



Fast-Track
CARBON

Market Segmentation: Improved Cookstoves and Clean Fuels in Guatemala Executive Summary

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Alliance for Clean Cookstoves

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Introduction and context



The Global Alliance for Clean Cookstoves was launched in 2010 with a mission to catalyze the uptake of clean and efficient cookstoves and fuels through a market-based approach to save lives, improve livelihoods, empower women, and protect the environment.

This study is one of a series commissioned by the Alliance to develop a better understanding of the demand landscape for cookstoves and fuels in its eight focus countries. Insights gathered from these studies are used to inform marketing strategies for clean and efficient stoves and fuels.

In Guatemala, **more than 70% of households¹ regularly cook food with firewood.** A significant portion of households, 28.5%, use LPG along with firewood, often referred to as “fuel stacking”. The World Health Organization estimates **5,000+ premature deaths per year** in Guatemala due to household air pollution.

Our study goals were:

Identify the segments of the Guatemalan population most poised to transition from traditional firewood cooking to cleaner cooking methods.

Characterize these segments and identify appropriate marketing strategies for each segment.

Design awareness messages to drive the purchase of improved cookstoves and clean fuels.

Assess consumer finance strategies to facilitate affordability of cleaner cooking products.

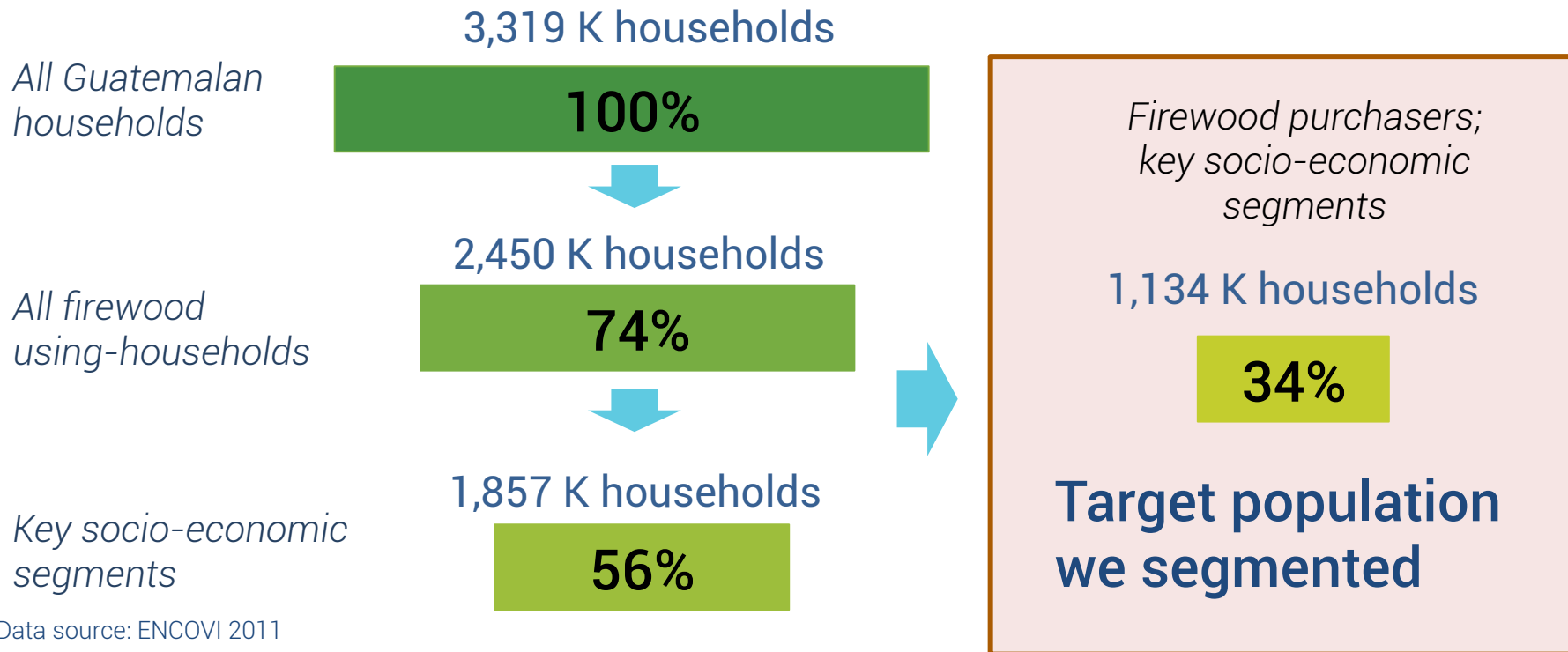
We achieved these goals by analyzing existing data, as well as new quantitative and qualitative data we collected.

¹ Based on ENCOVI 2011 data

Target population of the study



Our segmentation is based on a target population that includes firewood purchasers from the non-extreme poor and non-poor socio-economic groups



Data source: ENCOVI 2011

Firewood collectors were not considered in this work because of their reduced economic incentives to switch to more efficient cooking technologies that save on fuel. Extreme poor segments were not considered as these are better addressed through subsidy programs (as per the Guatemala Market Assessment Report, 2013). The upper two income deciles were excluded as households in this segment who have not fully transitioned to LPG exhibit a strong preference for traditional methods.

Methodology & Approach



To accomplish the study goals we:

- 1** Analyzed existing data (mainly the National Survey of Living Conditions, ENCOVI 2011)
- 2** Conducted qualitative research: 8 focus groups and 24 in-depth interviews
- 3** Gathered quantitative data from 400 firewood-using households
- 4** Quantitatively segmented the market, and further analyzed our data to present our findings.

Our research with consumers explored cooking and spending habits, and consumer perceptions of the 2 predominantly used fuels in Guatemala: firewood and LPG. We also exposed the consumers to the concept of the improved wood cookstove.

Based on these insights, we identified a set of key enablers and barriers for our target population in transitioning to cleaner stoves and fuels.

We then divided the target population into 7 distinct segments, prioritized those most poised to transition to clean cooking and identified intervention opportunities for these segments.

We also developed and tested a set of awareness messages for cleaner cooking (LPG and improved cookstoves) for the identified segments and examined consumer financing needs and opportunities.

General firewood perceptions



How is firewood perceived?

Firewood is an ally of the women to fulfill her household obligations, it is natural (vs. chemical like LPG), generously provided by nature (and hence sacred), and signifies abundant fire to cook. It is noble, as it accommodates limited budgets while providing abundant fire. Firewood is tradition.

General firewood perceived attributes

- | | | |
|--|------------------------------|--|
| | Price | <ul style="list-style-type: none"> • It is economical, at the reach of limited budgets • Its fire is abundant and hence thought to be quicker to prepare meals |
| | Cooking | <ul style="list-style-type: none"> • Heat can be retained and hence food is warm and ready when males arrive from work |
| | Other uses- Highlands | <ul style="list-style-type: none"> • Serves to heat home as well and to light traditional sweat baths (indigenous highlands) |
| | Other uses- Coast | <ul style="list-style-type: none"> • Drives away insects and prevents decomposition of thatch roofs (coastal areas) |
| | Space | <ul style="list-style-type: none"> • Requires ventilated space to store wood |

Firewood also

- Is highly inconvenient and uncomfortable
- Impacts health (e.g. burns, respiratory illness, eye irritation, temperature changes)
- There is social pressure against it (e.g. neighbors complaining about it in urban settings)



General LPG perceptions



How is LPG perceived?

LPG is aspirational, conveys modernity, comfort and convenience as it saves time. But at the same time can be dangerous (due to explosions; is also considered a “chemical” product and potentially poisonous), and requires constant spending.

General LPG perceived attributes

Price

- Expensive and variable cost
- Expenditure commitment, as needs to be bought every time it runs out

Cooking

- Lights immediately
- Good for small cooking tasks (not good for keeping food warm)

Other

- Practical (fast to cook)
- Comfortable (no smoke, easy to light, doesn't blacken pots and walls)
- Healthy

Safety

- Can explode and be toxic if inhaled

Space

- Can be placed in small spaces

LPG is also

- More suited for Westernized diets (vs. traditional diets which are better cooked with firewood)
- For small families who don't need large pots
- For those who don't have time to cook



Improved firewood cookstove: the product in the middle



How are improved cookstoves perceived?

ICS is a product whose identity draws from firewood and LPG. It has weak flames and reduces smoke like LPG. It retains the firewood economy and flavor, but also the discomfort and inconvenience. The concept of fuel savings competes with women's self-perceived ability to use firewood wisely. In the consumer's mind, the ICS can help firewood last longer, *but firewood savings are the women's domain.*

General ICS perceived attributes



Price and acquisition

- Likely long payment periods erode money savings prospects in consumer minds. Hence, economy is secondary.
- Not seen as commercial products; rather, many cooks know of their existence through donation programs.
- Cooks feel they would be cheaper if they commissioned their construction: "*Nowadays construction workers can build anything*"



Cooking

- Fire is small and weaker and hence not suited for large families or traditional diets.
- Smaller combustion chambers not suited to keep food warm for long periods.



Other uses

- As with LPG, secondary uses like heating and repelling insects are limited.



Summary of product comparisons

| Element | Firewood | LPG | ICS |
|---------------------------------|--|---|--|
| Diet | Traditional | Westernized | Keeps flavor for traditional meals, but weak flames not suited for traditional diet |
| Convenience | Inconvenient | Convenient | Inconvenient, but slightly less than open fires. |
| Comfort | Uncomfortable | Comfortable | Uncomfortable, but slightly less than open fires. |
| Health | Unhealthy | Healthy, but dangerous | Can be healthy as reduces smoke |
| Family | Warm welcoming, gathering place | Not a gathering place | Not a gathering place |
| Secondary uses | Heating (highlands), repelling insects and protecting thatch roofs (Coastal areas) | None | Few, but non-essential (e.g. use of ashes as fertilizers and soaps) |
| Price | At reach | Expensive | Expensive product, but fuel at reach. Believe construction can be easily commissioned. |
| Household characteristic | Large households | Small households; working women | Small households |
| Cooking | Retains heat; large fires = quicker cooking | Easy lighting, but doesn't keep food warm | Doesn't keep food warm nor light easily. |

Summary: key barriers for purchase and adoption of clean cooking



| Barrier | Description |
|--|---|
| Management of financial risk through firewood | <p>Our analysis among our target population (households purchasing wood) indicates that LPG usage could be cheaper than wood in many instances. However, firewood can be collected in periods of financial downturn. Cooks maintain the status quo to reduce the severity of economic downturns, despite giving away potential financial savings.</p> |
| Liquidity | <p>LPG usage requires having enough cash on hand to pay for full canisters, something that many cooks feel they cannot consistently do.</p> |
| Gender decision-making imbalance | <p>Women suffer most from the burden of firewood cooking, yet men often have (at least some) control over household decisions. Women are held accountable by men for purchases of durable items. Men may reduce household allowances if they find “unnecessary” expenses or know of financial savings.</p> |
| Price and present bias | <p>The relatively long payback periods of improved cookstoves erode the sense of financial savings.</p> |
| High penetration of “plancha” stoves | <p>Stoves that have a chimney (even if they don’t reduce firewood use) have a massive penetration, posing competition to more efficient and cleaner cookstoves.</p> |

Summary: key enablers for purchase and adoption of clean cooking



Our research revealed elements that could play in favor of cleaner cooking adoption:

| Enabler | Description |
|---|---|
| High firewood expenditures | Firewood expenditures can be cut substantially by switching to clean cooking technologies, which provides (a rational) justification for clean cooking purchases that reduce fuel expenditures. |
| Smoke nuisance and arduous labor to prepare and maintain fires | Smoke is highly uncomfortable for cooks, especially when attempting ignition with wet wood. Women also feel tired and their aesthetics and health are impacted by smoke. In highly urbanized areas, the smoke from firewood is a source of tension with neighbors. Firewood also requires hard work to prepare (collect, carry, arrange in piles, dry, and split) and maintain. |
| LPG is aspirational | Many cooks feel that if they had the money and income stability, they would cook with LPG. |
| Firewood cost inflation | Inflation is mostly manifested through reductions in firewood quality and quantity (rather than overall price), making firewood cooking even more uncomfortable. Already people use LPG more heavily (still part time) in the wet season when wood is wet. |
| Effective communication | The message "I live to take care of my family. Firewood smoke causes many diseases, some of which are even chronic. If I am not healthy, who will take care of my children?" is a call to action to improve the kitchen for health. Financial savings provide a rational justification for men to purchase. |

Segmentation approach



We segmented the target population to identify those most poised to purchase and adopt clean cooking technologies.

Qualitative research revealed the following segmentation hypotheses:

- Cooks who have the capacity to make or influence purchasing decisions that benefit them and their families are more likely to adopt clean cooking technologies.
- Women who aspire to better living standards will more readily adopt clean cooking technologies as firewood cooking is arduous and uncomfortable.
- Women will make clean cooking purchase decisions if they have the financial stability to make sacrifices today that benefit them in the future.
- Women who spend less time at home have less time to tend fires and will benefit from less labor intensive cooking technologies.

We identified 4 segmentation variables that affect the likelihood of adoption of clean cooking technologies (Improved wood cookstoves and clean fuels):

| Variable | Rationale |
|-----------------------------|--|
| Income | <ul style="list-style-type: none">• Women in higher-income households can make decisions that benefit them more easily, even if they do not contribute financially to the family.• As incomes rise, the population is less financially risk-averse and can adopt LPG. |
| Woman earns income | <ul style="list-style-type: none">• Income-earning women have more flexibility to use their budgets and make more purchasing decisions.• Women who work for an income (especially outside the home) have less time to cook. |
| Age | <ul style="list-style-type: none">• Tradition weighs less heavily among younger women who would more often prefer to cook with cleaner fuels.• Younger women are more educated and have a higher expectation for their standard of living. |
| Current usage of LPG | <ul style="list-style-type: none">• Households are already cooking with clean fuels but could expand their use.• This variable is also correlated with income. |



Segments identified

Based on quantitative analysis validated through qualitative research, we found 7 different segments:

| | | |
|---------------------------------------|--|---|
| Fuel stackers (LPG + wood) | Higher-income fuel stackers | These are households with relatively good living conditions where gas is used for cooking on average more than half of the time. These households have fewer economic barriers to purchase durable goods as they often have more than one source of income. |
| | Lower-income fuel stackers | These are low-income households that have adopted LPG but use it more sparingly. Women often stay at home to cook and generally have less decision-making power than males. |
| Exclusive firewood users | Mature income-generating women (>32 years) | These are households where cooks are breadwinners. They are more likely to own a house. They have stature in their communities and may feel some pressure to adhere to traditional norms. |
| | Mature traditionalist women (>32 years) | In these households women's decision-making power is constrained by males. They may have a house of their own and have accumulated some durable assets over time. Tradition weighs heavily on this segment. |
| | Young income-generating women (18-32 years) | These are young working women building an asset base to improve living conditions. Households often have dual incomes. Fertility rates are lower than other segments (including young traditionalist women). Women aspire towards a middle-class mode of living more than other segments. |
| | Young traditionalist women (18-32 years) | These women stay at home and their decision making power is constrained by heavily traditionalist men and often mothers-in-law. Women in this segment are often busy attending to their many children's needs. |
| | Low and unstable income households | These are households where incomes are not enough to cover the most basic needs. Men and women earn low and unstable incomes. Household sizes are very large and, ironically, this segment spends more on firewood than any other. |

Segment comparison



| Segment | Cooks that work for an income | Household size (people/household) | Fuel expenditures | Cookstove use |
|------------------------------------|-------------------------------|-----------------------------------|-------------------------|---|
| Higher-income fuel stackers | 98% | 4.5 | Q235/month (Q79 on LPG) | 51% of time on LPG 44% have a stove with a chimney |
| Lower-income fuel stackers | 0% | 5.8 | Q187/month (Q65 on LPG) | 43% of cooking time on LPG 44% have stove with chimney |
| Mature income-generating women | 100% | 5.5 | Q265/month | 41% have stove with chimney |
| Mature traditionalist women | 5% | 5.9 | Q186/month | 82% have stove with chimney |
| Young income-generating women | 100% | 4.6 | Q231/month | 41% have stove with chimney |
| Young traditionalist women | 0% | 5.6 | Q223/month | 61% have stove with chimney |
| Low and unstable income households | 9% | 5.8 | Q268/month | 15% have stove with chimney |



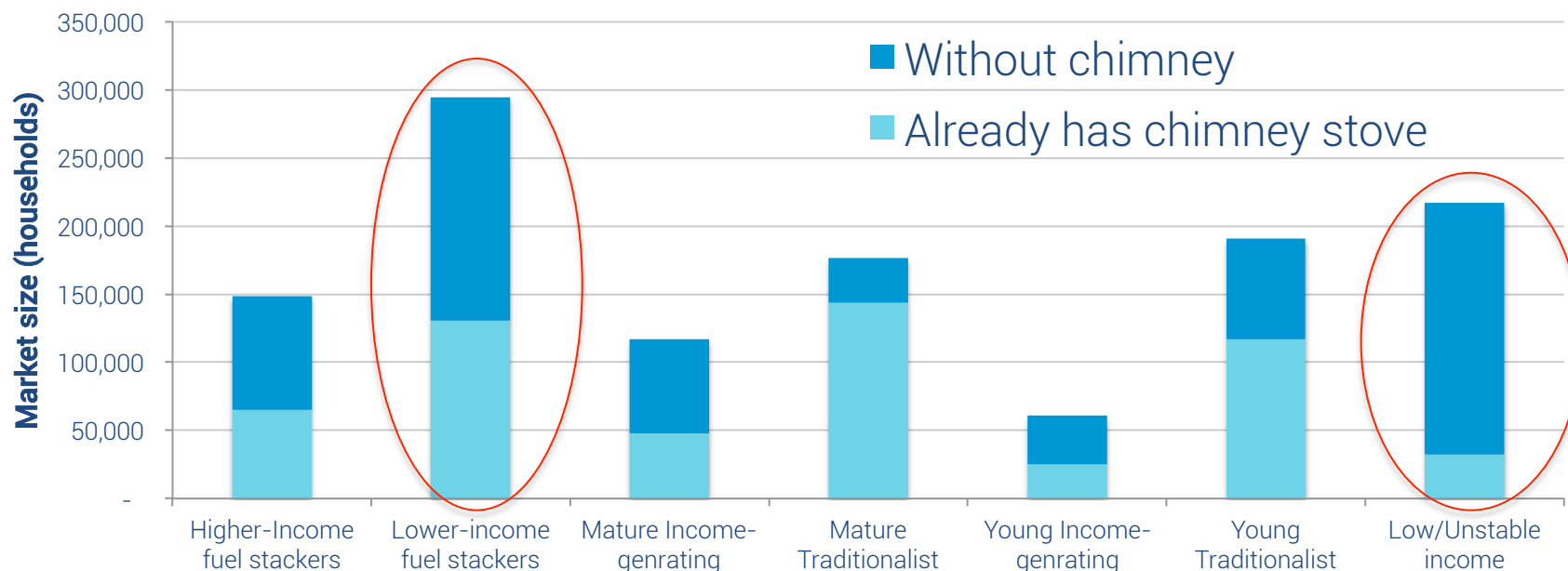
Key barriers and segments

| Barrier | Strongest among |
|---|--|
| Management of financial risk through firewood | All segments |
| Liquidity | All segments |
| Gender decision-making imbalance | Traditional women and low and unstable income households |
| Price and present bias | Exclusive firewood users |
| Expectation of highly-subsidized improved cookstoves | Exclusive firewood users in highlands |
| Product perceptions and attributions | All segments |
| High penetration of “plancha” stoves | Traditional women (especially the mature) |

Market sizes

Low-income fuel stackers and the Low and unstable income segments present the largest market sizes.

As mentioned earlier in the report, many households in our target population already own a “plancha” or other stove with a chimney; chimney stove ownership was highest among the “traditionalist” segments.



Segment prioritization



Our analysis showed that certain segments likely have a higher propensity to buy and adopt cleaner cooking technologies than others. We used the following criteria to prioritize those segments:

1. Likelihood to transition to clean cooking technologies
2. Market size without chimney stoves, as these stoves already reduce the discomfort of smoke and hence reduce the need for cleaner devices in the consumer's mind

| Segment | Likelihood to transition to clean cooking | Market size (# of households) without chimney stove | Prioritization |
|--------------------------------|---|---|--------------------|
| Higher-income fuel stackers | High | 83,664 | Primary priority |
| Lower-income fuel stackers | Moderate | 163,879 | Primary priority |
| Mature income-generating women | High | 69,075 | Primary priority |
| Mature traditionalist women | Moderate | 32,636 | Secondary priority |
| Young income-generating women | High | 35,878 | Primary priority |
| Young traditionalist women | Moderate | 73,639 | Secondary priority |
| Unstable income households | Low | 184,257 | Deprioritized |



Key areas of intervention opportunity

Rationale

Barriers addressed

Clean fuels

Increasing predictability of expenditures

Budget-constrained cooks feel anxious over not knowing how much will be spent on LPG and electricity and hence do not use them. Volatile LPG prices mean cooks cannot forecast future expenditures.

- Management of financial risk through firewood
- Liquidity

Demonstrating usability of LPG

Cooks need to learn how to cook traditional meals on clean fuel stoves to optimize fuel expenditures, overcome perceptions of LPG explosion/toxicity risk, and taste.

- Product perceptions and attributions

Addressing liquidity constraints

Having the money to buy a full tank of LPG is something many cooks feel unable to do and less so on a consistent basis.

- Liquidity

Improved wood stoves

Decentralization of ICS production and distribution

1) Manufacturers face high distribution costs in the absence of large and concentrated sales. 2) ICS face competition from plancha stoves which are locally made when cash is available. Despite relatively high prices, plancha stoves have an organic massive penetration. 3) Locally-built stoves offer possibility to foster mutualistic relationships by employing valuable connections in the communities.

- High penetration of plancha stoves
- Price and present bias
- Gender decision-making imbalance
- Supply-related barriers

Consumer awareness

1) Few potential customers know where to purchase ICS. 2) People are confused about which stoves are energy-efficient. 3) Potential to drive sales through awareness of open fire impacts.

- Product perceptions and attributions
- Fact that few know of ICS

Donor coordination

Many communities have expectation that ICS should be free due to distribution of highly-subsidized ICS, hindering market prospects.

- Expectation of highly-subsidized ICS

Examples of specific intervention opportunities



Clean fuels

Increasing predictability of expenditures

1) Offer cooks instruments to measure how much LPG is in canisters; 2) At the policy level, buffer or subsidize LPG prices to reduce volatility; 3) Improve canister quality to reduce leaks & ensure tanks are fully filled.

Demonstrating usability of LPG

1) Improve quality and look of tanks to sooth danger fears; 2) Establish replicable training modules on tortilla and bean cooking on LPG; 3) Offer male partners comparisons of firewood vs. LPG cuisine.

Addressing liquidity constraints

1) Offer possibility to partially refill canisters or smaller canisters; 2) Facilitate transition to larger canisters that last for entire paycheck cycles (e.g. from 25 lbs to 35 lbs).

Improved wood stoves

Decentralization of ICS distribution and marketing

1) Shift revenue models away from products to payments for performance (e.g. payments for adopted stoves) to decentralize production and sales; mobilize donors in this direction. 2) Offer community-based training to build ICS and couple with ICS awareness campaign. 3) Offer incentive-based payments to construction workers for building ICS. 4) Potential revenue models may include selling tools, molds, other instruments, and training to build ICS.

Consumer awareness

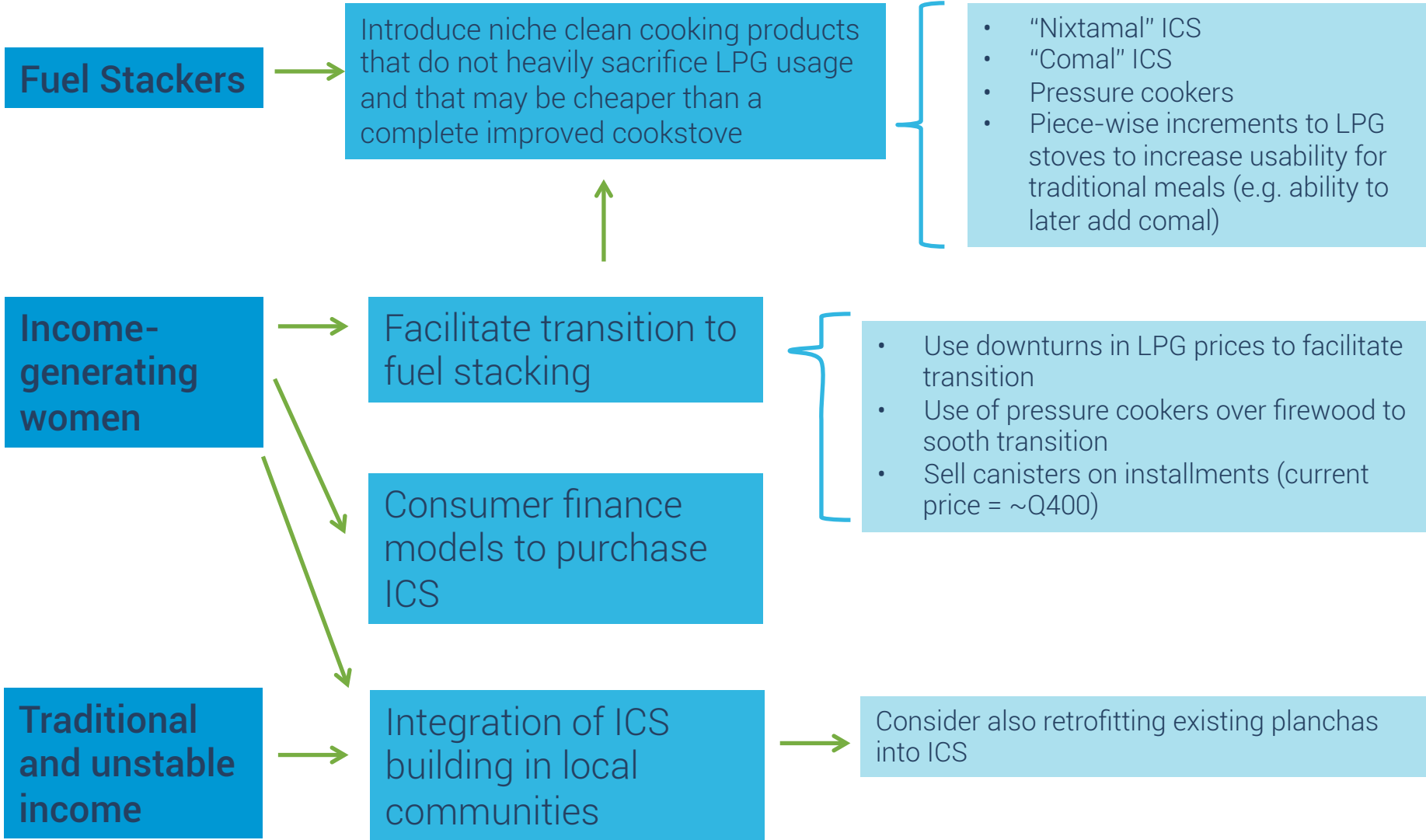
1) Communications campaign to create awareness of clean cooking, present the products, and where to find them. 2) Certification of ICS and certification awareness.

Donor coordination

Delimit areas where ICS can be donated and where they shouldn't.



Other areas of intervention opportunity: transitional models



Strategic Framework: Market Research in Action

Consumer Awareness: Message Testing



| Message | Gender focus | Reactions | Useful ? |
|---|--------------|--|----------|
| "Firewood smoke makes my children born weak or catch pneumonia and other diseases. If I switch to a cleaner stove my children will be healthier" | ♀ | The message is not credible because throughout generations, kids have grown and developed despite firewood cooking. If the smoke were really an issue, the solution would not be to buy an expensive stove, but rather take children out of the kitchen while the mother is cooking. | X |
| "I want my children to be successful. Firewood smoke keeps them sick and affects their academic performance. To help them, I should start using a cleaner cookstove" | ♀ | The cause of poor academic performance is not firewood smoke, but rather malnutrition, bullying, and problems at home. They cite examples of life success despite having grown with a firewood and the message is therefore not credible. | X |
| "I have a tight budget. If with these stoves I will be able to keep some extra money to buy things for my children, I will tell my husband to buy one" | ♀ | Women are responsible for wisely and sparingly use money and already use many tactics to save on firewood. Because they feel in control of firewood expenditures, the idea of spending on a device to later save on fuel seems to compete against an ability that makes them valuable at home. Men may also cut expenses if they know of savings. | X |
| "When I use an LPG stove I can finish my cooking chores faster freeing time to do other things and I can even look for a job or create a small business" | ♀ | The value of effective use of time is limited because of the lack of work opportunities in Guatemala. Hence, this message does not resonate with a current need. | X |
| "I live to take care of my family. Firewood smoke causes many diseases, some of which are even chronic. If I am not healthy, who will take care of my children?" | ♀ ♂ | They see that in their absence, children could be left abandoned to their fate or less-caring stepmoms. Because of work responsibilities, men aren't able to take care of children. This message is a strong call to raise awareness about women's health and the cleaner cookstoves offer a solution to the tension created by the message. | ✓ |
| "I have the obligation to protect my children and their health. Firewood smoke produced many diseases. Because of that, I cook with gas at home" | ♂ | The responsibility of taking care of children is in the women's domain. Women should be the ones taking care not to expose their children to smoke. LPG is seen as dangerous if children play with valves and hoses. | X |
| "I've realized that many neighbors are using cleaner stoves and are saving some money. I also want to start trying those stoves to have some extra money" | ♂ | The promise of savings is weak because you first have to spend money to save money over a long period. Savings are not guaranteed either as not many people have cleaner stoves to prove the case. However, saving money can provide a rational justification for the purchase <i>if</i> an emotional appeal for the product is established first. | X✓ |
| "I don't want my family to be seen with disdain; that my children are bullied because they smell like smoke or that my wife is told that she is one of the few that still cooks with firewood. In my house, we need to start cooking with gas." | ♂ | This message generated indignation. Firewood is an economic necessity and should not be a reason for discrimination. | X |

Consumer finance opportunities



| Financial sector | | | Product retailers | Employer-sponsored financing | In-house financing |
|--|--------------|--|--|--|---|
| Commercial banks | Cooperatives | Microfinance institutions (MFIs) | | | |
| <ul style="list-style-type: none"> • Overlap mostly with upper socio-economic levels of firewood users. • Requirements to get loans/credit often out of reach of many firewood users | | <ul style="list-style-type: none"> • Good overlap with target market | <ul style="list-style-type: none"> • Brand names like Elekra, Japón, El Gallo más Gallo that sell on credit • Need easy-to-install stoves • Appetite by players in this channel to be tested • Likely need large capital in inventory to deploy at their scale | <ul style="list-style-type: none"> • Can draw interest from corporates to prevent disease and absenteeism. Also for CSR purposes • Level of upfront payments to stove manufacturers need to be negotiated. | <ul style="list-style-type: none"> • Implemented with success for similar products (e.g. Ecofiltro) • Can serve markets not affiliated with MFIs or others • Partnering with local community centers (e.g. schools) can reduce credit payment risk |
| | | <ul style="list-style-type: none"> • Less stringent paper work requirements • Benefits in cash flow (consumers can get loans to pay upfront to stove manufacturers) • Experience managing risk with target markets • However, in reality stoves compete heavily against other potential loans and for the time of the loan agents, who often serve hundreds of customers • Synergies can be exploited by integrating clean cooking in MFI educational agenda. Clean cooking could reduce disease burden and repayment risk. | | | |

The Global Alliance for Clean Cookstoves can play a catalytic role by introducing products from multiple clean stove manufacturers to MFIs, retailers, and employers, thereby reducing transaction costs to manufacturers and potential consumer credit partners alike and build consumer confidence by introducing multiple choices of clean cooking products.

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THANK YOU

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