



**STUDY AND MAPPING OF
CONSUMER FINANCE MODELS
FOR CLEAN COOKSTOVES**

GHANA FINAL REPORT

ARC FINANCE

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GHANA FINAL REPORT

TABLE OF CONTENTS

1	KEY FINDINGS	3
2	INTRODUCTION	4
2.1	BACKGROUND	4
2.2	REPORT OBJECTIVES AND RESEARCH RATIONALE	4
3	RESEARCH DESIGN AND METHODOLOGY	6
3.1	RESEARCH DESIGN.....	6
3.2	STAKEHOLDER INTERVIEW METHODOLOGY.....	6
3.3	FOCUS GROUP METHODOLOGY	6
3.3.1	<i>Focus Group Demographics.....</i>	<i>7</i>
4	RESEARCH RESULTS	9
4.1	FINDINGS RELATED TO THE RESEARCH GOALS	9
4.2	FINDINGS FROM THE STAKEHOLDER INTERVIEWS	10
4.3	FINDINGS FROM THE FOCUS GROUPS: COOKSTOVES AND COOKING FUEL	13
4.3.1	<i>Ownership and Use of Cookstoves.....</i>	<i>13</i>
4.3.2	<i>Cookstoves Costs</i>	<i>15</i>
4.3.3	<i>Fuel Costs.....</i>	<i>15</i>
4.3.4	<i>Awareness of Improved Cookstoves</i>	<i>16</i>
4.3.5	<i>Preferred Type of Improved Cookstove.....</i>	<i>18</i>
4.4	FINDINGS FROM THE FOCUS GROUPS: CONSUMER FINANCE MODELS	19
4.4.1	<i>Individual Savings</i>	<i>21</i>
4.4.2	<i>Informal Savings Groups.....</i>	<i>23</i>
4.4.3	<i>Asset Finance</i>	<i>25</i>
4.4.4	<i>Layaway with a Vendor</i>	<i>28</i>
4.4.5	<i>Employer Loan</i>	<i>29</i>
4.4.6	<i>Remittances.....</i>	<i>31</i>
4.4.7	<i>Savings with a Financial Institution</i>	<i>33</i>
4.4.8	<i>Loan from a Financial Institution.....</i>	<i>35</i>
4.5	SUMMARY OF THE RESEARCH FINDINGS.....	37
5	RECOMMENDATIONS	38
5.1	CONSUMER FINANCE PRODUCTS FOR SCALE UP IN GHANA.....	38
5.2	PROMISING IMPLEMENTING PARTNERS	39

1 Key Findings

- **Willingness to take up a financing option was dependent on the perceived level of formality of the financing option.** The most preferred consumer financing options were informal and semi-formal mechanisms. These models exclude engagement of formal finance institutions, which participants were averse to.
- **Participant's willingness to take up financing was more dependent on the cost of the cookstove, and was not shown to be dependent on the type of cookstove.** Participants were willing to take up an informal or semi-formal financing option if they were unable to pay cash. However, for low-income participants, willingness to purchase an improved cookstove was also dependent on whether they would save on recurring fuel costs. For middle and high-income participants, monetary savings were important but environmental and health benefits were also considered and discussed during the focus groups.
- **An informal version of asset finance was the most preferred financing option.** Purchasing items on credit with small-scale retailers who sell direct to consumers at their place of residence is a common practice in Ghana. This financing option was popular because participants were accustomed to it.
- **Most cookstoves companies sell directly to consumers.** Majority of the stakeholders interviewed had internal sales agents and did not have an external sales/ distribution system.
- **Most manufacturers and retailers lack financing options.** Offering consumer finance for the purchase of improved cookstoves in Ghana is uncommon. Given that a manufacturer's main focus is to produce stoves, offering consumer finance is often a secondary consideration. Moreover, given that manufacturers often have cash flow restraints, they are generally limited in their capacity to be able to extend credit or other financing options to consumers.
- **The cost of offering and providing asset finance should be built in to the price of the cookstove.** Given that consumers are price sensitive, the retail price of the stove should be the same whether the consumer takes up the option to pay on asset finance or not. While this may encourage consumers to pay using asset finance rather than on cash, according to the findings of this research, it will encourage greater sales.

2 Introduction

2.1 Background

Arc Finance (Arc) was selected by the Global Alliance for Clean Cookstoves (GACC) to undertake a study on consumer financing mechanisms for clean cookstoves that was designed to identify partners and financial products with the greatest potential to be accepted by target customer segments in Ghana and Kenya. To gather the relevant data, Arc undertook desk research, conducted stakeholder interviews and engaged focus groups with potential consumers in country. Arc also prepared a literature review of all existing country specific data in clean energy, water, ICT and sanitation and other comparable consumer durables sectors. Arc made use of available microfinance data on demand, key legal and policy constraints of providing consumer finance, and consumer income and expenditure patterns.

Arc focused on consumer finance products or models that would be the most viable to consumer segments in Ghana and Kenya identified by the Alliance as most likely to adopt clean cooking solutions in the near term. This report summarizes the key research insights, strategic opportunities, challenges, and possible interventions to realize scale up of consumer finance for clean cooking solutions in Ghana.

2.2 Report Objectives and Research Rationale

The goal of this study was to identify viable consumer finance products and delivery models to support the purchase and adoption of clean cooking solutions among target consumer segments in Ghana that were identified by the Global Alliance for Clean Cookstoves (GACC or the Alliance)¹. This study seeks to inform the Alliance and its partners on the most effective consumer finance model/s with regard to different consumer segments in Ghana, and to identify potential partners for implementing and scaling up access to the identified consumer finance model/s.

Ghana was chosen for this research due to the challenging energy access environment experienced by the vast majority of the population. Ghana is also one of eight countries that has been prioritized by the Alliance for immediate engagement to enhance the demand and supply of cookstoves, as well as foster an enabling environment for a thriving clean cookstoves and fuels market.

Situated in sub-Saharan Africa, Ghana has a population of close to 26 million². Over 57% of the population is under the age of 25 and an estimated 52% of the population resides in urban areas³. Close to three quarters of the population over the age of 15 years can read and write. With Nigeria and South Africa as the clear economic leaders of the region, Ghana has the sixth largest gross domestic product in sub-Saharan Africa, estimated to be around USD\$41 billion⁴. The young population of Ghana presents both opportunities and challenges to providing adequate access to energy for Ghanaians. While there are increasingly more working-age citizens, the demand for energy will continue to grow. And for half of the population who reside in rural areas, access to energy will be more difficult than for those who reside in urban areas.

Demand for modern energy is a key economic indicator. While sub-Saharan Africa accounts for 13% of world population, it only constitutes 4% of the world's energy demand⁵. Access to modern energy, which is defined as access to a minimum level of electricity and other forms of energy that are safe and sustainable, is fundamental to development. The International Energy Agency reports that people living in sub-Saharan Africa experience more limited access to electricity than any other region in the world⁶. Around 80% of household energy is used for cooking in sub-Saharan Africa, and to meet their cooking fuel needs, four out of five people in the region rely on biomass, mainly firewood⁷. According to the Ghanaian government, biomass (firewood and charcoal) accounts for 59% of total energy consumption

¹ For more information on the research conducted to identify these segments, please see the Alliance's *Ghana Consumer Segment Study* (April 2014), available at: <http://cleancookstoves.org/resources/239.html>

² UN Population Division (2013) *World Population Prospects: The 2012 Revision*

³ United States Central Intelligence Agency (2014) *World Fact Book: Ghana*

⁴ IEA (2014) *Africa Energy Outlook: A Focus on Energy Prospects in Sub-Saharan Africa*

⁵ Ibid.

⁶ Ibid.

⁷ IEA (2014) *Africa Energy Outlook: A Focus on Energy Prospects in Sub-Saharan Africa*

in Ghana. Petroleum products account for around 32% of energy consumption, and 9% is made up of electricity⁸.

Lack of access to modern energy has significant, negative health consequences. For the Ghanaians who rely on biomass to cook, they are at risk of contracting serious, often fatal, diseases due to household air pollution (HAP). Acute respiratory infections, chronic obstructive pulmonary diseases (COPD) like chronic bronchitis or emphysema, as well as lung cancer, asthma, cataracts, and tuberculosis have all been linked to HAP⁹, which is estimated to result in the premature death of over 4 million people annually¹⁰. In Ghana alone, household air pollution (HAP) causes over 13,000 deaths each year¹¹. Lower respiratory infections, often caused by HAP, are the second leading cause of death in the country¹². The main cause of HAP in Ghana is the use of biomass in basic cooking devices, together with unventilated indoor spaces for cooking. Awareness of the health impacts of cookstove smoke, however, remains low.

The burden of energy poverty (lack of access to adequate modern energy) and the associated negative health risks are disproportionately experienced by women and children. In Ghana, it is the women who are generally responsible for cooking and usually do so with their children close at hand. Women exposed to indoor smoke while cooking with biomass fuels are three times more likely to suffer from COPD than others who use electricity, gas or cleaner fuels¹³. It is also estimated that pneumonia caused by HAP is responsible for more than 50% of premature deaths among children under the age of 5¹⁴. Moreover, for households that collect firewood for cooking, it is the female's responsibility to collect and carry the firewood. Women who are required to spend time collecting wood forego the opportunity to engage in other activities that could benefit their livelihood and well-being. Women are also at risk of violence or abuse when travelling far from home to collect wood.

The smoke from use of solid fuels (without the use of energy conversion technologies) for household energy also contributes to global climate change, and constitutes 21% of global black carbon emissions¹⁵. Unsustainable harvesting and traditional use of biomass also contributes to deforestation and land degradation¹⁶. The Ghanaian Ministry of Lands and Natural Resources estimates that only 1.6 million hectares of the country's 8.2 million hectares of forest that existed at the beginning of the 20th century still remain¹⁷.

By reducing fuel use and exposure to harmful cooking smoke, cleaner and more efficient cookstoves and fuels can address many of these negative impacts and deliver a wide range of health, environmental, livelihood and gender benefits. The Alliance, and its over 1,200 public, private, and non-profit global partners, is working to help overcome the market barriers that currently impede the production, deployment, and use of clean cookstoves in developing countries and has set a goal of fostering the adoption of clean cookstoves and fuels in 100 million households by 2020. One of these barriers is providing affordable consumer financing options for cleaner and more efficient stoves and fuels at scale. As a result, this study explored possible consumer financing mechanisms to promote and enable the purchase of clean cookstoves and identified those that are the most preferred by consumers in Ghana.

⁸ Ghana Ministry of Energy (2009) *National Energy Policy*

⁹ World Health Organization (2004) Desai, M., Mehta, S., Smith, K. *Indoor Smoke from Solid Fuels: Assessing the Environmental Burden of Disease at National and Local Levels*

¹⁰ World Health Organization (March 2014) *Household Air Pollution: Fact Sheet N.292*

¹¹ Institute for Health Metrics and Evaluation (2010), available at: <http://vizhub.healthdata.org/irank/heat.php>

¹² Ibid.

¹³ World Health Organization (2006) *Fuel for Life: Household Energy and Health*

¹⁴ World Health Organization (March 2014) *Household Air Pollution: Fact Sheet N.292*

¹⁵ Bond, T. C. et al. (June 2013) *Bounding the role of black carbon in the climate system: A scientific assessment*

¹⁶ World Health Organization (2004) Desai, M., Mehta, S., Smith, K. *Indoor Smoke from Solid Fuels: Assessing the Environmental Burden of Disease at National and Local Levels*

¹⁷ Ghana Ministry of Lands and Natural Resources (2012) *Ghana Investment Plan*

3 Research Design and Methodology

3.1 Research Design

Goals and Objectives

The team carried out the market research based on a set of agreed upon research goals and objectives. The team also developed several hypotheses to test during the course of the research. For a complete list of these goals and hypotheses, as well additional information on the research design and methodology, see Annex D.

Development of Consumer Finance Models

Seven business models were tested during the research. These include: informal group savings, layaway with a vendor, savings with a financial institution, asset finance, loan from a financial institution, employer loan/guarantee, and remittances.

Selection of Clean and/or Improved Cookstoves

The team tested five types of improved cookstoves with the focus group participants in Ghana. Each cookstove was a generic, non-branded model. The stoves were differentiated by the fuel type used. The following types of fuel were selected: wood, charcoal, ethanol, LPG (liquefied petroleum gas), and biogas. Each type of cookstove was sufficiently different from the others so that useful comparisons between them could be made. The cookstoves also ranged in price in order to determine price sensitivity among focus group participants. See the *Ghana Focus Group Report (Annex A)* for a description and picture of each of the cookstoves as they were presented to the focus group participants.

3.2 Stakeholder Interview Methodology

Prior to the focus group sessions, the team interviewed a range of stakeholders including banks, microfinance institutions (MFIs), clean and improved cookstove companies, consumer durable companies, government departments, non-governmental organizations, national associations and policy makers. The stakeholder group included organizations that might be potential implementing partners in the future. The interviews were conducted in the field and remotely. The goal of the interviews was to test the viability of the business models that were being developed, to refine the approach that was planned for the focus groups and to gather any other data that would help the project in terms of developing the business models and selecting the products. The team sought information on how these stakeholders currently or previously utilized various consumer financing business models to sell improved cookstoves and other consumer durables. They were also asked to comment on the risks, challenges and opportunities of the business models that they used and those that were tested in the focus groups.

3.3 Focus Group Methodology

Prior research carried out for the Global Alliance for Clean Cookstoves (GACC) indicates that the target consumer segment in Ghana for clean and/or improved cookstoves and fuel adoption consists of high to middle income households that reside in the urban areas. Arc Finance's research identified low-income households as a secondary segment to also investigate in regards to financing preferences.

For this study, methods focused on qualitative research, including ten focus groups sessions. Five focus groups were held in urban areas of the Western Region of Ghana and the other five were held in rural areas in Ashanti. Each focus group had a maximum of 10 participants. Upon arrival at every session, each participant completed a survey regarding their personal information (age, education, income level), cooking habits and knowledge of clean and/or improved cookstoves, use of mobile phones, and savings and lending patterns. A summary of the participants' demographics is presented below.

Each session lasted approximately two and a half hours. During the focus groups, the moderator guided and generated discussion among and with the participants around research objectives. The dynamic of

the discussion encouraged each participant to contribute their personal preferences in order to achieve a range of opinions on the subject. Though it has no statistical significance, this qualitative market research study is useful to understand the arguments and mental processes behind opinion, attitude, and value formation.

Selected consumer finance models were tested depending on the socio-demographic profile of the participants. Participants were told that their opinion was sought to determine the viability of each model as a potential means to purchase a clean and/or improved cookstove. The goal was to determine the participants' willingness to take up a financing option in order to purchase a clean and/or improved cookstove and whether this willingness varied depending on the type of cookstove. In addition, the most desirable financing option to purchase a clean and/or improved cookstove was also determined.

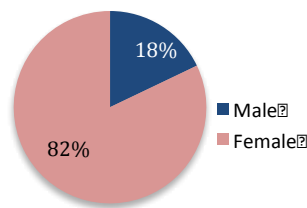
3.3.1 Focus Group Demographics

For a full description of the focus group participant demographics and a complete list of participants' occupations, please see the *Ghana Focus Group Report*. The summary below provides a snapshot of the type of participants who took part in the focus groups.

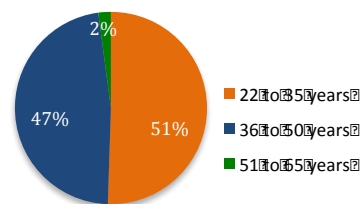
Gender and Age

As shown in the graphs below, majority of participants were female and almost all of the participants were between 22 and 50 years of age.

Gender: Participants



Age: Participants



Income

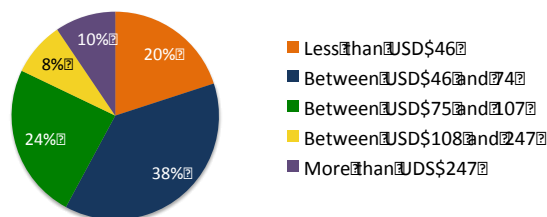
Participants were categorized into quintiles in accordance with their *monthly household income*:

- Quintile 1 (Q1) = less than USD\$46 (also referred to as 'very low income' in this report)
- Quintile 2 (Q2) = between USD\$46 and USD\$74 (also referred to as 'low income')
- Quintile 3 (Q3) = between USD\$75 and USD\$107 (also referred to as 'middle income')
- Quintile 4 (Q4) = between USD\$108 and USD\$247 (also referred to as 'high income')
- Quintile 5 (Q5) = more than USD\$247 (also referred to as 'high income')

As demonstrated in the graph below, one fifth of the focus group participants were considered very low income; over one third reported that they were low income; and, around one quarter reported that they were middle income.

Income: Participants

What is your average monthly household income?

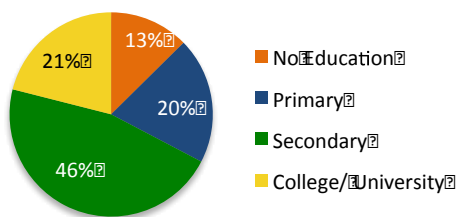


Education and Occupation

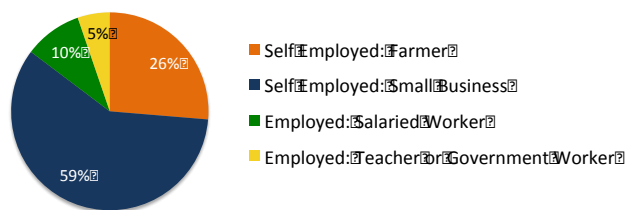
As shown in the graph below, almost half of the participants stated that they had secondary level education. Just over a quarter declared that they were self-employed farmers; almost two thirds stated that they were self-employed in some form of small business; and, the remainder said that they were salaried workers.

Many of the participants that identified as self-employed described their business as one where they would 'walk and sell'. Whether it was food (fruit, snacks, or drinks), small personal items (like soap) or household items, these participants mostly purchased a few items at a time and then walked around the local area to sell them. Some of the other self-employed participants stated that they were hairdressers, plumbers, dressmakers, that they processed palm kernel oil or that they prepared traditional food and sold it (often from their home or by the roadside). All of the farmers farmed crops including plantain, cassava and cocoa. None had cattle. The salaried employees included government employees and teachers, as well as NGO workers, secretaries and engineers.

Education Level: Participants



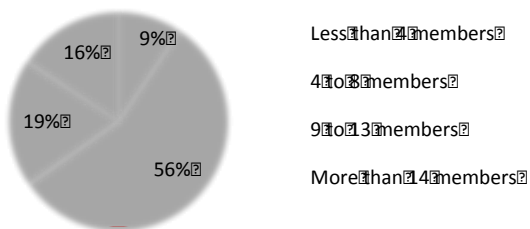
Occupation: Participants



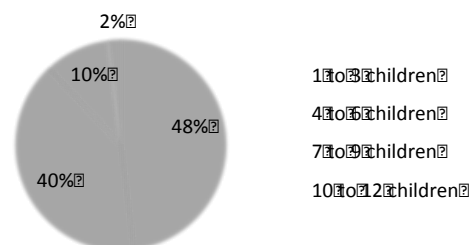
Household

These graphs below show that over half of the participants stated that they had between 4 and 8 members in their household, and close to 50% reported 1 to 3 children in the household.

Number of Household Members: Participants



Number of Children in the Household: Participants



4 Research Results

4.1 Findings Related to the Research Goals

In response to the research goals and objectives of the study, the investigation conducted by the team demonstrates that:

- Consumers (low, middle, and high-income) prefer to pay for improved cookstoves using an informal or semi-formal financing option (excluding the option to pay cash);
- The perceived value of the stove, the associated costs of the financing option, and the level of formality of the financing option all contribute to the consumers' willingness to take up a financing option
- The participants' willingness to take up a financing option was not necessarily dependent on the type of cookstove but more specifically the cost of the cookstove; and
- Overall, an informal version of asset finance was the participants' most preferred financing option

The team found that the majority of all participants regardless of demographics preferred to pay cash for an improved cookstove rather than take up a financing option. It was also noted that the cookstove retailers that took part in the stakeholder interviews preferred that consumers pay cash for the stove. This response, however, seemed to be an initial preference as many of the focus group participants went on to select asset finance as their most preferred business model among all the options. This was particularly true of rural, low-income participants. This was also reflected in the stakeholder interviews where several stakeholders commented that where there is an option to pay in installments, customers will choose this rather than pay in cash, even if they have the ability to pay cash.

The research confirmed that consumers are more willing to engage in an informal loan or savings mechanism than to take up a formal financing option. This finding, however, was slightly different than expected. A participants' preference for a financing option was more aligned with the level of formality of the business model rather than a specific financing mechanism (e.g. savings or a loan). Generally, the more informal the financing model, the more it was preferred.

A clear indication whether a consumer would be more willing to take up a financing option for a high-end, more expensive cookstove was not demonstrated. Ethanol and biogas stoves were generally not selected as the preferred improved cookstove. Furthermore, LPG stoves were not often selected as the preferred cookstove. For those that selected LPG as their preferred cookstove, their preferred financing option was not different from that of the groups that preferred a lower costing stove, like the charcoal and wood stoves. This might indicate that consumers are not more willing to take up a financing option for a more expensive cookstove; however, there were not enough participants who chose a more expensive cookstove to support this.

The team found that consumers in rural areas are less likely to take up a formal financing options. Participants residing in rural areas were generally averse to engaging with a formal financial institution. They were more keen to engage in informal asset finance.

4.2 Findings from the Stakeholder Interviews

Interviews were conducted with ten stakeholders in the cookstove sector in Ghana during September 2014. Five of these stakeholders were manufacturers, distributors and/or retailers of cookstoves. Three interviews were conducted with an MFI or a bank. One interview was conducted with a company who provides advisory and consulting services related to the production and sale of cookstoves and one interview was conducted with a representative from a government department. Several other stakeholders were contacted to take part in this study, however, they did not respond within the given timeframe and their opinions are not included in the summary below.

Insights from Stove Companies (Manufacturers, Distributors and Retailers)

Most cookstoves companies sell directly to consumers. With the exception of one of the cookstove manufacturers, most of the stakeholders interviewed sell direct to consumers. Some manufacturers reported that a small portion of their sales is to distributors and/or retailers, however, the bulk of sales was direct to the consumer. Given that a manufacturer's main focus is to produce stoves, offering consumer finance is often a secondary consideration. Moreover, given that manufacturers often have cash flow restraints, they are limited in their capacity to be able to extend credit or other financing options to consumers.

Offering consumer finance for improved cookstoves is uncommon in Ghana. Among the stakeholders interviewed, most noted that they sold their cookstoves for cash. There are a limited number of small scale MFIs and financial NGOs who offer financial services for clean energy products. One manufacturer was considering trying to use remittances to increase sales but was still in the planning phase of this venture. Another manufacturer offered layaway to consumers, however, the maximum layaway length was one month due to currency devaluation and the price of the cookstoves increasing over the course of a month.

Consumers are very price sensitive. Consumers will be strongly deterred from purchasing an item if they perceive that they can get it cheaper elsewhere. For this reason, consumers generally prefer to purchase direct from the manufacturer because they believe that the product will be cheaper than purchasing elsewhere (e.g. an intermediary, retail store, or a sales agent not representing the company).

Low-income consumers would benefit from financing options. Several stakeholders were of the opinion that consumers cannot afford to purchase the stove on cash and require financial assistance. This may be particularly relevant to low-income consumers who struggle to save the whole amount of the stove but stand to benefit from lower recurring fuel costs as a result of using an improved stove. Middle and high-income consumers, as found in the focus group research, would be less reliant on a financing option to purchase an improved cookstove (not including a biogas stove), however, financing may provide them with an incentive to purchase.

Low-income consumers are primarily interested in cost savings. While reiterated by several stakeholders and supported by focus group participants, one of the companies who provided this insight stated that their clients were generally low-income consumers and would most likely not purchase the stove unless there were guaranteed cost savings from fuel. While some of these consumers may be aware of deforestation and the negative health benefits of cooking on traditional stoves, their perceived value of the stove amounts to the money saved on cooking fuel. For very low-income consumers who collect wood and do not pay or pay a minimal amount for cooking fuel, an improved stove may not provide them with monetary savings and a financing option to purchase an improved cookstove may not be appropriate. While middle and high-income participants may be interested in the monetary savings, they may also include the environmental and health benefits in their perceived value of the stove.

Asset finance is a commonly used finance mechanism in Ghana. While focus group participants reported that they regularly make purchases using asset finance, only one of the stakeholders interviewed in Ghana offered asset finance to their consumers. This company sells most of their stoves on asset finance. Even where consumers have the cash to purchase the stove, they will opt for asset finance once they know that it is available. The important feature of this asset finance model is that the company engages in direct door-to-door sales to consumers. This establishes a sense of trust and responsibility between the customer and the company. The company reports that the default rate is very

low. Culturally, this type of financing bodes well with consumers because, as focus group participants noted, they are used to people coming to their home to sell them products. Participants stated that a lot of household items, food, and consumer durables are purchased on asset finance. While the terms of the sale/purchase of goods are at the discretion of the sales person (e.g. whether the customer receives the product upfront or at the end of the payment, the length of the term, and interest), this is a well-known and well-used financing mechanism in Ghana.

Offering products on credit is expensive to cookstove companies. In Ghana, the average interest rate is around 30% to 40%. According to some, the rate may be quite a lot higher at around 60% or 70%. For cookstove companies to offer certain financing options, like asset finance, they would have to take on the cost of the credit that they provide to the consumer. The company, however, often does not recoup the operational costs of providing credit. Consumers are very price sensitive and will react if the stove price is higher for the provision of asset finance.

Rapid inflation and subsequent currency devaluation has created economic hardship for many cookstove manufacturers in Ghana. The Ghanaian Cedi has decreased to approximately half of its value two years ago, with majority of the inflation occurring since the beginning of 2014. This has proven financially difficult for cookstove companies who import materials to manufacture and sell their stoves in Ghana, in some cases to the point where the Ghanaian market is no longer economically viable for them to operate in.

Insights from MFIs and Banks

There is a multi-tiered microfinance system in Ghana. The tiered system has recently undergone restructuring, however, the core remains the same with the larger MFIs like rural and community banks, and savings and loans companies at the top. These institutions are classified as ‘formal financial institutions’. The lower tiers of this system include small-scale institutions that are considered part of the ‘informal financial system’. These institutions cover savings collectors (locally known as susu collectors), RoSCAs (Rotating Savings and Credit Associations), and other savings collection schemes organized by banks. It is estimated that there are over 3000 susu collectors in Ghana, of which around 1200 of these are registered with Ghana Cooperative Susu Collectors Association.

Ghanaians have a strong culture of saving with a susu collector. Unlike other parts of Africa and Asia where informal group savings (also known as ‘merry-go-rounds’ or RoSCAs) are widely practiced, one of the stakeholders noted that this was not such a common practice in Ghana. There is, however, a strong culture of individual saving and this is often via a susu collector. Individual saving with an independent susu collector or with a collector sent by a bank or an MFI are both common. The individual figure of the susu collector is a local tradition of collecting small amounts of savings on a regular basis (these installments are referred to as ‘susu’ in a local language).

A limited number of MFIs in Ghana are engaged in financial services that facilitate the sale of clean energy products. Several stakeholders mentioned that MFIs in Ghana tend to focus on mainstream financial products and areas of business that have been established in Ghana for many years. This includes banking, insurance, investments, and loans (home and business loans). These financial products and services are perceived as low-risk while achieving a stable profit margin.

Insights from Other Stakeholders

The Ghanaian government is seeking to continue to promote the use of LPG as a cooking fuel. The government is currently revising its strategy on LPG through the National Implementation Taskforce for LPG Promotion and seeking stakeholder engagement and agreement on the best way to move forward to achieve this aim. Due to environmental concerns, the government wishes to provide 50% of households with LPG by 2016, compared to less than 20% of households that currently have access to LPG¹⁸.

Cookstove manufacturers and retailers often lack a sustainable profit margin. According to one of the stakeholders interviewed, one of the main concerns with the cookstove sector in Ghana is that cookstove manufacturers and retailers do not add a profit margin sufficient to make their business sustainable. Low profit margins also mean that these companies lack the ability to invest in research and

¹⁸ IEA 2014

development regarding the use of their stove and how to improve the sales and distribution of their stoves.

4.3 Findings From the Focus Groups: Cookstoves and Cooking Fuel

Ten focus group sessions were held in the Western and Ashanti Regions of Ghana. Participants were selected based on their income level, gender, age, education level, and the type of cookstove that they owned. For more information on the methodology of the focus groups and detailed findings, see Arc's *Ghana Focus Group Report*.

4.3.1 Ownership and Use of Cookstoves

Wood

The wood stove refers to a '3-Block' traditional stove that is constructed from clay or stones. Participants stated that they use wood stoves to prepare traditional dishes (e.g. fufu, kenke, banku); cooking with wood is faster than cooking with charcoal; and, wood stoves are better for cooking large quantities of food. Some of the downsides mentioned, however, were that wood stoves are inconvenient when it rains, smoke hurts cooks' eyes, and kitchen utensils get dirty.



Wood stove made of mud with three molded points in an urban area in the Western region, Ghana

Wood stove made of mud with three

Charcoal

High, middle, and low-income participants all stated that they owned a 'coal pot'. This is typical Ghanaian stove, which uses charcoal for fuel. Many participants remarked that they liked the taste of food when it is cooked on a coal pot and that the coal pot is the best stove on which to prepare traditional Ghanaian food. Some participants stated that they use the coal pot all the time or most of the time, whereas others relied on charcoal when it rained and they were unable to cook with wood. This is because the wood is too wet to ignite and the wood stove is often not under shelter. The disadvantages cited by participants for using charcoal (and the coal pot) to cook is that it takes too long to light, it makes the kitchen dirty, and the smoke emitted while cooking is bad for their health.



Use of the coal pot among low-income level participants



Use of the coal pot among middle to high-income level participants

LPG

Many participants valued LPG (liquefied petroleum gas) as a ‘quality-of-life’ item. Owning a cylinder or burner was considered prestigious even if it was not used. The main reason cited for not using LPG was cost. A large majority of participants felt that LPG was very expensive and were unable to use it because it required a large upfront payment to refill the cylinder, whereas charcoal or wood could be purchased on a daily basis and in small quantities.

Several rural participants in lower income groups had never seen an LPG stove or had never used one or did not know how to use one. Unlike the fixed four burner LPG stoves in many households in developed countries, when participants discussed LPG stoves, they were generally referring to one or two burner LPG stoves with portable, refillable LPG cylinders.

Stove Stacking

The majority of participants in both urban and rural areas owned two cookstoves. In general, the participants in urban regions had an LPG stove as well as a coal pot, whereas participants in rural areas mostly had a (3-block) wood stove and a coal pot. A few participants stated that they owned three cookstoves - wood, charcoal and LPG - or four cookstoves, including an electric stove, mostly in the urban focus groups.

The main reasons cited as to why participants owned more than one cookstove were the cost of fuel, the availability of fuel, time efficiency, and personal preferences regarding the flavor and method used to cook traditional Ghanaian dishes. Lower income participants in both urban and rural regions stated that when the cost of one fuel was high, they changed to using a cheaper fuel. The switch was most frequently made between wood and charcoal. There were, however, several low and middle-income participants who used LPG and expressed high price sensitivity towards LPG. They switched to wood or charcoal when their LPG ran out and they did not have the money to refill the cylinder. Similarly, when a particular fuel was not available for purchase, people opted for a different fuel, which usually required using a different stove. Participants also noted that they would often simultaneously prepare food on two different stoves in order to save time.

The table below provides an indication of the types of stove combinations that participants had and their reasoning for doing so. For a more complete list of stove ownership and participants’ rationale, see the *Kenya Focus Group Report*.

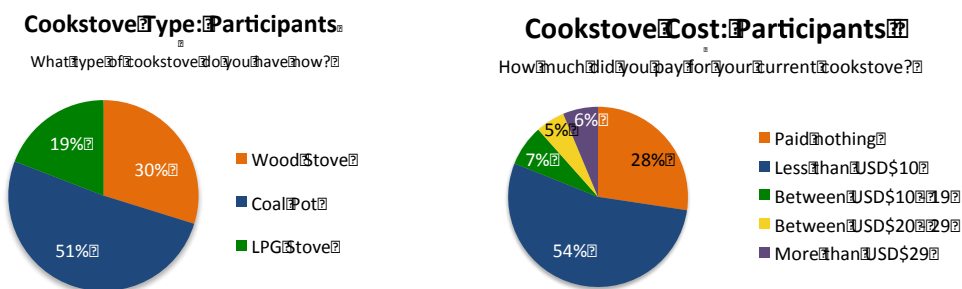
Table x. Ownership of Several Cookstoves by Region

RURAL	URBAN
Own Two Stoves	Own Two Stoves
Own a 3-block (wood) stove and a coal pot <i>‘I prefer charcoal. But when you are in a hurry, I use both wood and charcoal together.’</i>	Own 2 coal pots <i>‘I have 2 coal pots and I use both at the same time because it makes cooking faster.’</i>
Own 2 coal pots <i>‘I have 2 coal pots so it is always faster for me.’</i>	Own an LPG stove and a coal pot <i>‘Majority of people in the urban areas have a gas stove, but they also have a coal pot.’</i>
Own a 3-block (wood) stove and an LPG stove <i>‘I use gas the most and use wood second. I use wood to prepare my kenke. I use the gas to prepare other foods.’</i>	Own Three Stoves
	Own LPG, charcoal and wood stoves <i>‘I use gas but when it finishes, I use the coal pot. Sometimes I use wood.’</i>

4.3.2 Cookstoves Costs

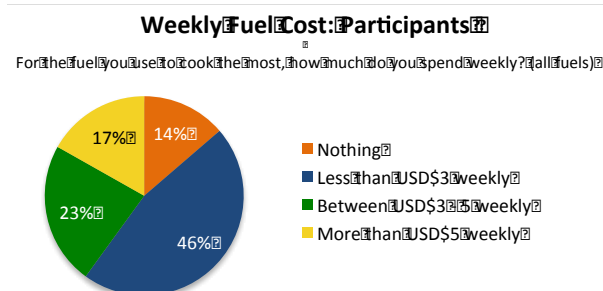
Focus group participants reported that they owned at least one of three types of cookstove: a wood stove, a coal pot, and/ or an LPG stove. The graph below (left) shows that when asked ‘What type of stove do you have now?’ half of all participants stated that they have a coal pot. This graph captures participants’ initial responses, however, most participants had more than one cookstove.

The graph below (right) indicates how much participants paid for their current cookstove. The two graphs are closely related. Around half of all participants stated that they have a coal pot. Just over half stated that they paid less than USD\$10 for their cookstove, which is the approximate cost of a coal pot in Ghana. Around one third stated that they have a wood stove. Just under one third stated that they paid nothing for their cookstove, which is aligns with the 3-Block wood stoves that cost nothing (or very little) to build.



4.3.3 Fuel Costs

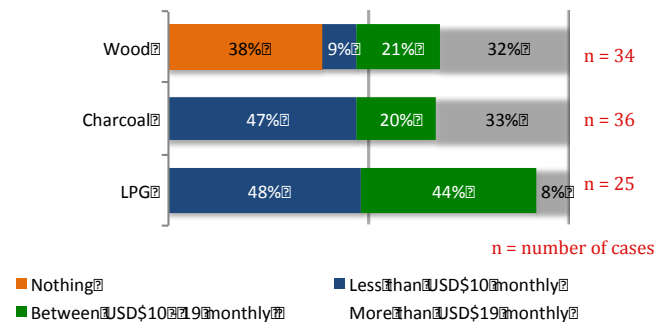
Each participant was asked to define at the beginning of each focus group in a survey, among all the cooking fuels that they used, which fuel they used the most to cook with, and then indicate how much they spent on purchasing that particular fuel. The graph below shows how much participants spent on purchasing cooking fuel per week, inclusive of all fuel types. Nearly half (46%) of all participants spent less than USD\$3 weekly (USD\$12 monthly) on cooking fuel. About a fourth (23%) spent between USD\$3 and USD\$5 weekly (between USD\$12 and USD\$20 monthly). There were 17% paying more than USD\$5 weekly (USD\$20 monthly) on cooking fuel.



The graph below disaggregates the data by fuel type and is shown on a monthly rather than weekly basis. Surpassing charcoal and LPG, average monthly expenditures on wood were the highest, even when taking into consideration those who pay nothing for wood. Interestingly, of the 26% who stated that they used LPG the most to cook, only 8% of LPG users paid more than USD\$19 monthly. The average monthly expenditure on LPG was USD\$10.

Monthly Fuel Expenditure: Participants

For the fuel that you use the most, how much do you spend monthly?



In addition to the quantitative data collected from the survey, the following insights were gained during the focus groups.

Wood

The majority of participants, rural and urban, spent between USD\$3 and USD\$20 per month on wood. Most rural participants who used wood to cook did not pay for wood; they collected it for free either from their farm or in the local area. Many stated, however, that they supplemented the wood that they collected for free by purchasing wood. This was usually due to scarcity of wood or lack of time to go and collect the wood. Participants who engaged in cooking and selling local foods for a living generally used wood to cook and purchased it because large amounts were needed for their business. These participants stated that they used somewhere between USD\$24 to USD\$56 per month on purchasing wood. In rural areas, wood was also bought in large quantities to warm water for bathing.

Charcoal

Most participants stated that they found charcoal to be the most readily available fuel in the market. Low-income participants generally stated that they bought charcoal in small increments. Many stated that they would buy 1 or 2 GHS (around USD\$0.3) worth of charcoal at one time and use it the same day. Middle and high-income level participants stated that they purchased charcoal in big bags. Several middle and high-income participants stated that when purchasing charcoal in small increments, the cost is a lot higher and similar to the cost of gas.

LPG

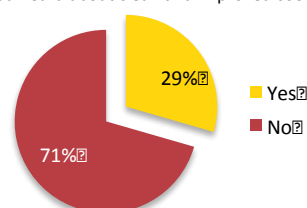
Comparing spending costs on LPG is difficult due to varying cylinder sizes. Participants who used LPG though, stated that they generally refilled them once per month or once every several months, which meant that the average cost per purchasing transaction was a lot higher than wood or charcoal, which were generally purchased at more regular intervals.

4.3.4 Awareness of Improved Cookstoves

In general, there was a low level of awareness about improved cookstoves with 71 percent of participants stating that they had not heard about them. This was more apparent among lower income levels in urban areas and among rural participants. Those that had heard or seen an improved cookstove had a positive general impression about them because they knew about their fuel efficiency, reduced smoke, and ability to cook easier and faster.

Awareness of Improved Cookstoves: Participants

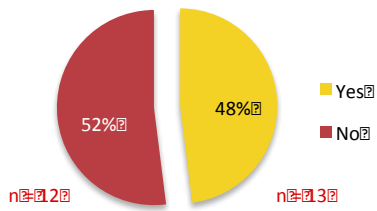
Have you heard about clean and improved cookstoves?



As shown in the graph below, of the 29 percent of participants who had heard about improved cookstoves, almost half (48%) had actually bought one. This equates to 13 people out of 95 of total participants in the research who had purchased an improved cookstove. Some participants stated that they had purchased an improved charcoal stove (i.e. Gyapa) and said they had purchased an LPG stove. Note that some people that did not consider their LPG stove as improved and therefore did not report that they had bought one.

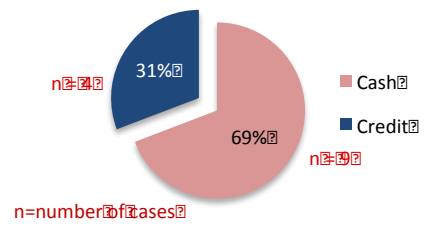
Purchase of an Improved Cookstove: Participants

Have you ever bought a clean and improved cookstove?
(Of the 29% who had heard)



Means of Purchase: Participants

How did you buy your clean and improved cookstove?
(Of the 48% who had purchased)



The means of purchasing their improved cookstove was primarily with cash. As shown in the graph above, 9 of the 13 participants who had purchased an improved cookstove, did so with cash.

4.3.5 Preferred Type of Improved Cookstove

Participants were exposed to five different cookstove models (each using a different fuel): a wood improved cookstove, a charcoal improved stove, an LPG stove, an ethanol stove and a biogas stove. Each stove differed in price and fuel type. Note that the wood and charcoal stoves are considered 'improved cookstoves' because less efficient and less clean versions exist. The LPG, ethanol and biogas stoves, are considered 'clean' given that they are smokeless regardless of the type or model.

As demonstrated in the table below, most focus group participants selected the charcoal improved cookstove as their preferred improved cookstove. Participants were very sensitive to price and while some may have preferred a wood improved stove, the cost was much higher than the charcoal improved stove. See the *Ghana Focus Group Report* for full details on stove costs and characteristics as presented to the participants.

Table x. Preferred Improved Cookstove by Income Segment

Income Segment	RURAL	URBAN
Very Low Income	Wood ICS/ Charcoal (1 focus group)	-
Low Income	Charcoal ICS (2 focus groups)	Wood ICS/ LPG (1 focus group)
Low and Middle Income	LPG (1 focus group) Charcoal ICS/ LPG (1 focus groups)	Charcoal ICS (2 focus groups)
Middle and High Income	-	Charcoal ICS (2 focus groups)

4.4 Findings From the Focus Groups: Consumer Finance Models

Prior to conducting the research, the team selected and identified a range of innovative financing options, which are presented below. During the focus group sessions, the team tested to see which of these consumer finance models was most commonly used by participants and which models were most attractive for participants to use for purchasing an improved cookstove. Each consumer finance model involves a different set of actors and/or payment processes. During the focus groups, the researchers tested the conditions would make each model attractive.

The team grouped the business models into four different categories according to financing type: savings (informal savings, layaway, savings with a financial institution), leasing (asset finance), loans (loan from a financial institution, employer loan), and remittances. This classification differentiated the level of risk that the participant would be willing to take on and identified participants' preferences to either save, lease, take out a loan, or seek/use remittances.

Participants' preferences were aligned with the financing type or mechanism of the business models and also with the level of formality of each of the business models. As such, the business models were re-categorized into the following: informal (own individual savings, informal savings group), semi-formal (asset finance, layaway, employer loan, remittances) and formal financing options (saving or taking a loan with a financial institution).

The most preferred consumer finance models were informal (own individual savings) and semi-formal (asset finance). Overall, the general trend was that the less formal the business model, the more participants preferred it. The vast majority of participants disliked the formal financing options, like saving or securing a loan with a financial institution.

The table below summarizes the overall preference of business models as expressed by the focus group participants. Given that focus groups capture rich qualitative data and each participant has a slightly varied perspective and preference to the next participant, the table below is an indication of overall preference. See the discussion below each business model for a more nuanced understanding of participant's preferences, likes and concern as they relate to each of the consumer finance models.

Table 2. Evaluation of Consumer Financing Options

Level of Preference	Business Models
Most Preferred	<ul style="list-style-type: none"> ✓ Asset Finance: Rent to own (all income levels) ✓ Own Individual Savings (low-middle income level)
Sometimes Preferred	<ul style="list-style-type: none"> ✓ Informal Group Savings (all income levels) ✓ Layaway with a Vendor (all income levels)
Seldom Preferred	<ul style="list-style-type: none"> ✓ Savings with a Financial Institution (all income levels) ✓ Employer Loan/Guarantee (middle-high income level)
Least Preferred	<ul style="list-style-type: none"> ✓ Loan with a Financial Institution (all income levels)
Uncommon Usage	<ul style="list-style-type: none"> ✓ Remittance (all income levels)

The table below provides an indication for focus groups preference by income level. The three different forms of informal savings (individual savings, informal group savings, and saving with a susu collector) are highlighted in yellow. Asset finance is shaded in green. The table demonstrates that savings and asset finance were the most preferred business models across each income level.

Table 3. Evaluation of Consumer Financing Options by Income Level

Income Level	Very Low Income (1 focus group)	Low Income (3 focus groups)	Low and Middle Income (4 focus groups)	Middle and High Income (2 focus groups)
Level of Preference				
Most Preferred	Savings (Individual savings with a susu collector)	Asset Finance	Savings (Individual savings)	Savings (Informal group savings)
			Asset Finance	Employer Loan
Less Preferred	Layaway	Savings (Individual, group and savings with a susu)	Asset Finance	Asset Finance
			Layaway	Layaway

Price Point

As part of the focus group discussion, participants were asked how expensive a cookstove would need to be in order to be willing, or to desire to take up a financing option to purchase the cookstove. While there was a range of responses from participants, several participants stated that they would opt to pay in installments if the cost was more than 30GHS to 50GHS (USD\$8 to USD\$14). As one middle to high income participant stated “*Beyond 50 cedis (USD\$14) we would buy using installments*”. On the other hand, there were other participants who felt that they would not purchase the cookstove if it was more expensive than 50GHS (USD\$14). In general, there was limited appetite among low and middle income participants for biomass cookstoves beyond USD\$10 to USD\$15. This could be because the price of a coal pot in Ghana is typically under USD\$10. For middle and high-income participants, majority stated that they would not need to save or use a financing mechanism for a cookstove that cost up to USD\$40 but they could pay cash for this amount.

Findings Related to Informal Financing Options

The team considered business models to be informal financing options if they involved the individual, the individual's family and/or friends and possibly other third parties where there no formal or legal agreements exist. According to this definition, informal savings counts as informal financing, whether conducted on an individual basis or facilitated through a savings group.

4.4.1 Individual Savings

In this model, the consumer saves on their own, often in a moneybox at home, until they have saved up enough money to purchase an improved stove. The consumer then purchases the stove using cash from an improved cookstove retailer. A large majority of participants were saving at home.

Prior to introducing the consumer finance models, focus group participants were asked how they would purchase an improved cookstove. Many participants stated that they would save on their own until they had enough money and then purchase the cookstove outright in one transaction. Participants identified three different means of savings on their own: saving at home, saving with a susu collector, and savings with their (informal savings) group. The most commonly suggested way to save was at home. Participants were prompted to provide examples of how often and how much they would save in order to purchase a cookstove. The table below provides a summary of responses.

Table 4. Spontaneously Suggested Informal Savings Models by Income Segment

Savings to Pay Cash	
Low Income Level	Low and Middle Income Level
a) Save 15 GHS (USD\$4) weekly over 2 weeks and pay cash	a) Save (at home) 1 GHS (USD\$0.3) daily over 1-2 months
b) Save 20 GHS (USD\$6) monthly over 4 months to pay cash	b) Save (at home) 1 GHS (USD\$0.3) daily over 2 months

Once the business models were presented and discussed, focus group participants identified individual savings as one of their most preferred means to purchase an improved cookstove. Many stated that they saved on their own in the household, often in a moneybox or a secret hiding place, and that using their savings would be the best method to purchase a cookstove. Participants felt that saving individually in the house was not risky because they would not find themselves in a situation where they owe money to a savings group, vendor or financial institution. Interestingly, very few participants noted that saving in the house was risky due to possible theft.

Wealthier participants stated that paying cash from their own savings would be their first option because they could afford to purchase the cookstove immediately and would not need a financing option for most of the stoves that were presented (all but the biogas stove were priced under USD\$45). However, some of these participants indicated that they might save over a few months for a stove that cost \$30 or \$40 but this was an achievable financial goal. For the poorer participants who preferred this method of payment, the attraction was that they were often already saving in their house and it would be easy to continue to save with the goal of purchasing a cookstove in mind. These participants, however, were more often focused on stoves that were under USD\$10. This seemed to be the approximate price point for poorer participants that still engaged their interest in purchasing an improved cookstove.

The preference to purchase a stove using cash corresponds to the findings of the stakeholder interviews, which revealed that the majority of their cookstove sales are on a cash basis. The fact that majority of sales were paid for in cash, however, does not in itself demonstrate that this is a preferred payment method because, as many of the stove retailers advised, purchasing the stove on cash was the only option provided to the consumer. In fact, one of the stakeholders noted that a customer would most likely opt to pay in installments when they learn that this is an option, even when they have the ability to pay cash.

Furthermore, paying cash does little to enhance the demand for clean cookstoves. Participants themselves pointed out that if they save on their own in the house, they would be tempted to spend the money on other things. While consumers often have numerous pressing financial needs, by purchasing an improved cookstove they are likely to reduce their recurring cooking fuel costs. While environmental

and health costs are likely to diminish, monetary savings are dependent on the type of fuel that the cookstove uses, external fuel prices, and the consumers' expenditure on cooking fuel.

Table x. Summary of the Findings on Individual Savings

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> • Not risky as money is not owed to anyone • Low income participants cited limited capacity to save (amount and frequency) • Many participants already saving on their own (in their house) and it would be easy to continue saving (mostly lower income participants) • Preferred option for wealthier participants as they could purchase a stove (excluding biogas) out of their savings without need to save additionally 	<ul style="list-style-type: none"> • Tempted to spend the money on something else • Someone else in the household could spend the money • Potentially risky due to theft
Industry Stakeholders (Supply Side)		<ul style="list-style-type: none"> • Difficult to scale

4.4.2 Informal Savings Groups

With this model, the consumer would make regular monetary contributions to an informal savings group. These groups are often held with women and meet on a regular basis (weekly, fortnightly, monthly). Each time the group meets a different member takes home the collective contributions of the group. The consumer would utilize the money that they receive when it is their turn to collect the group's contributions to purchase a cookstove.

Informal group savings was identified as an uncommon practice among Ghanaians and a many participants showed no interest in belonging to one. Accordingly, this was a controversial option for purchasing an improved cookstove. In other parts of Africa and Asia, this type of model has experienced success in helping low-income people save on a regular basis and purchase clean energy products, including cookstoves. Interestingly, in Ghana, it was generally the middle and high-income participants that saw value in this type of model while the low-income participants expressed distrust towards engaging in a savings group.

For participants who did participate in an informal savings group, they were asked how often and how much they save with their group. The table below summarizes the responses from participants by income level.

Table 5. Informal Savings Group Practices

Types of Informal Savings Groups		
Low Income Level	Low and Middle Income Level	Middle-High Income Level
<p>a) We collect 2 cedis (USD\$0.6) <u>weekly</u> in my group (6 group members) = USD\$2 monthly</p> <p>b) We collect 5 cedis (USD\$1.4) <u>weekly</u> in my group (20 group members) = USD\$6 monthly</p> <p>c) We collect 5 cedis (USD\$1.4) <u>daily</u> in my group (32 group members) = USD\$39 monthly</p>	<p>a) We collect 2 cedis (USD\$0.6) <u>weekly</u> in my group = USD\$2 monthly</p>	<p>a) We collect 2 cedis (USD\$0.6) <u>weekly</u> in my group (20 group members) = USD\$2 monthly</p> <p>b) We collect 10 cedis (USD\$3) <u>monthly</u> in my group = USD\$3 monthly</p> <p>c) We collect 50 cedis (USD\$14) <u>monthly</u> in my group (5 group members) = USD\$14 monthly</p> <p>d) We collect 5 cedis (USD\$1.4) <u>daily</u> in my group = USD\$39 monthly</p>

The majority of those who preferred this form of financing resided in urban areas. While many did not belong to a savings group, they were enthusiastic about the possibility of setting one up. For these participants, the benefit of saving with a group was that they would be committing their savings to purchase a stove and that they would not be able to use the savings for something else. One of the benefits of all purchasing a stove together is that the members are likely to negotiate for a discount on the stove because of their group purchase.

Many participants who resided in rural areas generally viewed this model negatively. Their main concern was that the group would fall apart or members might default when it was their turn to receive the collective contributions of the group. Several provided anecdotes about how this had already happened to them or someone they knew. Another cause for concern among rural participants, particularly those engaged in agricultural activities, was that their income is seasonal and they do not have a regular income stream to maintain group contributions. Some participants provided accounts of arrest and physical harm that had occurred to members who were unable to keep up with group contributions (note that this was also stated in relation to asset finance payments and loan repayments).

None of the interviewed stakeholders were practicing this type of model to sell their cookstoves. One stakeholder expressed interest in engaging in this type of model and was planning a pilot in a peri-urban village with women's groups. The group would be given one stove upfront 'on credit', and once the stove has been paid back the group would receive another stove. This would continue until everyone in the group had a stove. It was noted that this arrangement would only be possible in villages where there was a leader or someone known to the company to take on responsibility for the group. The universal

benefit of these types of models is that group members know each other and provide a social incentive to not default on group contributions.

Table x | Summary of the Findings on Informal Savings Groups

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> • Commitment to save with a dedicated goal to purchase a cookstove • Encouragement from the group to continue saving consistently • Would not be able to access the funds to spend the money on something else • Potential to negotiate with the vendor for a better price if the whole group purchases together • Accessible – an easy way to save (informal, easy to organize, easy to join and be a member, usually does not require collateral or a credit assessment) • Save with people that are known and trusted (i.e. friends, neighbors) • Group leader could purchase the stoves on behalf of the rest of the group, alleviating the other group members from negotiating price 	<ul style="list-style-type: none"> • Uncommon practice • Distrust among low and very low income participants that they will be repaid by other group members when it is their turn to receive the group's money • Distrust that the informal group and the money collected will be managed appropriately • Seasonal income – difficult to contribute on a regular basis • Afraid of repercussions if unable to meet one of the payments (to the group) • Takes a long time to save collectively
Industry Stakeholders (Supply Side)	<ul style="list-style-type: none"> • Limited risk to the vendor • Limited cost to the vendor 	<ul style="list-style-type: none"> • Difficult to scale • Difficult to gain access group meetings due to their informal nature • Resource intensive (time) to visit savings groups and market to them directly • Number of sales limited to the number of group members • May need to wait several months before a group member/s able to purchase a stove (depending on savings amount and frequency)

Findings Related to Semi-Formal Financing Options

Semi-formal financing options include commercial actors (manufacturers and retailers), employers and/or money transfer agencies or an e-commerce business. Semi-formal financing options go beyond informal actors (family and friends), exclude formal actors (formal financing institutes), and involve some type of agreement or transaction. Therefore, the semi-formal business models are asset finance, layaway with a vendor, employer loan/guarantee, and remittances. Each of these business models involve an arrangement with a third party that is not a friend, family member, or financial institution.

Remittances could also be considered as a formal financing option because they often involve a money transfer agency, which is a type of financial institution. The transfer agency is a formal institution, but for the purposes of this summary, remittances are considered as a semi-formal business model because a transfer agency is not a bank. Furthermore, the money transfer agency or e-commerce site does not provide credit or bear any financial risk for facilitating the remittances.

4.4.3 Asset Finance

With this financing option, the consumer receives the cookstove up front from a vendor and then makes payment installments to the vendor until the cookstove is paid off. The installments are usually for a fixed amount and due at fixed intervals.

Prior to the business models being presented and discussed, focus group participants were asked how they would like to purchase a cookstove. Many participants stated that they would like to purchase a cookstove on credit: to receive the stove upfront and then make (often small but regular) repayments to complete the payment of the stove. When the asset finance model was introduced, participants identified with this type of financing and exclaimed that this is what they were describing when asked how they would like to purchase an improved cookstove. The table below summarizes participants suggested credit models, indicating how much they would like to pay and how often.

Table 6. Spontaneously Suggested Credit Models by Income Level

Pay on Credit	
Low Income Level	Low and Middle Income Level
<p><i>Daily Repayments</i></p> <p>a) Pay <u>daily</u> installments of 2 GHS (USD\$0.6) over 1 month</p> <p>b) Pay <u>daily</u> installments of 5 GHS (USD\$1.4) over 1 week</p> <p><i>Weekly Repayments</i></p> <p>c) Pay <u>weekly</u> installments of 10 GHS (USD\$2.8) over 3 weeks</p> <p>d) Pay <u>weekly</u> installments of 15 GHS (USD\$4) over 2 weeks</p> <p><i>Monthly Repayments</i></p> <p>e) Pay <u>monthly</u> installments of 15 GHS (USD\$4) over 2 months</p> <p>f) Pay <u>monthly</u> installments of 20 GHS (USD\$6) over 4 months</p>	<p><i>Daily Repayments</i></p> <p>a) Pay <u>daily</u> installments of 1 GHS (USD\$0.3) over 1 month</p> <p><i>Weekly Repayments</i></p> <p>b) Pay <u>weekly</u> installments of 3 GHS (USD\$0.8) over 2.5 months</p> <p>c) Pay <u>weekly</u> installments of 5 GHS (USD\$1.4) over 1.5 months</p> <p>d) Pay <u>weekly</u> installments of 15 GHS (USD\$4) over 2 weeks</p> <p><i>Monthly Repayments</i></p> <p>e) Pay <u>monthly</u> installments of 10 GHS (USD\$2.8) over 3 months</p> <p>f) Pay <u>monthly</u> installments of 12 GHS (USD\$4) over 2.5 months</p> <p>g) Pay <u>monthly</u> installments of 15 GHS (USD\$4) over 2 months</p>

The credit models suggested by participants include a range of preferences; some wish to pay daily, some wish to pay weekly, and others suggested they would like to pay monthly. Interestingly, participants preferences and suggested credit – or asset finance – models closely corresponded to their prevailing savings habits and income generation. For example, participants who already saved 1GHS (USD\$0.6) with a susu collector on a daily basis thought that this would also be a good model for paying off a cookstove.

Overall, asset finance was the most preferred financing option to purchase an improved cookstove. Rural and urban, low, middle and high-income participants all showed preference for this model. In fact, asset finance was the most common buying mechanism used in Ghana and many participants stated that they regularly used this method to buy household items and consumer goods, from body cream to TVs.

Asset finance is often understood as a relatively formal process in developed countries. The consumer goes to a large retail store, often located in an urban area, chooses an item and indicates that they would like asset finance. Depending on the store, generally a credit check, appraisal, and legal paperwork would need to be completed before the consumer is approved to receive the item on asset finance. Interestingly, this is not how this business model was understood, particularly in rural areas.

Participants assumed that the vendor would come to their house to sell the cookstove. They would make a somewhat informal agreement (a credit check and legal paperwork might not be completed) with the vendor on the terms of the purchase. The vendor would then leave the stove with the consumer and when the vendor returned to the consumer's house, at pre-agreed intervals, the vendor would collect a repayment from the consumer. The vendor would continue to visit the consumer's house until the stove was paid off. When asked what they would do if they could not make one of the repayments, participants stated that they would negotiate with the vendor to arrange for the payment to be made at another time. This indicates that participants perceived this option as a relatively informal and flexible arrangement.

For rural participants in particular, this is a viable, well-used sales and distribution method given the limited distribution networks in low-income rural areas, and high transportation costs for consumers to purchase goods outside of their town. Another advantage for rural participants was that it did not require a visit to a large urban retail store. Moreover, this is clearly a very similar system to the savings (susu) collectors (who come to consumers places of residence to collect savings), which are widely known and used in Ghana.

The negative aspects of this model for participants revolved around their ability to make repayments on time, even if they could possibly negotiate with the vendor. There was also concern that there could be disagreements with the vendor regarding the payment schedule or the stove could be faulty and need to be returned after it had been used, which participants perceived as not possible.

One of the interviewed stakeholders was engaging in this form of asset finance, as described by participants. The company stated that this business model was very successful for their business and that they were continuing to scale up using this model. The CEO mentioned that while some repayments were made late, there are a low number of customers who default.

Table x. Summary of the Findings on Asset Finance

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> • Understood as an informal arrangement with a vendor who sells goods door-to-door and then returns for repayments • Common practice, well understood and reportedly used very frequently • No travel to a shop required (participants understood that the vendor would sell at their place of residence) • Often perceived as flexible – participants were of the understanding that they could negotiate directly with the vendor if they could not meet one of the repayments • Direct relationship with the vendor – perceived as cheaper than if purchased through a third party 	<ul style="list-style-type: none"> • Fear of not being able to meet one of the repayments • Previous negative experience when using asset finance • Potential for disagreements regarding account management (how much has already been paid off) • Many participants believed that if the stove was faulty they would not be able to return it as they would have already used it • Risk of becoming over indebted • Regular income source needed to ensure that repayments can be met

	<ul style="list-style-type: none"> • Knowing that the vendor will be coming to collect the repayments provides incentive to save • Improves purchasing power • Able to enjoy and use the stove before completing payment for it • Potential to meet repayments with the money saved from reduced energy/fuel costs • Opportunity to build credit rating and gain access to other financial services • (Mobile payment mechanisms can limit time and transportation costs to make payments, however, this was not considered or thought of by these focus group participants) 	
<p>Industry Stakeholders (Supply Side)</p>	<ul style="list-style-type: none"> • Potential for scale up • Low default rate (when clients are appropriately appraised – from the experience of one of the stakeholders) • Providing the stove as collateral can reduce business risk • Very limited risk or resource burden for the vendor if the asset finance is managed by an external third party (depending on the way the relationship is set up) • Partnering with an external third party (e.g. MFI or bank) to administer and manage the asset finance can reduce costs and risk • Mobile payment mechanisms can reduce the administrative and account keeping burden 	<ul style="list-style-type: none"> • If the asset finance is managed 'in house' it is costly and risky to administer

4.4.4 Layaway with a Vendor

This financing option allows the consumer to put a cookstove on hold with a vendor and then pay installments to the vendor until the cookstove is paid off. The consumer receives the cookstove once the cookstove has been paid in full. The payment installments can vary; they could be for a fixed amount due at fixed intervals or the consumer could be free to make payments when they choose.

When discussing this business model, there were a few participants who had previously purchased a stove on layaway. These participants stated that they had paid an initial deposit of 20GHS (USD\$6) to the cookstove vendor, and then two weeks later paid the remaining balance (approximately USD\$8) and collected the stove.

Layaway was sometimes selected as the second most preferred financing option by low, middle and high-income participants. It was perceived as less risky given that they would not be pressured to make payments towards the cookstove. Another positive aspect of this model was that participants expected that the stove price would be arranged with the vendor beforehand, ensuring that its cost would not increase throughout the payment period. Due to the high level of inflation in Ghana over the past two years this is an important consideration.

Strong concerns, however, were raised. There was a general lack of trust that the vendor would actually release the stove once the participant had finished paying for it. There was general discontent that, contrary to the commonly practiced asset finance, the stove would not be received until after they had finished paying for it. Middle and high-income participants felt that it was too time consuming to travel to the vendor to make the installments for a relatively low amount (recall that all but the biogas stove were presented as costing less than USD\$45).

It was also perceived that layaway was a form of financing that was practiced in the large, urban retail stores, not in rural areas. When the consumer engages in asset finance, the vendor returns to collect payment. If the consumer does not receive the item until after finishing all the repayments, there is little incentive for the vendor to return with the item. Lastly, others disliked the model as it was difficult for them to commit to regular installments and because the price of the stove might increase once their payments were completed due to inflation.

Therefore, asset finance was preferred over layaway. Moreover, layaway with a large retail store is clearly more formal and time consuming than engaging with a vendor at the consumer's residence, and is therefore a less preferred option.

One of the interviewed stakeholders was offering layaway to consumers as a form of financing. The company had previously trialed asset finance but found that consumers defaulted and did not return to the shop to make payments. This is interesting to note because, as focus group participants stated, they are accustomed to receiving asset finance at their residence, not at the retail store. This could be a crucial difference to the business model that affects the default rate. The company reported that their layaway program had also been largely unsuccessful. They only offered a layaway period of up to one month given high inflation. The company found, however, that consumers did not finish their payments within the set time frame, and so the company would return the customer's installments rather than sell the stove.

Table x. Summary of the Findings on Layaway

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> • Commitment to save with a dedicated goal to purchase a cookstove • Less risky as no pressure to meet structured repayments • Able to decide the amount and frequency of when payments are made • Price of the stove would be agreed at the beginning of the layaway 	<ul style="list-style-type: none"> • Uncommon practice • Price of the stove might increase while they are paying it off and they might have to pay more for the stove • Potential disagreements with the vendor over how much had been paid towards the stove • Urban, middle and high income participants felt that layaway was not necessary for a stove under USD\$45

	<p>period (and would not rise with inflation while paying for the stove)</p> <ul style="list-style-type: none"> • Used by urban, middle and high participants (not rural or low income urban participants) • Enjoyment from receiving the stove after it is paid for • No collateral required • (Not considered by participants but could be relevant: mobile payment mechanisms can limit time and transportation costs to make payments) 	<ul style="list-style-type: none"> • Could take a long time to pay off due to lack of incentive or pressure to make payments • (Not considered by participants but could be relevant: consumers may be wary of making mobile payments before receiving or 'seeing' the product) <p><i>Layaway offered in a store:</i></p> <ul style="list-style-type: none"> • Perceived as something that would only be offered in big retail stores in urban areas • Intimidating to shop at a large retail store (and make small payments towards a stove) • Time and resource intensive to travel to the store • No large retail stores in the vicinity • The vendor may move or shut down before the layaway payments are completed and they receive the stove <p><i>Layaway offered by a door-to-door salesperson:</i></p> <ul style="list-style-type: none"> • Some participants thought that layaway might be offered by a door-to-door salesperson, which would be risky as there would be little incentive for the salesperson to return once they have a layaway deposit but have not yet given the client the stove
<p>Industry Stakeholders (Supply Side)</p>	<ul style="list-style-type: none"> • Easy to set up • Low start-up costs • Relatively minimal costs to manage • Very limited risk for the vendor – no default risk • Opportunity to build customer loyalty and encourage repeat purchases • Can entice consumers that may otherwise make the same purchase elsewhere • Mobile payment mechanisms can reduce the administrative and account keeping burden 	<ul style="list-style-type: none"> • Consumers did not return to complete their payments (according to one of the stakeholders interviewed) • Consumers did not finish paying off the stove at the end of the specified layaway period and received their layaway deposit back instead of the stove (according to one of the stakeholders interviewed) • Administrative and account keeping costs • Consumers wary to trust retailers with their savings • Requires strong brand reputation and market presence to encourage consumers

4.4.5 Employer Loan

For this model to work, the consumer is required to be employed and be receiving a regular salary. The vendor and the employer enter into an agreement to allow the vendor to sell cookstoves to the company's employees. The employee purchases and receives the cookstove up front. The employer pays the vendor and then subtracts the amount of the cookstove from the employee's salary, usually over a time period rather than one lump sum deduction.

A majority of the focus group participants were not salaried workers so the model did not apply to them. For those who were on a payroll, some agreed that this was a good model to acquire a stove and positively viewed companies that sold household appliances through this method. Others, however, did not like the idea of having payments deducted from their paycheck for a stove. They consented that this model works well for purchasing larger items like a car or land, but is not appropriate for a relatively low costing stove.

As with all of the business models, participants were very price sensitive and would not be willing to engage if the intermediary, in this case the employer, was increasing the price of the stove in order to make a profit. Participants felt that the stoves should be priced at a discount given that the vendor would be selling a large amount to the company.

One of the financial stakeholders that was interviewed for this study advised that they provide a “check-off” (local terminology for the employer loan model) type system for salaried workers whose employers do not provide this service to their employees. The company representative noted that the consumer had to have an account with them and be receiving a regular wage into their account. The company would then deduct an agreed percentage of the consumer’s salary to repay the price of the item. The drawback is that majority of Ghanaian consumers are non-banked, informal workers without a regular salary.

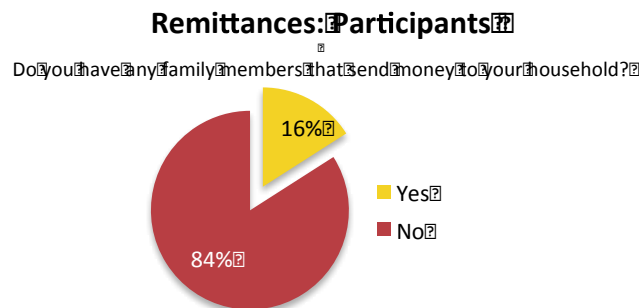
Table x. Summary of the Findings on Employer Loans

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> Well known and commonly used finance mechanism used by salaried employees (referred to as the ‘check-off system’) The employer may be able to receive a discount on buying the stoves in bulk, which could be passed on to the consumer Convenient – no need to remember to make payments Relationship with employer already established No collateral required 	<ul style="list-style-type: none"> Not applicable – many participants were not salaried workers Some salaried employees said that the ‘check-off system’ is better suited to more expensive items (e.g. car, school fees) Did not like the idea of having money automatically deducted from their salary Limited trust in the employer – some participants felt that the employer would benefit and receive profit from the sale of the stove
Industry Stakeholders (Supply Side)	<ul style="list-style-type: none"> Once a relationship is developed with an employer, this can provide a regular and stable stream of sales Limited risk for the vendor (depending on how the business relationship is set up) Access to large potential markets Time and resource efficient marketing No risk of consumer default (depending on how the business relationship is set up) Potentially easier than partnering with a financial institution (although possibly less scope) 	<ul style="list-style-type: none"> Difficult to navigate corporate decision-making to reach an agreement with the employer Can take a long time to cultivate and maintain a working relationship with an employer The employer may not market or limit the ability of the vendor to market to their employees High staff turnover will negatively affect the party who bears the risk of default

4.4.6 Remittances

For this model to be applicable, the consumer needs to have a relative or close friend living abroad or in another part of the country. The consumer asks the relative or close friend to send them money to purchase a cookstove. The consumer then purchases the cookstove when they receive the money; either through a traditional money transfer agency, mobile phone transfer or online money transfer.

Prior to participating in the focus group, each participant completed a questionnaire on his or her current finances. In response to whether they receive remittances from family members, 16 percent of participants said that they did. Of the 16 percent that said that they receive remittances, 77 percent stated that these remittances are received from abroad and the remaining 23 percent stated that they are domestic remittances.



Remittances are an important source of income in Ghana and an increasingly important source of development finance. Participants stated, however, that remittances were unreliable because it was unpredictable when relatives would send money to them. On average, more urban participants were in receipt of remittances than rural participants. A majority of the remittances were from abroad rather than domestic cash flows. Remittances were used to pay for high priority expenses, like school fees, business expenses and hospital bills. To use remittances for a stove was considered inappropriate because it was one’s responsibility to pay for a less urgent item like a cookstove.

Nevertheless, the potential of this model is high. A good product combined with the level of formality of the institution (remittance agency) is very likely to entice consumers to change their perception of using remittances to buy a cookstove. In addition, people might not request money specifically to purchase a stove but may use a portion of that income for a stove. Other research has shown that remittance receivers in developing countries use the money to cover household expenses, including energy costs, which includes cooking fuel. One of the interviewed cookstove sellers showed interest in piloting the use of remittances to purchase cookstoves, however, the company was still planning this venture, so no outcomes are available as yet.

Table x. Summary of the Findings on Remittances

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> Some participants felt that their relatives would send them money for a stove if they asked Family members are often familiar with the family home, cookstove, and the negative effects of cooking with lots of smoke from traditional cookstoves 	<ul style="list-style-type: none"> Not applicable – many participants did not receive remittances Those that did receive remittances often did not receive them on a regular basis Culturally not appropriate to specifically ask for ‘money for a cookstove’ because cookstoves were considered inexpensive, everyday items unlike an emergency or school fees, which they often felt they could ask for (though use of remittance to pay for household and energy costs was not tested)

<p>Industry Stakeholders (Supply Side)</p>	<ul style="list-style-type: none"> • Limited risk for the vendor • Increasingly easy to facilitate remittances with e-commerce sites • Limited transaction, operational and start-up costs • Targeted and direct marketing possible online 	<ul style="list-style-type: none"> • Raising awareness with diaspora • Developing appropriate and strategic marketing • Need to develop strong and rapid delivery channels once stove has been purchased, including delivery, installation (where necessary), and after-sales service
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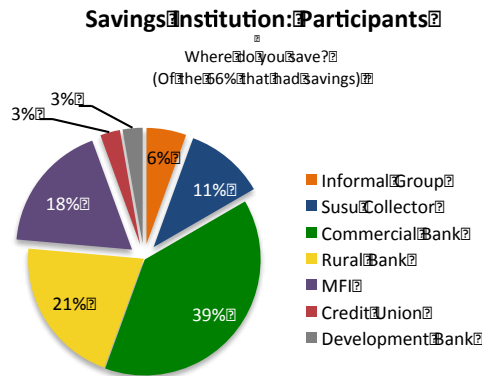
Findings Related to Formal Financing Options

Formal financing options are those that involve a formal financial institution such as a bank, MFI, or a credit union. These formal mechanisms include securing credit from a formal financial institution and saving with a formal financial institution.

4.4.7 Savings with a Financial Institution

With this model, the consumer would save money with a financial institution in their personal account and then withdraw money to purchase a cookstove.

Around two thirds of participants (66%) stated that they had a savings account. The graph below demonstrates the type of institute with whom participants had their savings account. The places where participants reported saving were commercial banks (39% of participants with savings), rural banks (21% of participants with savings) and MFIs (18% of participants with savings). The susu collector was reported to be used by 11% of participants with savings, although it is ambiguous whether these participants were referring to an individual susu collector or to a susu collector who was linked to a bank or an MFI. Often on further questioning, the participant was unsure themselves. In many cases where the participant did know that the susu collector was from a bank, they were unable to recall the name of the bank.



Saving with a financial institution was not a preferred financing option. Few participants had savings in a financial institution, and those that did usually saved via a susu collector from the bank (or MFI). The susu collector is a popular figure in Ghana, whether that collector is individually registered or a representative of a formal financial institution. MFIs and banks have adopted the traditional susu collection system and send their own employees to consumers' houses to collect savings.

While many did not prefer this financing option, saving with a financial institution via a susu collector was common practice. The benefit of the susu collector is that it turns a formal financing option into a far less formal saving mechanism. Saving with a financial institution that does not involve collection via a susu collector is not popular and would not achieve the same amount of savings as a door-to-door, susu collector. Firstly, opening an account with a formal financial institution is perceived as a highly formal activity. Second, travelling to the financial institution incurs transportation costs, is time consuming, and can be an intimidating experience, particularly if the amount that they wish to deposit is not much more than the cost of the transportation to get to the branch location. Third, the knowledge that a collector will regularly visit the consumer's place of residence compels the consumer to save, even a small amount, on a regular basis. It is much easier for the consumer to forget, defer, or spend their savings on something else without the regular contact of a susu collector.

Without the use of a susu, this model is perceived as formal; both by low-income participants and high-income participants who see this option as time consuming and potentially restrictive (there may be withdrawal fees and/or start-up fees). When this model is considered with the susu collector, the drawbacks are similar to those with the layaway option. Consumers prefer to receive the stove upfront and may be hesitant to trust that the financial institution will provide the stove at the end of the payments. There were many anecdotal stories, particularly in rural areas, where MFIs had been collecting savings via a susu collector but had then collapsed or relocated without returning savings deposited with them.

None of the interviewed stakeholders were saving at formal financial institutions in order to purchase a cookstove.

Table x. Summary of the Findings on Saving with a Financial Institution

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> Rural banks are popular in rural and urban areas Some participants stated that they receive interest on their savings Some banks were known to sell consumer durables Savings secure from theft <p><i>With a susu collector from a financial institution:</i></p> <ul style="list-style-type: none"> Susu collectors are well known and frequently used Low cost/ transaction few to save with a susu Timely in that the susu often comes everyday to collect, which means that money (i.e. business profits) can be saved immediately rather than spent elsewhere No travel costs as the susu collects at the consumers residence or place of work Flexible amount saved, no commitment, minimum or fixed saving installment 	<ul style="list-style-type: none"> Few participants had a savings account with a financial institution Susu collectors (that do door-to-door collections) were more popular Opening and maintaining an account with a financial institution was perceived as costly and time consuming Too costly (time and money) to travel to a financial institution to deposit money, and the amount they wish to deposit may be less than the transportation costs to get to the branch Not enough money to deposit – concern that their deposit amount would be too small to deposit Going to a financial institution is an intimidating experience Lack of incentive or pressure to save (as with a door-to-door susu collector) Negative previous experience (savings depleted due to account fees)
Industry Stakeholders (Supply Side)	<ul style="list-style-type: none"> Potentially increase client base and possibly increase borrower base in the long term Improve client's financial education and ability to leverage their finances through additional financial services 	<ul style="list-style-type: none"> Limited viability for a dedicated cookstove or energy savings account product Limited ability to reach unemployed, rural and remote consumers

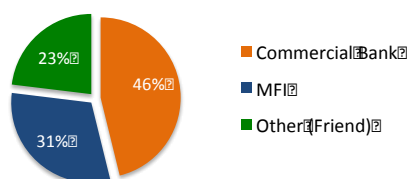
4.4.8 Loan from a Financial Institution

Utilizing this financing option, the consumer would receive credit from a bank, MFI or a credit union and use the credit to purchase a cookstove. The consumer would then repay the bank or the MFI for the credit amount.

There were a few participants (16% of the total) who stated that they had previously or currently taken out a loan with a formal financial institution or with a friend to pay for unplanned events. Those who showed willingness to take a loan from a financial institution said that these loans were for larger amounts and for important and unplanned circumstances, like purchasing property, starting a business, renovating the house, paying school fees or covering accidents, but not for purchasing a cookstove.

Loan Institution: Participants

With whom do you have a loan?
(Of the 16% that had a loan)



This mechanism is the most formal of all the business models and, was often chosen as the least preferred financing option because consumers have to enter into a loan agreement, which can involve a binding legal contract, a credit rating check, a guarantor or collateral, as well as interest and fees. This mechanism would require the consumer to have an account with a financial institution. It also requires the consumer to travel to the branch location.

Participants perceived this business model as very costly. Many low-income participants did not have an account with a financial institution. For middle and high-income participants, this mechanism was also viewed as costly but for them it was unnecessary because the price of the cookstove was relatively low (unless they opted for a biogas stove). There were several comments that suggested that the cost of the cookstove together with the cost of the loan diminished participants overall willingness to purchase the stove. This was not unique to this model. Where participants perceived the financing option or the cookstove itself to be too expensive, many stated that purchasing a new cookstove was not a priority as they could continue to use their current stove.

Consumers that may find this to be an attractive option would likely already have an account with a financial institution and possibly already have a loan with that institution. In this instance, an attractive option might be for the consumer to ‘bundle’ the loan for the cookstove together with a preexisting loan. This might also be an attractive option for consumers seeking a more expensive cookstove, like biogas, where the vendor does not provide asset finance.

Table x. Summary of the Findings on Loans from a Financial Institution

	Likes	Dislikes
Focus Group Participants (Demand Side)	<ul style="list-style-type: none"> • Would provide an opportunity to open an account with a financial institution • Build a relationship and credit history with a financial intuition • Convenient if already and existing customer 	<ul style="list-style-type: none"> • Difficult to obtain a loan: <ul style="list-style-type: none"> - need to be able to read the contract - often requires a credit rating check - might need a guarantor or collateral • Expensive – fees and interest • Loans were generally perceived as viable for expensive items (e.g. car, land, school fees) • Fixed repayments • Fear of repercussions if they default

		<ul style="list-style-type: none"> • Low income participants viewed this option as too costly and cumbersome to obtain • Middle and high income participants viewed this option as unnecessary given that they could use other means to purchase a stove
<p>Industry Stakeholders (Supply Side)</p>	<ul style="list-style-type: none"> • Limited credit checks if consumer is already a client • Limited risk for the vendor 	<ul style="list-style-type: none"> • Need to develop a relationship and partner with a financial institution • Need to develop strong and efficient monitoring systems for warehousing and sales • Cost of providing microcredit • Risk of default and cost to collect missed or late payments • Risky for the financial institution's reputation if the product sold and associated with them are faulty or not good quality

4.5 Summary of the Research Findings

The results of the research indicated that the most preferred business models were semi-formal and informal financing options. Overall, asset finance was the most preferred option and individual savings (without a financial institution) was highly preferred. One of the urban focus groups with middle-high income segments chose the employer loan/ guarantee as their most preferred option and saving with a financial institution via a susu collector was also mentioned by other groups as a favorite.

While it was predicted that informal methods, like individual savings, would be preferred, it was a surprise that asset finance would be a preferred model. Participants clearly demonstrated an aversion to engaging with a formal financial institution, particularly those who resided in rural areas. Engaging in a semi-formal financing option, however, was perceived as far less intimidating. While there were negative anecdotes about repercussions of not meeting repayments with a vendor who had extended asset finance to a consumer, on the whole, participants viewed agreements with local vendors and retailers as a positive and even necessary aspect of their consumer behavior. It was also perceived that the consumer would receive the best price for the cookstove when purchasing direct from the vendor. This further explains why semi-formal financing options like asset finance and layaway with a vendor were well received.

The team identified that the perceived value of the stove, the associated costs (of the stove and the financing option), and the level of formality of the business model all contributed to consumers' willingness to take up a financing option for the purchase of a cookstove. While consumers of all income ranges shared their preference for informal and semi-formal financing options, they had different preferences regarding when they would be willing to take up a financing option. This was closely tied to the cost of the stove and their subsequent willingness to purchase the cookstove. Overall, participants were willing to take up an informal or semi-formal financing option if they were unable to pay cash.

The team determined that participant's willingness to take up a financing option was dependent on the cost of the cookstove, but not necessarily on the type of cookstove. Overall, low, middle and high-income participants were willing to pay cash or use their own savings to purchase a cookstove. Where they could not afford to do so, low-income participants were more likely to secure a financing option if the stove provided monetary savings. If the stove did not necessarily provide monetary savings but offered environmental and health benefits, middle and high-income participants were willing to secure a financing option. Participants of all income levels were concerned with the associated costs of the financing options and perceived that the informal or semi-formal options would cost the least, and were therefore the most preferred.

The team identified that, overall, an informal asset finance was participants' most preferred financing option. Purchasing items on credit with small-scale retailers who sell direct to customer's place of residence is a common practice in Ghana. Participants indicated that they felt comfortable with this type of financing option because they were accustomed to this type of financing. It should be noted that the asset finance model that participants preferred could be more readily compared to a localized variation of susu collection rather than engaging in an asset finance mechanism with a large-scale retailer.

The cookstove manufacturers and retailers that were interviewed indicated that the majority of their sales were paid for in cash and that they preferred this method of payment because it did not affect the cash flow of their business. One of the companies, however, offered an informal asset finance mechanism, similar to the one preferred by majority of participants. The company reported that this method of consumer financing was proving successful and they were expanding the model into neighboring West African countries.

5 Recommendations

5.1 Consumer Finance Products to Scale Up in Ghana

The best consumer finance product to scale up in Ghana is informal asset finance. Semi-formal finance options, like asset finance, offer a balance between consumers and producers in terms of both risk and accessibility. Formal financing options, while perhaps the least risky for cookstove manufacturers and possibly the easiest model to scale up, were not attractive to focus group participants. Informal financing options include some of the most accessible models for focus group participants but are difficult to scale for cookstove retailers.

Asset Finance

Asset finance, offered by door-to-door sales agents rather than at a retail store, is a common and widely used sales/ distribution mechanism in Ghana. This financing option works because the sales agent knows where the customer resides in order to collect the repayments and the customer bears little risk because they receive the product up front. As with any financing mechanism that places the consumer in a position of debt, the consumer's total indebtedness and ability to pay should be appraised prior to approving an asset finance agreement. Asset finance would not be the best option for low-income consumers that collect wood and would not be in a position to save money on their fuel costs. For low-income participants that would rely on reduced fuel costs to meet the repayments, this financing option would be applicable for stoves that allow for the consumer to make sufficient fuel savings. This is not the case for middle or high-income consumers, as they would be less reliant on the savings to meet the repayments.

Another added benefit of engaging in asset finance offered at a consumer's place of residence is that the sales agent has the opportunity to re-visit the consumer after they have made a purchase. The sales agent would be able to ensure that the consumer knows how to use the stove and that the product is not faulty. Moreover, use of an improved cookstove increases with a home visit.

Given that consumers are price sensitive, the cost of offering and providing asset finance should be built in to the price of the cookstove. In order to not deter consumers, the retail price of the stove should be the same whether the consumer takes up the option to pay on asset finance or not. While this may encourage consumers to pay using asset finance rather than on cash, according to the findings of this research, it can have the effect of increasing the total number of sales. For low-income consumers, asset finance would make the purchase of an improved cookstove accessible. For middle and high-income consumers it would provide an incentive.

Each of the consumer financing options that were tested in the research come with opportunities and challenges as well as a level of risk and preference on behalf of the consumer and the cookstove retailer. In order to identify the best consumer finance products for scale up it is important to highlight not only the business models that were most preferred but also the traits of these models. Favorable aspects of the preferred business models can be adapted to new and existing financing models to create effective and scalable business models.

Economic and social differences can vary widely between regions and no one single financing option will be the most appropriate for all consumers. From a business perspective, the sales and distribution model of the company will have a large impact on the ideal consumer finance model to adopt. From a consumer's perspective, perception of risk, and level and frequency of income will contribute to their preference for a particular financing option.

5.2 Promising Implementing Partners

In order to successfully implement and scale semi-formal financing options in Ghana, cookstove manufacturers and retailers have the option of offering these financing models internally or by partnering with other institutions. Investment in promising implementing partners would involve engaging directly with manufacturers/ distributors/ retailers to develop their internal capacity to provide semi-formal financing options and/or fostering partnerships between financial institutions and manufacturers/ distributors/ retailers to provide the recommended consumer finance products for scale up in Ghana. The benefit of providing finance internally is that companies can potentially realize higher profits; however, the administration of offering internal finance can be difficult to manage, costly, and time consuming. Partnering with another institution can relieve the administrative burden of providing finance but may lead to challenges regarding the consumer's perception, experience, and after-sales service.