

Ghana LPG Cylinder Recirculation Model: The Opportunities and Challenges

MCJERRY ATTA BEKOE, AUGUSTINE NTAAMA ENNINFUL

Abstract:- The pursuit for cheap, productive and environmentally friendly energy resources has advanced over the years. This has resulted in an increment in the demands and needs for energy which testifies to the direct impact energy has on the economic growth of a country. In 1990, the Government of Ghana established the Liquefied Petroleum Gas (LPG) Promotion Program to encourage the citizens to switch from wood fuel to LPG as an initiative to deal with the domestic cooking energy crises. The program received good feedbacks from the citizens; however, due to the numerous issues it posed, the program was ceased. In spite of the failure of the LPG Promotion Program, there was a massive progress in LPG usage in urban areas. This led to the Rural LPG Promotion Program (RLP), an initiative launched by the government in 2013, to improve access in the rural areas. There has been improvement in the RLP; however, fuel cost and an inadequate implementation structure hinder the program's success. In view of the above, this paper seeks to identify and examine the opportunities and the challenges the LPG Cylinder Recirculation model, a program yet to be launched, brings to the promotion of LPG in the nation. Some opportunities identified include; reduction in the health and environmental problems associated with LPG service stations operations, less cost on citizens to repair damage or leakage in cylinders, reduction in explosions at LPG service stations and job creation. However, some challenges identified include; lack of enough cylinders for the program and negative effect on the businesses of the LPG marketing companies and LPG tanker drivers. It is therefore recommended that for the LPG Cylinder Recirculation Model to achieve its objective, the Ghana Cylinder Manufacturing Company (GCMC) should be renovated for production to increase the quantity of cylinders and even repair damaged ones and talks should be held between government and the LPG marketing companies on how best the LPG marketing companies can be involved in the policy. Much work will be required to make this upcoming program productive and sustainable.

Keywords:- Energy, Recirculation, LPG Cylinder, Environment,

I. INTRODUCTION

Modern energy has a direct impact on the economy of a country as well as the poverty of individuals. The literature on poverty across the world shows that, indeed, income deprivation should not be considered as the only dimension of poverty as deprivation in other dimensions of human life-sustaining activities such as education, life expectancy, access to modern energy sources and room availability in the house are significant both in rural and urban areas in determining poverty, and not necessarily related to deprivation in income (Alkire & Santos, 2010; Atkinson, 2003; Kakwani & Silver, 2008). Energy is one of the very basic needs to sustain life as it is used for cooking, lighting and various forms of production processes. In spite of its importance, over the years, the issues of accessibility, affordability and pollution of the environment plays a major role on the type of energy use (Broni-Bediako E, et al, 2018).

With the ever increasing awareness of the dangers associated with exposure to the traditional methods of energy particularly wood fuel (that is charcoal and firewood) for mainly cooking, modern energy helps eliminate the dangers wood fuel pose to the environment and individuals. Notably, trees are saved from deforestation which is a major driver for the supply of wood fuel and subsequently the release of Green House Gas (GHG) emissions in Ghana (United Nations Environmental Program [UNEP]-Risoe Center, 2013). Also, most African women in the rural areas are the most beneficiaries to the promotion of modern energy since the amount of time they spend in search of wood fuel, which has detrimental effects on the health (such as: respiratory infections, lung cancer, cardiovascular diseases and among others), are invested in income-generating and educational activities daily (UNDP, 2004). Also, modern energy makes life easier by providing services as Bartels illustrates how many spend hours a day walking long distances to collect firewood because their cooking stoves are the traditional one (usually three-stone open) (Bartels, 2007).

Despite the various initiatives put in place by the government of Ghana to make modern energy in the form of Liquefied Petroleum Gas (LPG) easily accessible; like other developing countries, there is still the challenge of improving access to the citizenry. About 80% of households in Ghana depend directly on wood fuels for cooking (Karakara A. & Dasmani I, 2019). Furthermore, the International Energy Agency (IEA) noted that unlike other regions and developing countries where traditional biomass energy use is expected to stagnate or decline, Africa's traditional biomass use is likely to increase sharply by 2030 unless there is a significant increase in access to cleaner and affordable energy carriers for cooking (IEA, 2006). The

hypothesis by the IEA has been impacted greatly by the outbreak of COVID 19 and the Russian-Ukraine war which has greatly affected the cost and access to fuel causing a surge in the demand for wood fuel especially in Ghana.

In 1989, the Ministry of Energy embarked on its first LPG promotion program as part of its efforts to reduce deforestation (Modern-Ghana, 2011). The main objective of the program was to foster wider use of LPG as a substitute for charcoal and firewood for cooking; health was not a stated objective (Ahunu, 2015). The LPG promotion program involved the free distribution of 14.5kg and 5kg cylinders and transportation services to the citizenry. The government absorbed most of the cost on the LPG program and a LPG fund was set up (Energy Commission, 2010). In spite of the great response the program received from the citizens, it ceased to operate due to challenges such as lack of safety education on the usage of LPG, increase in unauthorized LPG driven vehicle, frequent rise in the cost of LPG and its accessories, lack of accessibility of LPG and high level of risk in transporting LPG (Broni-Bediako & Amorin, 2018). However, there were measures in place to handle the issues which resulted into the introduction of the Rural LPG Promotion Program (RLP).

The RLP, an expansion of the LPG Promotion Program, was launched in November 2013 (ENERGIA, 2015) in Garu-Tempana in the Upper East Region of Ghana to contribute to Ghana's overarching goal to expand LPG access to 50% of Ghana's population by 2020 (Petersson, 2016). Within the RLP, there was an increased effort to promote LPG in rural areas where half of Ghanaians live and where the usage of biomass fuel is at its apex (IMANI, 2017). The program succeeded in increasing the tonnage of LPG consumed nationwide but failed to attain its main goal of expanding LPG access to 50% of Ghana's population by 2020 due to fuel cost, poor LPG access and an inadequate implementation framework (Asante K. P, et al, 2018). According to literature, the percentage of Ghana's population using LPG as their primary source for cooking for 2020, the most recent year was 25%. (Sasu D. D, 2022).

This research seeks to identify the opportunities and challenges the LPG Cylinder Recirculation as a model provides to the acceleration of LPG usage in Ghana.

II. BACKGROUND OF LPG CYLINDER RECIRCULATION MODEL IN GHANA

A. *The LPG Cylinder Recirculation Model*

On the 12th of October 2017, at a cabinet meeting, the President of Ghana on the counsel of cabinet, directed the implementation of the LPG cylinder recirculation model few days after the gas explosion, on 7th October 2017, at an LPG refilling station at Madina Atomic Junction in Accra that led to the loss of lives, injuries and loss of valuable property (Ghana I, 2018). The decision by the government of Ghana to intervene was as a result of similar events happening as stated by the Minister of Information when he made a statement that “in the past three years, we have been subjected to eight such incidents of explosions. This latest incident was one too many, which we must take all

necessary steps to bring it to an end” (Ghana I, 2018). However, the policy was scheduled, due to challenges encountered, to be in full implementation at the start of 2018 which never happened to date.

Despite all the talks about the recirculation model, discussions on the cylinder recirculation initiative dates back to 2012 when in June 2012, Ghana's SEforALL plan, a Sustainable Energy for All Action Plan as termed by the United Nation's Sustainable Energy for All (SEforALL) program (ENERGIA, 2015), called for the distribution of LPG to accelerate the rate of uptake of LPG for cooking through LPG cylinder recirculation model (Energy-Commission, 2012a). Since November 2017, the National Petroleum Authority (NPA) have been mandated by the Ministry of Energy to constitute an implementation committee to plan, oversee and ensure the smooth and successful implementation of the National LPG Promotion Policy using the Cylinder Recirculation Model (CRM) with the aim to ensure that 50% of Ghanaians have access to safe, clean and environmentally friendly LPG for increased domestic, commercial and industrial usage by 2030 (Baneseh M, 2018). NPA has also been in talks with stakeholders, which include the LPG marketing companies and LPG tanker drivers who raised concerns that the implementation of the policy would put them out of business, to implement the LPG Cylinder Recirculation Model.

This policy means that consumers will no more have cylinders of their own but rather will purchase already filled cylinders at particular LPG selling points. Furthermore, consumers will make an advance payment for an initial cylinder and subsequently pay for only the LPG (Energy-Commission, 2012a; National Petroleum Authority, 2017a). From Baneseh (2018), the operational framework of the implementation of the CRM begins with the classification of LPG refilling stations by NPA into low risk and high risk stations in relation to their failures to meet desired standard of safety in an evaluation of every LPG refilling station in the country. As stated by the then Chief Executive Officer (CEO) of NPA, Mr. Alhassan Tampuli, the low risk LPG refilling stations and high risk refilling stations would be allocated solely for the purpose of distribution of Autogas and filled cylinders respectively. This initiative comes with new and enhanced measures of safety for its operation. The dynamics of the new LPG supply chain starts with the role of the LPG Bulk Distribution Company (LBDC), "whose responsibility will be to either import or buy the LPG from local refinery or/and gas processing plant, such as Tema Oil Refinery and Ghana National Gas Company, and store the LPG in their Bulk Storage facility", a statement from Mr. Alhassan Tampuli. He added on by stating that the LPG product from the LBDC will be sold "in bulk to either the Bottling Plant for the sole purpose of filling the empty cylinders or to the LPG Marketing Companies (LMCs) for bulk sale to industrial end-users - factories, restaurant, and mini-power plants- and also to auto gas users. The LPG Bottling Plant Company will be responsible for filling the empty cylinders for onward distribution to LMCs." The role of the LMC in the supply chain will be for the acquisition, preservation and trademarking of the cylinders. Distribution

of filled cylinders will be done in zones, the sites of the Bottling Plants, by exclusive trucks but there will be no limitations to the zones, as clarified by Mr. Alhassan Tampuli.

III. METHODS AND MATERIALS

A thorough review of secondary data served as the main source of information for this paper. Literature on existing data from Ministry of Energy, National Petroleum Authority and Ghana National Petroleum Corporation were reviewed together with articles, journals, newspapers and recognized websites were employed.

IV. OPPORTUNITIES LPG CYLINDER RECIRCULATION MODEL PROVIDES TO THE GHANA

Should this policy be finally implemented, the research identifies the following advantages it provides to the country.

A. Job creation

The CRM will lead to an increase in employment opposed to the popular believe that it would put a lot of businesses out of operation. This believe can be said of the first LPG policy draft in 2017, which was recalled for additional consideration with the businesses involved after the outcry by the LPG marketing companies and LPG tanker drivers (Akoloh, 2017). Considering the fact that the CRM will be instituted when the old LPG businesses will be still in operation, until the old LPG businesses fade out gradually, gives the assurance of the security of all existing jobs during the policy implementation stage. A country like Peru serves as a template to show how much job will be created using the CRM since Ghana shares similar population growth with them, a statement from Mr. Tampuli. The introduction of additional supply chains in the operations of the CRM justify the possible leap in the rate of employment.

According to Graphic Online, Baneseh (2018), "Direct job creation is estimated to be 9,468 in relation to new jobs under the LMCs, LBPs, LCTs and door-to-door delivery. This does not affect current jobs of LPG Bulk Transporters, LPG Bulk Distribution Companies, and LPG Bulk Storage companies as well as the retail outlets that would transition into distribution centres, which is estimated to be around 3,355. In addition to the above jobs created, the NPA will recruit a little over 200 safety auditors throughout the country, as well as resource its newly established Health Safety Security and Environment department. There will also be a number of indirect jobs created for installations, maintenance, fabrication and other services."

Also, the newly inducted governing board of the Ghana Cylinder Manufacturing Company (GCMC) (Brobbe, 2021), validates the re-establishment of the GCMC which will create jobs for welders, dealers of metal scrap and mechanics.

B. Improvement in the Accessibility of LPG

Improving the access and patronage of LPG in the country will finally be achieved with the CRM after several years. The introduction of the LPG Promotion program and later the Rural LPG Promotion program were to achieve mainly the objective of increasing the accessibility of LPG throughout the country to 50% of the country's population. Unlike the other LPG Promotion programs, the CRM is a diverse means of distributing the LPG product to anyone at any place. As stated in the words of K.P. Asante et al (2018), "instead of a few hundred small filling stations, the policy will likely result in thousands of retailers served by a small number of industrial-scale filling stations." In 2014, an evaluation by Global LPG Partnership (GLPGP) of LPG demand in the Greater Accra Region in Ghana showed that 83% of the recipients of the investigation, with low LPG patronage, prioritized the closeness to LPG refilling plant as a solution to their low LPG patronage (GLPG, 2014). This finding shows that in times where door-to-door services are rapidly taking over the market, the diverse distribution channels in CRM will meet the current consumer's preference with ease. Thus, the CRM ability to penetrate any market in the country will be the solution to the restriction on the number of distributing channels.

C. Safety Enhancement

Most explosions in LPG refilling plants in the country occurred primarily as a result of the upfront exposure to LPG either through the presence of the gas tank or the dispenser. With CRM, there will be the elimination of gas tankers at refilling plants, especially at residential areas, due to the modification of the various LPG refilling stations. The modification will prevent the dangers posed by distributing autogas, filling empty cylinders and refilling plants from gas tankers at the same station. As stated by IMANI (2017), "Any move to reduce fatality will require an effective means that will remove gas refill sites from residential communities." Also, the nature of the CRM operation serves as a form of checks on LPG products from the bulk facility through to the marketing companies, who will be mandated to enforce that all cylinders to be used will be in good shape, before it reaches the consumer. Additionally, the safety measures required for gas outbreak in cylinder storage sites is relatively controllable and teachable than that of LPG refilling stations.

D. Increase in Revenue

Ever since the introduction of LPG in the country, a higher consumption of the LPG products greatly increases the economical gains to the country. Reasons for this statement can be found in Broni-Bediako and Amarin (2018), "The consumption of LPG has resulted in an increase sales of LPG accessories such as rubber tubing, gas, gas lighters, gas stove stands, and the construction of many LPG filling stations around the nation. The amount of taxes paid by the owners and consumers of LPG help to increase the government's annual revenue." This is to say that the introduction of the CRM, a more accessible model, will increase LPG usage which will raise the consumption, thus, increasing the revenue of the country.

V. DISCUSSION

The evaluation of this paper shows that the LPG Cylinder Recirculation Model will contribute greatly in achieving the main objective of increasing LPG access to 50% of the Ghanaian population by 2030 taking into consideration the model's mode of operation.

However, there is the issue of not completely averting gas explosions in the CRM. Even though safety will be assured for consumers, properties and communities around some designated stations, the same cannot be said for outside those areas since the gas tankers would still be in the operation of distributing gas to designated areas for Autogas and bulk consuming such as hospitals. The CRM does not address the risk of transporting gas along the roads to various points. Despite the absence of a gas explosion occurring outside of LPG station for sometime now, the explosion at Appiatse should serve as a warning of the risk gas tankers pose on the road. Tankers transporting gas has been the norm from the beginning of the LPG Promotion program up until now. The purchase of modernized gas tankers with safety systems, to reduce if not eliminate the impact of explosions outside of the LPG stations, will be a great addition to protect people and the environment as a whole. Also, the drivers of the gas tankers should be educated on how to drive in order not to cause accident that can cause gas explosion and how to handle situations that could cause explosions in the line of duties.

One major impediment to the CRM, like the LPG Promotion program and RLP, is the financial challenges it poses particularly on the rural people. This financial challenge is in the form of the initial deposit made into the start of the model. If not handled, it will be the reason for the ineffectiveness of the policy. It will be therefore, appropriate for government to intervene and take over the cost, specifically for the people in the rural areas. Otherwise, the National Petroleum Authority (NPA) could partner with private businesses to develop achievable financial plans that would lessen the impact of the financial challenges (IMANI, 2017).

The success of the CRM is heavily dependent on the production of cylinders. That is, the main requirement for the effectiveness and smooth sailing of the CRM is the quantity of cylinders in the system. With one cylinder manufacturing plant in the country, the Ghana Cylinder Manufacturing Company, it will be essential on the government to fast track its recapitalization or involve private businesses into the manufacturing of cylinders (IMANI, 2017). Also, the government could supplement the locally manufactured cylinders with imported ones to promote the constant fast distribution of LPG in the country. This could be achieved through the involvement of incentives.

The LPG Cylinder Recirculation Model will most likely result in a rise in malpractices such as unwarranted filling of cylinders and distribution, under and over delivery of LPG product and stealing of cylinders (IMANI, 2017). Malpractices like this call on the government to put in place

systems to limit deviation of commercial sales of LPG and promote limpidity in the distribution channels (ibid@8).

VI. CONCLUSION

Shortage in cylinder production, malpractices, financial hurdles in the initial deposit and gas explosions are the likely challenges to impede the growth of CRM from achieving the aim of ensuring 50% of Ghanaians have access to safe, clean and environmentally friendly LPG by 2030. Therefore, the recapitalization of GCMC, regular checks on the operations of the CRM and financial assistance will help in the effective and smooth running of the model.

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