particularly power) to increase the productivity of economic activities;

A number of government- and donor-led programs have been developed since the White Paper's adoption, some of which have been put into action but with very limited success. This prompted the Government of Gambia to conduct an evaluation and develop measurable goals and targets by 2020 with the assistance of ECOWAS, the UNDP, and the EU. The 2020 goals and targets were extended to 2030 in order to align them with the SE4ALL's overarching objectives.

To achieve the SE4ALL targets in The Gambia, Promotion of LPG Use was identified in the main recommended energy access programs.

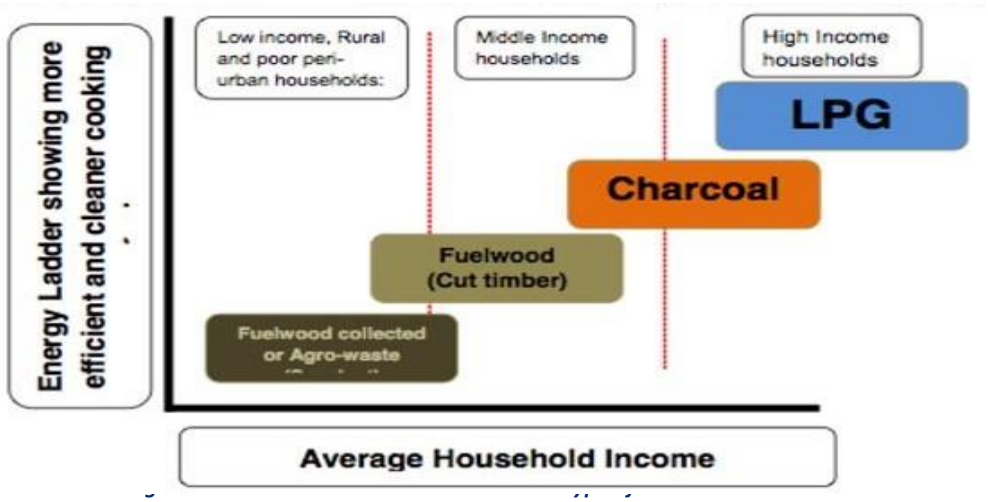
The Gambia Government set the following Energy Access Targets in accordance with SDG 7 in 2014 shown below

Figure 11: Energy Access Targets Set by Gambia Government in Action SE4ALL Report Gambia



To meet these targets, the National Investment Program for Access to Energy Services (NIP for AES), drew up a budget for the supply of both LPG stoves and improved cooking stoves to every household in the Gambia; (number of households estimated were 208,470 for improved cooking stoves and 206,700 for LPG stoves) for a combined total of 415,170 stoves to be distributed.
The improved cooking stoves were estimated to cost $3,070,000 USD while the LPG stoves were estimated to cost $9,660,000 at a cost of $46.73 USD per LPG stove. The expectation was that the type of fuel used will be strongly dependent on the Gambia's energy ladder shown below

Figure 13: Household Income in Gambia vs Type of Fuel used (Action SE4ALL Report, 2014).



6.1.3. The Gambia National Clean Cooking Energy Action Plan (2015)

The National Action Plan for Clean Cooking Energy was developed with the overall objective of increasing the efficiency and sustainability of biomass-based cooking energy and introducing modern biofuels such as ethanol, biogas and briquettes. One of the four specific objectives of the plan included the promotion of LPG Fuel and Stoves recognizing that LPG fuel is clean and highly efficient and further listed it as an activity under a proposed pilot project/progamme. It noted that past interventions had limited success due to narrow and sectoral approaches that did not take into account broader intervention areas that include private sector involvement, financing and incentive mechanisms and quality control systems. The lack of continued funding to continue interventions past project lives was also noted. The document set out and costed specific programs such as support to LPG distributors to set up distribution outlets, develop a policy and regulatory framework for international quality and safety standards, micro finance schemes to lower barriers to LPG adoption and usage and extensive sensitization to achieve the mass promotion of LPG usage. A National Clean Cooking Alliance was set up to increase consumer awareness and policy and regulatory advocacy in furtherance of the above objectives.

6.1.4. The National Development Plan (NDP 2018-2021)

The NDP aimed to put in place measures for the popularization of LPG as cooking fuel in urban areas; to encourage research and development of innovative appropriate technologies for household application in the use of LPG in both rural and urban areas; regulate and monitor the pricing structure, as well as encourage private sector participation in the provision of infrastructure to improve storage capacity and popularize the use of butane gas as an environmentally- friendly source of fuel.

6.2. Policy, Regulatory and Institutional Effectiveness Gaps

Penetration of LPG usage in the Gambia is still extremely low, falling well below the targets set by the Gambia government.
These targets were for 50% of the Gambia population to use LPG for cooking by 2020 from a usage level of 4.6% in 2013. It was expected that by 2020; 162,000 households will use LPG and that by 2030; 272,000 households will use LPG corresponding to 50% of the population in both targets. However, statistics show that only 12% of Households in the Gambia own at least one bottle of LPG as 2020/2021 and 1.9% of Households use it as a main cooking fuel nationwide (GBOS, 2023).

It is vital that LPG is promoted in The Gambia as a vital proponent of clean cooking energy in line with the Sustainable Development Goal 7 for Universal Access to Energy (‘affordable, reliable, sustainable and modern energy for all’) which made promoting access to clean cooking energy for households an important and urgent policy objective in Sub-Saharan Africa by 2030.

6.2.1. Policy Gaps

Inadequate Policy Focus on LPG and Poor Implementation Rate of Existing Policies

Nigeria, Cabo Verde, Ghana, and Senegal are some of the few nations with a gas policy document that expressly addresses LPG popularization in those nations. These strategies have worked, as evidenced by the fact that Senegal (over 65% urban adoption and 45% national adoption rate) and Cape Verde (71% national adoption rate) both have some of the highest LPG adoption rates in Africa.

The majority of the other nations in the region, including the Gambia, lack LPG only policy texts or have not yet developed workable solutions to promote LPG use across the region, as evidenced. The problem could be attributed to government's unclear formulation of enabling policies and the fact that the majority of the available energy policies do not take into account the proliferation of LPG or the current energy landscape.

The policy review shows that past government interventions in clean cooking intiatives and policies have been primarily focused on efficient cooking stoves, alternative fuels such as bio mass briquettes, sustainable harvest/use of charcoal and firewood over the promotion and popularization of LPG use in the Gambia in the short to medium term.
Key LPG Policy objectives in recent years that did not fully materialize include the following:
From Gambia National Clean Cooking Energy Action Plan 2015

- Reduce the unit cost of LPG to promote its use and reduce dependence on Fuel wood.
- Popularise the use of LPG Nationwide;
- New regulatory and licensing framework for the The LPG market;
- Improve standards of cylinders;

From Gambia National Energy Policy (2014-2018)

a) Reduce the cost of LPG fuel and promote it as an alternative to charcoal and other un-sustainable wood fuels;
b) Develop new regulatory and licensing framework for The LPG market
c) Adopt a regional approach for popularisation of LPG use, countrywide
d) Ensure environmental and safety standards for storage, transportation and distribution

It is noteworthy that in the Gambia's National Energy Policy 2014 to 2018, LPG popularisation is recognised as a long-term goal rather than an immediate term goal as improved cookstoves and other alternative fuels from bio mass. Action Plan 2014 to 2019, development objectives on Domestic Fuels/Household Energy; key policy elements are focused solely on alternative domestic fuels and improved cooking stoves that are not LPG related. Out of 15 strategies, there is only one slight reference to LPG as an alternative fuel and it is mentioned alongside kerosene.

This is in stark contrast and contradiction to the Gambia National Clean Cooking Energy Action Plan, and the Gambia SE4ALL Action Agenda Report.

It is crucial that government implements beneficial policies and incentives, that effectively implement tax exemptions, microfinance loans/support (to help with the cost of initial acquisition), pay-as-you-go models, and laws that forbid cross-filling of cylinders. This will aid in the creation of an investment-friendly climate to increase public-private partnerships and continued investment in cylinders and improve LPG affordability, accessibility, availability, and user education in the area,

6.2.2. Legal and Regulatory Gaps

6.2.2.1. Lack of Sector Specific Regulations on Pricing, Hoarding, and Health and Safety Standards for LPG

The household energy sector is the least regulated and there are several institutions and ministries involved in regulating various parts of the value chain. The Ministry of Energy and Petroleum and the Ministry of Forestry are directly involved in the fuel wood regulation with the latter having a more regulatory role both in primary exploitation and regulating transport etc. Historically there has been restriction on the production of charcoal in the Gambia.
The household energy sector needs better coordination and governance to ensure coherence in the policy objectives of the different Ministries. Petroleum products are not also regarded as essential commodities in the Gambia under the 2015 Essential Commodities Act and it is imperative that the Gambia government reviews the sector wholistically.

Furthermore, there is no explicit or specific LPG legislation regulating the industry in the Gambia. Legal aspects of the LPG industry are covered as part of legislations for the petroleum industry however LPG is not listed among the petroleum products covered by the Petroleum Products 2016 Act therefore there is no definite regulatory framework is in place to support LPG as a modern energy source.

LPG sector-specific legal and regulatory measures are therefore required to strengthen the weak legal framework for the sector. The importation and sale of LPG is currently not subject to any laws or regulations under either The Petroleum (Exploration, Development and Production) Act 2004 or the Petroleum Products Act 2016.

According to Section 24(1) of the Act, the Minister in charge of petroleum and petroleum product concerns may, after consulting with the Minister in charge of Finance, issue regulations outlining the pricing guidelines that will be used for a number of different types of petroleum products.

Section 24(2), states that regulations must include provisions regarding the following: (a) the creation of a pricing committee to monitor global petroleum product prices and provide advice to the Minister responsible for petroleum and petroleum product matters; (b) the price at which products in certain categories will be fixed; (c) the classification of petroleum products into different pricing categories; and (d) the maximum markup that can be imposed by various license holders. The need for an LPG pricing committee and structure has been identified in various policy documents to date and is still yet to be implemented.

6.2.2.2. Conflicting Laws and Authority

The authorities responsible for enforcement and policing are made up of a few different regulatory agencies with overlapping jurisdictions such as PURA and the Gambia Competition and Consumer Protection Commission, which causes uncertainty and complexity for businesses along the value chain. The provisions of Section 25 of the Competition Act 2007, which forbids price fixing, contradict Section 24(2)(b) and (c) of the Petroleum Products Act. It is a general and prevailing belief in free market economics that state involvement in the determination of prices of products does not promote and maintain competition however for petroleum products, governments of lower- and middle-income countries tend to establish pricing structures to account for and/or remedy market failures.

6.2.3. Institutional Gaps

There are no defined safety and quality standards for LPG by the Gambia Standards Bureau and poor and minimal enforcement of Safety and Quality Standards in the The LPG market.

Cross-filling and a lack of enforcement at the point of refill have led to a large number of uncertified and hazardous cylinders being in use at the moment. This is a safety problem that may cause loss of life and property.
National regulatory organizations of the Gambia such as Weights and Measures, Gambia Standards Bureau and PURA must set and enforce the essential minimum safety standard and requirements for cylinders. There are also cylinder models as old as the abandoned butanisation policies of the 80s in circulation. For the The LPG market to gain consumer confidence and trust, quality assurance must be established.

PURA appears to lack the logistical capacity to monitor standards of performance and quality of service delivery in the LPG sector. They are yet to develop a set of operational standards for LPG refilling plants, and seem to lack the capability to monitor and apply the appropriate sanctions where necessary. Capacity building is required to strengthen PURA and Gambia Standards Bureau to effectively perform their regulatory functions.

Gam Petroleum currently has the infrastructure to expand its LPG storage capacity from 1000MT in order to store it in greater bulk to avoid supply chain disruptions.

Overall, the main issue with LPG remains the negative safety perceptions and initial costs of the cylinders, and specific effort needs to be made to increase safety awareness and to reduce the cost of the cylinder for ordinary Gambians.

7. Strategy and Implementation

The LPG popularization strategy is aligned with the United Nations (UN) Sustainable Energy for All (SE4All) initiative and the ECOWAS' mission to improve the living conditions (economic, social and health) in the ECOWAS member countries, by improving access to modern energy services in the rural and peri-urban areas through promoting access to modern cooking fuels like LPG.

The findings from the diagnostic phase highlighted a number of challenges inhibiting the population's access to LPG in the Gambia. In developing the popularization strategy and implementation plan, these challenges will be addressed, with the strategy aligned to other existing global and regional policies and initiatives.

Overall, this strategy document is designed to strengthen and complement other Gambia Government and ECOWAS policies, initiatives and programmes, in increasing access to modern energy services, by providing clarity and articulating actionable and implementable plans.

7.1. High Level Strategy Objectives and Targets

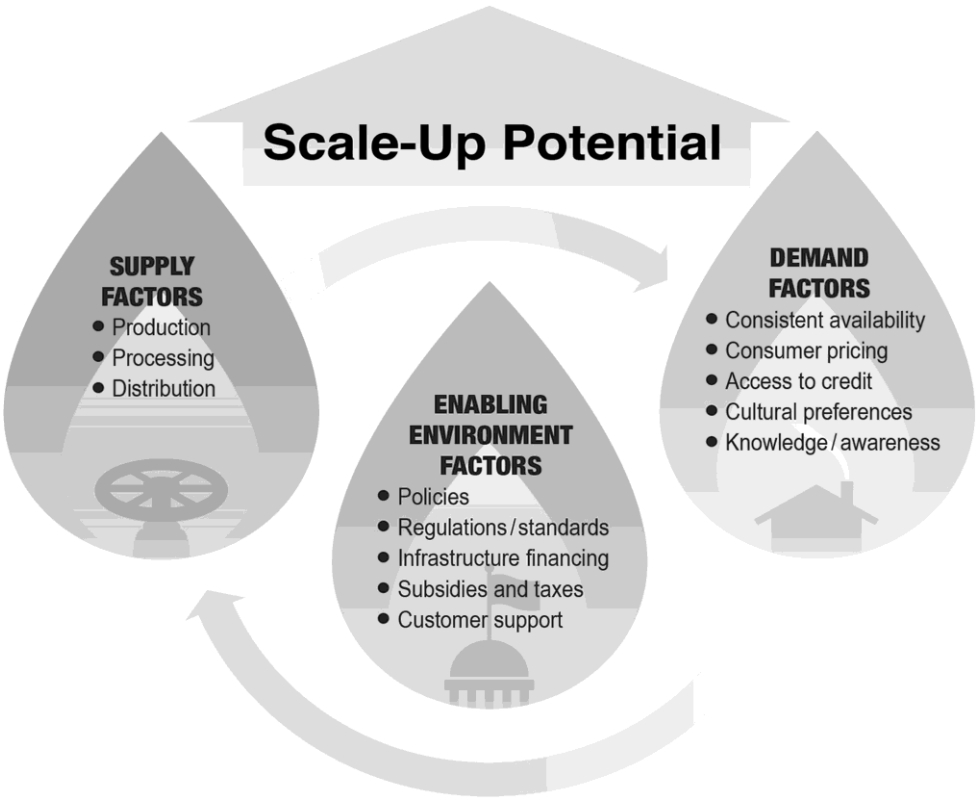
Table 15: High Level Strategy Overview

Objectives	Targets	Urgent Actions
Vision: Popularisation of LPG Nationwide Mission: a) Create an environment conducive for the LPG penetration in households by removing all potential barriers b) Increase Public private investment in the LPG value chain c) Foster the use of LPG in the households under conditions of availability, accessibility, and safety management	- Increase LPG per capita consumption -Ensure that at least 50% of households currently using traditional biomass for cooking are provided with access to LPG by 2030. -Ensure 100% access to LPG by 2050.	-Institute Price Structure for LPG with retail ceilings. -Subsidise LPG cylinder and refilling costs through supplier rebates -Set up a high quality and well-regulated distribution system -Further inflate prices of Firewood and Charcoal through taxation -Convert existing infrastructure into higher LPG storage capacities and/or build new ones through PPPs -Develop LPG regulations and quality and safety standards. -Heavily invest in infrastructure, education and promotion of LPG

7.2. Intended Outcomes

- Reduced energy dependency on wood and charcoal;
- Improved living conditions of women and children
- Improved living and economic conditions of the most disadvantaged families;
- Private sector development in the area of energy;
- Development of innovation and increased micro-economic activities in the LPG sector and
- Creation of skills to provide services nationally;
- Conservation and enhancement of the fragile ecosystem;
- Substantial reduction of deforestation, degradation and greenhouse gas emissions;

Figure 14: Scale Up Potential



7.3. Action Plan/Strategy Matrix

	Critical Issues	*Strategy*	*Action Plan*
1	1. *Create an environment conducive for the LPG penetration in households by removing all potential barriers.* 2. *Increase private investment in the LPG value chain.* 3. *Foster the use of LPG in the households under conditions of availability, accessibility, and safety management.*	• Pursue all objectives concurrently • Develop and implement incentives to encourage private LPG retail/service companies to build up distribution network and retail outlets • Mainstream gender into policies and programmes and evaluate effectiveness; • Integrate climate change and energy efficiency into LPG programmes and projects and evaluate effectiveness; and • Organise regular inter-Ministerial and Inter-Agency Meetings to review LPG policies, programmes and projects	✓ Cabinet Paper on the special incentives to be introduced to spur private sector investment and encourage national LPG adoption. Government to consider measures such as subsidies on either equipment costs or refill costs and modes of encouraging pay as you go and post-paid services for the LPG sub-sector in lieu of the upfront pre-paid modes of payment currently in practice.
2	*LPG Industry Structure/Market Controls:* The industry is composed of a variety of players - large and small - but lacks a single authoritative and representative organization to serve as its mouth piece and coordination point.	Develop an effective LPG industry association with national recognition and clearly defined roles and mandates.	✓ Establish an LPG industry association for Gambia - the Gambia LPG Association (GLPGA). ✓ Affiliate the GLPGA with the WLPGA to benefit from available technical and financial support. ✓ Empower and resource the GLPGA to deal with industry problems.

Table 16: Action Plan/Strategy Matrix

	Critical Issues	Strategy	Action Plan
3	*Regulation:* 1. There is no explicit and specific LPG legislation regulating the industry in the Gambia. Legal aspects of the LPG industry are covered as part of the legislation for the petroleum industry. 2. The regulatory authority (PURA) has a limited capacity and resources rendering it unable to police the LPG industry nationwide.	Strengthen the weak legislative and regulatory environment for the industry to facilitate revitalization of the industry. Conduct consultations with stakeholders in The LPG market chain to develop and implement regulation structure and mechanism for The LPG market chain;	✓ Develop a constructive dialogue with the relevant agencies and authorities for collaboration in efforts to streamline the legislative and regulatory environment in the LPG sector. ✓ Raise and enforce technical standards in order to remove substandard equipment and practices. ✓ The GSB to collaborate with PURA, NEA and GFRS to set standards and technical regulations on LPG, with regard to cylinders, environmental, health and safety requirements. ✓ Advocate the establishment of an LPG Division under PURA with a clear mandate for regulating the industry.

4	*LP Gas Supply/Refineries/Manufacturing Plants/Storage/Distribution:* The Gam Petroleum Depot which is the sole bulk supplier of LPG in the country has limited storage capacity of 1000 metric tons. There is therefore inadequate reserve capacity for the supply of LPG in Gambia. Additional LPG delivery points (loading points) and storage facilities are required to facilitate access to the product.	LPGMCs/OMCs/private investors must be encouraged to establish private storage depots to provide adequate and reliable product supply in all parts of the Gambia. In addition, new economic and efficient transport modes such as pipelines or improved road networks to tap into the Senegalese domestic gas market with the onstream of their gas discoveries should be established. Well-established network of LPG mini filling stations and small and micro distributors in both urban and rural areas preferably no more than 500m-1km away from communities	✓ Encourage suppliers and supply chain operators to invest in joint LPG storage depot projects. ✓ Advocate the provision of government land and effective implementation of customs and duties exemption for LPG equipment.

5	*LPG Cylinders:* Most cylinders in circulation are in poor condition due to the absence of a cylinder management system (maintenance and renewal) for Gambia.	Clarify who owns, who fills, who maintains the cylinders and establish standard cylinder sizes for the Gambian market. Monitor supply chain, ensure regulatory compliance and enforcement	✓ Make mandatory the periodic inspection and re-certification of all LPG cylinders in the country. ✓ Prepare and cost a program central pressure testing facility for cylinders. ✓ Encourage the LPG industry association to work with the appropriate regulatory authority to phase out dangerous cylinders from the market. ✓ Empower and resource the GSB to monitor cylinders at various ports of entry.
6	*LPG Appliances:* A variety of LPG appliances can be found in the Gambian market. Conspicuously missing are appliances for cooking stoves that can utilise LPG power	Suitable, affordable appliances to be made available to prospective LPG consumers throughout the country. Encourage and support the development of manufacturing plants and/or industry hubs for innovative stoves adapted for LPG use as seen in Senegal	✓ Encourage The LPG marketers and local stove manufacturers and vendors to secure suitable, affordable appliances for the consuming populace.

7	*Safety/Image*: Although records of LPG accidents in the Gambia are limited, the industry has a poor safety image. There are currently no nationally accepted operational and safety standards in the LPG industry.	Improve LP Gas safety throughout the distribution chain and at the point of use. Prepare and implement annual programmes for public education and awareness creation on energy access, renewable energy and energy efficiency	✓ Clarify cylinder ownership and maintenance obligation on wholesalers and distributors ✓ Make mandatory the periodic inspection and re-certification of all LPG cylinders in the country. ✓ Strengthen the PURA, and GCCPC to monitor and undertake periodic checks on refilling plants and LPG distribution facilities. ✓ Educate Public on the life span of equipment. ✓ Form LPG Associations (from OMCs to End Users) to assist in the formulation of regulatory policy. ✓ Produce a readily accessible document on regulatory and safety procedures for the industry.
			✓ Enforce the ban on the ✓ importation of used cylinders into the country.
8	*Pricing/Access by the Poor:* The initial hardware-related cost of switching to LPG is a real barrier for the poor, not least because consumer credit is a rarity in Gambia. Uncertainty regarding availability and pricing, together with safety concerns, are deterrents.	• Promoting access by poor people to LPG should be formally adopted as a guiding principle for all industry stakeholders. • Conduct stakeholder consultations to develop and implement favourable and transparent product pricing regime for LPG. • Fully engage with financial institutions to provide medium to long-term finance for capital investments in production and business growth for entrepreneurs in the LPG and cookstoves businesses, and soft loans to end-users • Conduct annual energy access and	✓ Provide access to credit for private entrepreneurs to establish refilling plants in rural and peri-urban communities. ✓ Provide access to credit for end users, to buy LPG equipment and cylinders if necessary. ✓ Promote extensive use of smaller cylinders (3kg - 6kg) to reduce the recurrent cost of refilling for the poor. ✓ Use of cooperatives (LPG user associations) to guarantee LPG cylinder and equipment purchases for rural ✓ consumers and the poor.

		consumer research surveys	
9	*Investment/Funding/Implementation:* Both external and internal sources of financing have to be explored to meet the funding requirement for the sector. Grants and public investments will be needed in areas such as institutional capacity building and public education since they may not meet commercial investment criteria.	Attract local and external or foreign investment and skills essential for improving access and service delivery in the LPG industry.	✓ Prepare a comprehensive national business plan for the LPG industry. ✓ Organize a donor/investors forum to sell various investment opportunities to potential investors. ✓ Encourage government to provide incentives and an improved regulatory and safety environment to attract private investors. ✓ Establish a specialized fund for the LPG ✓ industry with seed funds from the petroleum levy.
10	*Consumer sensitization and awareness* General Population needs to be fully apprised of the benefits, incentives and health, economic and environmental advantages of LPG use	Communication and information dissemination Urban and Rural Engagement and Communication Gender Promotion	✓ User education and enlightenment via a multi-pronged approach in schools, campaigns, radio tv and social media programmes, road shows and community rallies

7.4. Costing of Strategy

Action	Description	Budget (USD)
Direct Subsidies of LPG Cylinders	30% cost of 6kg cylinder cost to 200,000 households	$3,000,000.00
Direct Subsidy of LPG Refills	50% cost of two 6kg refill per year to 200,000 households	$ 250,000.00
Mass Sensitisation and Awareness	Public Awareness and Sensitisation of Households	$1,000,000.00
Regulatory and Institutional Strengthening	Review of laws, standards and procedures guiding the LPG Industry and Capacity Building for Enforcement	$5,000,000.00
Contingent funding and mobilisation costs		$750,000.00
Total Costs		$10,000,000.00

Table 17: Costing of Strategy

7.5. Implementation Plan

		2023	2024	2026	2028	2030	2032	2034	2036	2038	2040	2045	2050
PROGRAMMES/PROJECTS/INITIATIVES	***Responsible***												
- Set up a coordinating team/intersectoral committee comprising of the LPG focal points in interfacing with government institution derived from the Stakeholder List above	Ministry of Petroleum and Energy												
- Identify sources of funds targeted at LPG development in country and develop partnerships with donor agencies, project developers, and global and regional financial institutions.	Ministry of Petroleum and Energy and Ministry of Finance and Economic Affairs												
- Develop promotion and informational website and social media pages for active information sharing and dissemination on various initiatives, achievements and programmes.	Ministry of Petroleum and Energy												
- Ensure the adoption and harmonization of the cylinder models and standards nationwide	Ministry of Petroleum and Energy												
- Facilitate the introduction of a quota for the state-owned Corporation to supply the Gambia with LPG	Ministry of Petroleum and Energy												
- Develop awareness campaigns and sensitization programmes in the region through radio and Television jingles, radio hypes, social media platforms and flyers.	LPG Inter-Sectoral Committee set up by MOPE												
- Collaborate with international partners such as WB, UN, EU, UNDP, UNEP, WHO, etc. to disseminate information on LPG benefit to the peri-urban and rural areas.	LPG Inter-Sectoral Committee and Donor Partners												

	IMMEDIATE TERM													
- Support market players in setting up an Active National LPG Association	Ministry of Petroleum and Energy													
- Develop national LPG business plan/ LPG investment master plan based on the identified gaps and needs, with focus on public-privatepartnership projects.	ECOWAS & MOPE													

Table 18: Implementation Plan

- Create a division within PURA responsible for LPG monitoring, evaluation and compliance unit to ensure regulatory compliance and support the implementation of national LPG strategies and investment master plan.	PURA												
- Submit and approve a Cabinet Paper/Government Policy Directive to provide incentives such as subsidies to consumers, tax holidays to The LPG marketing companies, local cylinder manufactures and micro-distribution business in (urban, peri-urban and rural areas) in order to reduce end-user costs	MOPE and MOFEA												
- Actively encourage and steer investors to invest in the LPG subsector	MOPE and MOFEA												
- Provide access to sources of funds at the regional and national levels from donor agencies and negotiate favourable interest rates with financial institutions to support microfinancing programmes and popularization initiatives	MOFEA												
	MEDIUM TERM												
- Promote the establishment of storage depots and other auxiliary industrial facilities such as manufacturing plants	MOPE												
- Develop an in-house LPG popularization project to lobby for a minimum of 300,000 6kg cylinders to distribute freely to all Gambian households nationwide by 2030	MOPE and ECOWAS												

- Develop capacity building programmes to train and retrain LPG mini, micro distribution retailers, wholesalers, women, children, entrepreneurs, etc. on the safety and handling of LPG household equipment.	MOPE, ECOWAS & Donor Partners														
	LONG TERM														
	- Work on the possibility of a pipeline network between Senegal and the Gambia to benefit from Senegal gas production, implement gas-to- home piping system in future urban development plans to improve clean cooking in the Gambia	ECOWAS & MOPE													

8. Monitoring and Enforcement

8.1. Establishment of the LPG Promotion Steering Committee

It is strongly advised that a multi-sectoral steering group comprised of several stakeholders (ministries, agencies, and government departments) be constituted for the execution of this strategy. This group will be in charge of creating initiatives of public interest and collaborating with all relevant parties, from energy producers and distributors to consumers. It will also be the entity responsible for evaluating and monitoring sectoral energy efficiency initiatives, as well as suggesting changes and new actions.

The agenda is also an agenda of market transformation based on improved storage, new technologies and innovative processes. The strategy outlined for the energy sector over the next 15 years will require mass sensitization campaigns, advocacy and promotional drives in sufficient quantity and quality needed for the challenge embraced.

8.2. Monitoring and Evaluation

Monitoring and evaluation of the programme will be carried out in accordance with the Ministry of Petroleum and Energy's approved guidelines and processes. The overarching goal of the monitoring and evaluation process is to ensure the Program's successful and high-quality execution by:

a) tracking and analysing the implementation of action plan tasks as well as actual accomplishments
b) enabling the implementation team to take early remedial action if performance deviates considerably from initial plans as the programme progresses; and
c) update strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken.

The Ministry of Petroleum and Energy shall establish, in coordination with the relevant office/department/unit a detailed monitoring plan for tracking and reporting on programme time-bound milestones and accomplishments at the start of project implementation, which will be periodically updated. The monitoring plan will track, report on, and review programme activities and successes by referring to the targets outlined in the matrix. An external evaluation will be conducted six months into 2030.

8.3. Risks that can Impact Strategy Achievement

1. Low Government Commitment to Programme

   The objectives and activities of the programme are consistent with national energy policy objectives and action plans for improving energy access to urban, peri-urban, and rural households, communities, and institutions. The Ministry of Petroleum and Energy is dedicated to the Program and will contribute resources to it.
   The project will be managed by the Ministry of Energy, with support from the LPG Promotion Steering Committee, which includes government ministries, departments, agencies, non-governmental organisations, and the business sector. Close coordination, regular communication, and distribution of duty will ensure that key policy/institutional counterparts remain actively involved.
2. Low Institutional Capacities for Implementation

   Due to limited capacity in the country with similar subsidy initiatives, there is a technical risk associated with the project. The implementation of activities will be carried out with the assistance of international experts/companies with documented and successful past experience. Only mature and well-established energy technologies are being proposed. Special emphasis will be paid to better defining the existing baseline in order to construct effective personalised and well-targeted training programmes in the capacity building and enabling activities.

3. Low Stakeholder Engagement

   Stakeholder consultations were undertaken with Government Ministries, Departments, and Agencies, NGOs, and the corporate sector, during the Strategy development phase. The overall response was enthusiastic support and interest in participating in the mass promotion of LPG. A well-structured national dissemination campaign showcasing the sustainability of the project and highlighting the opportunities throughout strategy execution will ensure the appropriate stakeholder reaction. Throughout the period of the Programme, these activities will be complemented with an active debate and participation of important national and community-based associations.

Annex A1

Consulted Stakeholders and Key Participants for the Development of this Strategy

Designation	Stakeholders
Primary State Actors	Ministry of Petroleum and Energy (High)
	Ministry of Finance and Economic Affairs (High)
	Ministry of Environment and Natural Resources (High)
	Ministry of Trade (High)
	Public Utilities and Regulatory Authority (High)
	Gambia Competition and Consumer Protection Commission (High)
	Gambia Bureau of Statistics (High)
	Petroleum Commission (High)
	Weights and Measures Bureau, the Gambia (High)
	Gambia Standards Bureau (High)
	Gambia Fire and Rescue Services (High)
Secondary State Actors	Ministry of Gender, Children and Social Welfare
	Ministry of Health (Medium)
	Department of Forestry (Medium)
	GIEPA (Medium)
Primary Non-State Actors	Gam Petroleum (High)
	Importers (High)
	Wholesalers and Distributors (High)
	Resellers (Medium)
	Consumers/End Users (High)
	Gambia Chamber of Commerce (Medium)
	CSOs/Women Groups (Medium)
	Donor Agencies (EU/ECOWAS) (High)
Secondary Non State Actors	Gambia Renewable Energy Centre (Low)
	Renewable Energy Association of the Gambia (Low)

Table 19: Stakeholder Matrix

Annex A2

Comparative Policy Analysis and Case Study of Neighbouring Senegal as one of the Countries with the Highest LPG Adoption in West Africa

In 2018, 1.5 million LPG stoves were in use in Senegal, and the majority of the Senegalese population (especially in the metropolitan areas) utilized LPG as their cooking fuel. The butanisation initiative, promoted by the Senegalese government in 1974, led to market expansion over time, resulting in a 170,000 MT annual consumption in 2017.

The majority of LPG utilized in Senegal is imported. The home and commercial sectors account for nearly all of the nation's LPG consumption. LPG is undoubtedly cheaper in Senegal than Gambia where it was subsidised by government to encourage national use and adoption for many decades until there was sufficient market penetration.

The periods between 1986 and 2009 saw aggressive media campaigns and incentivising of the smaller cylinders namely the 3kg and 6kg cylinders via subsidies.

This is 56 times more than the annual consumption when the butanisation program first started. The growth rate slowed down after the LPG subsidy stopped in 2009 having reached LPG penetration rate of 60% however, government periodically intervenes with subsidies and price regulations to correct market failures and to ensure that the price for LPG refills remains sustainable and attractive in comparison to charcoal.

The Senegalese government used the re-circulation model where the distributor owns the LPG bottles and government subsidised the cost of the bottles by half and the cost of refills as well.

In 2009, the automatic subvention/subsidies were removed and now government only periodically intervenes with such subventions when the prices of LPG imports get too high to be affordable to the general populace.

Senegal relied mostly on the private sector to do the storage capacity increase, which increased, from 10,000 MT to 18350 MT in 15 years. This was underpinned by government subsidies that encouraged large numbers of the population to switch to LPG.

Despite not having major natural gas deposits previously, Senegal was successful in promoting LPG usage. This was due to political will, clear cut policies and government interventions.

Every 5 years, Senegalese authorities do safety tests on all bottles and tests the hydraulic pressures and conduct depot safety tests.

There is a production quota on place in charcoal, and safety awareness has generally minimised accidents in the LPG sector.

It is important to note that whereas The Gambia has technically only two main oversea importers, and no local refinery, Senegal has four large companies, Shell, Total, Mobil, and Elf, that import LPG to supplement the country's domestic refinery SARL.

LPG Price Structure in Senegal

Description (SENEGAL)	2.7kg	6kg	9.kg
Price Parity Import	314,371	314,371	314,371
Taxable Base	376,617	376,617	376,617
Door Rights	3,766	3,766	3,766
Ex Depot Price	318,137	318,137	318,137
Tax Stabilization	0	0	0
Grant	0	0	0
Distributor Margin	122,630	122,630	122,630
Cost for Depot Passage	32,480	32,480	32,480
VAT base	440,767	440,767	440,767
VAT	**0**	**0**	**0**
All taxes included price	440,767	440,767	440,767
Ex-Distributor Price	1,189	2645	3,967
Gross margin	80	155	210
Ex-Wholesaler Price	1,269	2800	4,177
Retailer Margin	35	85	110
Consumer price	**1,304**	**2885**	**4,287**
Round	**1,305**	**2885**	**4,285**

Table 20: LPG Price Structure in Senegal

Annex A3- Survey Instruments

STAKEHOLDER INSTITUTIONS SURVEY

1. What is the name of your organisation?
2. Does your organisation operate on a national or provincial level? (More than one answer possible)
3. As a stakeholder organisation, who do you consider to be your constituents? (More
4. than one answer possible)
5. What mechanisms do you have in place to keep in touch with them in order to represent their interests?
6. Does your organisation have a formal strategy for LPG popularisation? (Could we have a copy?)
7. What do you consider the best way(s) to advance consumer interests and address LPG unaffordability, translated into priority institutional strategies? How did your organisation become involved with LPG/Clean cooking initiatives?
8. Are you in possession of the National Energy Policy?
9. What other documentation regarding LPG do you have or have access to?
10. What do you see as potentially beneficial aspects of LPG?
11. What do you see as potentially negative aspects of LPG?
12. How do you think the beneficial aspects could be enhanced?
13. How do you think the negative aspects could be mitigated?
14. Overall, what is your organisation's position on the current state of the government LPG programme?
15. In what direction would you like to see the programme developing?
16. Would you be willing to enter into a formal dialogue process with MOPE with the aim of improving the programme to increase LPG Penetration Rate in the Gambia?
17. Would you be willing to help establish an advisory committee for LPG promotion and penetration in the Gambia?
18. On a scale from 1 to 5, can you indicate if you are now better informed about the LPG programme?
19. What is your position now towards the LPG programme?

GOVERNMENT INSTITUTIONS SURVEY

1. What is the name of your Government entity?
2. In what way does your entity contribute to SDG Goal 7 (Access to clean cooking)?
3. In the course of its work, does your entity engage structurally with LPG businesses, civil society and/or communities and what are the ways in which this engagement is done?
4. If the answer to question is yes, in which way is this done?
5. If the answer to question 4 is no, why?
6. In the course of its work, does your entity engage informally with LPG businesses, civil society and/or communities and what are the ways in which this is done?
7. In what way is your entity involved with the Gambia Government LPG popularization programme?
8. As a Government entity, what do you see as your role in this project?
9. Are you in possession of the LPG policy document?
10. What other documentation regarding LPG and other clean cooking initiatives do you have or have access to?
11. What do you see as potentially beneficial aspects of LPG Popularisation?
12. What do you see as potentially negative aspects of LPG popularisation?
13. How do you think the beneficial aspects could be enhanced?
14. How do you think the negative aspects could be mitigated?
15. Overall, what is your organisation's position on the current state of the LPG penetration and use?
16. In what direction would you like to see the strategy developing?

17. In which way could your entity contribute to the development of the LPG sector?
18. On a scale from 1 to 5, can you indicate if you are well - informed about the benefits of this project – LPG promotion in the Gambia?
19. What is your position now towards a government subsidy on cylinder pricing, free cylinder distribution, tax breaks/holidays for investors and retailers, duty free imports on LPG equipment?

Survey Questions (Business Community- Importers, Wholesales, Retailers)

1. Business Information, Name, Location and length of Registration
2. Respondents Demographic Details (Age, Gender, Education, Business Experience)
3. No of employees in business and business Capex and Opex costs
4. Type of Business (Importer/Filling Station/Retailer (Stoves or Cylinders)
5. Types and Sources of Products Sold
6. Current selling price, opinion on price stability of LPG and maximum and minimum price indices
7. Source of LPG purchases
8. Frequency of LPG deliveries
9. Total yearly imports/sales/storage capacity
10. Stock levels and how long it lasts for
11. Mode of payment of stock (up front or credit; details of credit arrangements)
12. Experiences with stock shortages and reasons behind such if any
13. Sales information (volume of sales and high and low selling days/points)
14. Customer Characteristics (by gender and location)
15. Past customer complaints and what they center on
16. Business Experience with Current Supplier(s) on stock reliability, availability and quality
17. Business discounts offered or received
18. Government incentives received if any
19. Overall perception of business and industry challenges, profitability and viability
20. Perception on demand and supply trends
21. Business views on effectiveness of different policy options for expanding usage (sample policies floated will be LPG start up packages for businesses and consumers; subsidies of some or all LPG products such as cylinder, gas and stove); tax breaks and/or incentives such as duty free etc
22. Suggestions of other policy options and strategies that could increase sales/usage
23. Opinions on reasons behind current market trends of demand and supply

Survey Questions (Consumers)

1. Location (Rural/Urban/District)
2. Demographic Profile (Name, Literacy Level, Occupation, Gender, Age, Household number and income)
3. Current fuel consumption and sources
4. Ease of access for each type of fuel source utilised
5. Cost of each fuel source
6. LPG Awareness as a fuel
7. Awareness of Government Initiatives to promote usage of LPG
8. LPG frequency of usage (reasons for use or non-use)
9. Constraints limiting usage rate of LPG
10. LPG Availability and Proximity to retail outlets and filling stations, average wait times

11. Support Expected from government and other stakeholders in order to increase/maximise LPG usage
12. Suggestions on how to improve LPG access and usage

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