

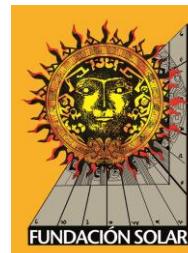


Global Alliance for Clean Cookstoves

Guatemala Cookstoves and Fuels Market Assessment

Intervention options

Energía Sin Fronteras
Fundación Solar
Universidad Politécnica de Madrid
July 2013



CAMPUS
DE EXCELENCIA
INTERNACIONAL





Introduction

- The “Guatemala Cookstoves and Fuels Market Assessment” was conducted by Energía Sin Fronteras, Fundación Solar and Universidad Politécnica de Madrid, in collaboration with ONGAWA Ingeniería para el Desarrollo Humano, on behalf of the Global Alliance for Clean Cookstoves (“Alliance”).
- It is **one of a series of country assessments** completed by the Alliance to:
 - ✓ Enhance sector market intelligence and knowledge;
 - ✓ Contribute to a process leading to the Alliance deciding which regions/countries it will prioritize;
 - ✓ Support the Alliance in developing its strategy and approach to country level interventions.
- **Each assessment has two parts:**
 - ✓ Sector Mapping – an objective mapping of the sector;
 - ✓ Intervention Options – suggestions for removing the many barriers that currently prevent the creation of a thriving market for clean cooking solutions.
- This document is meant **to explore the intervention opportunities** in the cookstove sector in Guatemala.
- Clean cookstoves, improved cookstoves, efficient cookstoves all refer to cookstoves which are *cleaner* and *more efficient* than open fire. In this document, the term “**improved cookstoves**” (ICS) is used.

The Alliance team directing the project was led by Amy Sticklor. The consortium team was directed by Maryse Labriet (Energía Sin Fronteras).

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Executive Summary: Three main axes of action, 22 intervention options organized in 7 groups

Three axes of action are proposed. Setting the institutional and knowledge basis is the starting point. Specific options to reinforce the Cookstove Value Chain (Supply / Demand) immediately follows, covering intervention options related to awareness, certification and training, integrated projects and multi-fuel and multi-technology approaches. Consolidation of national funding is a crucial transversal axis.

Setting the institutional and knowledge basis

Cookstove Focal Point
Cookstove Multisectoral National Committee
Regional and International coordination

Institutional basis

Knowledge

Systematized studies and information
Monitoring system
Information circulation
Linkages between stakeholders
Newsletter

Enhance demand and strengthen supply

National campaign
Capacity-building of decision-makers
Show place

Awareness

Certification and training

Integrated Project Framework

Integrated projects

Multi-fuel and technology

Standards and certification
Training and licenses
Info and follow-up of users

LPG
Other fuels
Integrated energy services and products

Transversal consolidation of funding

MFI study and recommendations
Corporate Social Responsibility
Mobilize national funding
Carbon finance

Funding



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A three-pronged strategy proposed by the Global Alliance for Clean Cookstoves



Main insights from the Sector Mapping

Population, Poverty and Diversity

- 14.7 million people, 51% in rural areas.
- 40% of indigenous population with 23 different languages. Communication is a real challenge.
- 54% population under the poverty line of which 13% are extreme poverty.
- Ease of Doing Business is low.

Fuel usage and cooking practices

- Around 70% of households use firewood for cooking.
- LPG is used by households over the poverty line, for specific uses (breakfast, re-heating food), combined with woodfuel. This niche is still marginal, but robust and could be reinforced.
- Collection of firewood is carried out by both men and women.
- Total woodfuel consumers: 2.1 million households; total woodfuel buyers: 1.3 million households.
- The existence of clean cookstoves and their benefits remains unknown by most households.

Annual wood deficit

- More than 5 million tons of dry wood equivalent.

Health burden of solid fuel use for cooking

- Household Air Pollution (HAP) accounts for economic losses equivalent to around 1% of Guatemala GDP.
- More than 5000 deaths (all ages) in 2010 due to HAP.
- HAP is the second cause of Disability-adjusted life years (DALYs).
- Lower respiratory infections are the first cause of DALYs in 2010.
- High contribution to outdoor air pollution too.
- Several HAP research projects, such as RESPIRE and CRECER.



Extreme poverty



Poverty

Photos Fundación Solar

Main insights from the Sector Mapping (*cont'd*)

Many projects and studies, no systematization

- Guatemala has unique experience in ICSs, but without systematization of information, no follow-up nor information on cookstoves in place.

Two complementary approaches: Donations and Market

- Most of the projects involve highly subsidized cookstoves.
- For the extreme poverty segment of the population, appropriate strategies, based on highly subsidized cookstoves inserted into larger programs, need to be put into place.
- Willingness-to-pay by households who buy firewood is demonstrated, as soon as savings associated with firewood purchases are proven.
- Market-oriented centralized mass-production exists, but is highly dependent on donation-based programs.
- Different mobile models of cookstoves available: ONIL, NOYA, DONA DORA, ECOCOMAL, etc., as well as several versions of the *in situ* plancha stove.
- There is no stove certification nor quality requirements in the country.

Potential market

- From 0.7 to 1.4 million households could buy an efficient cookstove, with appropriate financing measures. The willingness-to-pay of the “non-extreme poverty” segment is uncertain.

A relevant national policy framework

- The new National Energy Policy (2013-2027) opens the door for new initiatives and strategies to promote clean cooking. This is the first policy that explicitly address the use of domestic firewood, and places the Ministry of Energy and Mines as a main player and leader in the country.
- The regional (Central American) level of energy and market strategies must also be considered.



ONIL



NOYA



ECOCINA



DONA DORA

Remaining barriers

There are multiple barriers that currently prevent the creation of a thriving market for clean cooking solutions.

One main barrier has been eliminated with the publication of the new Energy Policy, where ICS are explicitly incorporated with target numbers for implementation.

The remaining barriers, in order of importance and priority, are:

- Lack of awareness by the population on HAP harmful effects on health, resulting in a lack of interest in the technology and in a low willingness-to-pay.
- ICS donation practices which hamper market strategies if they are not designed in an appropriate manner.
- No designated government office (focal point) for ICS.
- Lack of regulation framework for ICS.
- No ICS certification.
- Lack of awareness of decision-makers on the different types of ICS and on the contribution of residential firewood to national emissions, air quality, and health.
- Lack of capacity-to pay by the poor.
- Cultural and geographic diversity of the country. Among other challenges, difficulty of promoting ICS in remote poor areas.
- Lack of integrated and systematic data on ICS projects and stoves.
- Lack of support for the research and development of ICS.



Photo: Fundación Solar

In summary: A window of opportunity. Once a wheel starts to move, the others move...



Current situation

- High incidence of HAP on health and health expenditures.
- Ignorance of harmful effects of smoke.
- A warning report by the INAB-IARNA-URL published in 2012, highlighting the deficit of more than 5 million tons of dry wood equivalent per year in Guatemala.
- Market of up to 1.2 million households.
- Multiple built in-place and mobile stove models available to satisfy several market niches.
- Many projects dominated by highly subsidized cookstoves. They sometimes compete with market.

Country commitments

National Energy Policy (MEM, 2013-2027)

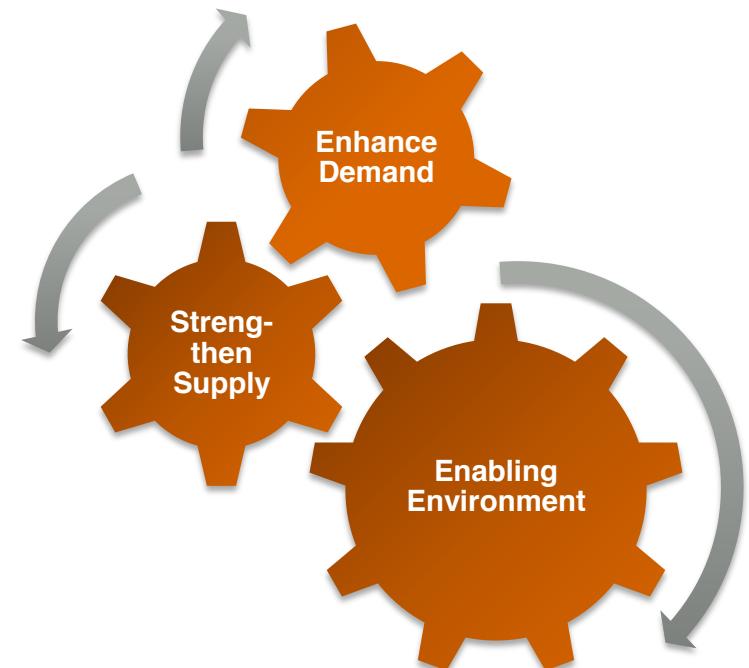
- Installation of 100,000 efficient biomass stoves.
- Reduction of 15% in industrial firewood consumption,
- Increase of 10% in energy plantations,
- Substitution of firewood by other energy sources in 25% of households.

Regional and international commitments

- SICA: To lower use of firewood by 10% and install one million stoves by 2020.
- Global: Commitments of compliance with MDGs.

Act now

- Political will: A new energy policy where the Government has placed the issue of firewood and efficient cookstoves, as well as fuel substitution on the table, where LPG can play an important role.
- Market assessment by the Alliance.
- Demonstrated willingness-to-pay with appropriate financing measures.
- Increased concerns related to black carbon.





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Supply and demand of cookstoves: expected results

To ensure the viability of market development, the two types of demand (highly subsidized cookstoves and market-based cookstoves) have to be separated. For both types of demand, the successful implementation and use of cookstoves require a similar chain of results.

*Highly subsidized
cookstoves in
integrated
projects*

**Two types of
demands**

*Market-based
cookstoves*

Firewood users know about HAP effects and monetary savings.

Information on types of stoves, certification and price is available.

Adapted financing options are available and accepted.

Cookstoves are available, guaranteed and certified.

*Final result:
cookstoves
are
implemented
and used.*

Enabling environment: expected results

Four types of results are expected from an enabling environment to promote the implementation and use of cookstoves.

*Highly subsidized
cookstoves in
integrated
projects*

**Two types of
demands**

*Market-based
cookstoves*

The institutional framework, with clear targets, policies and shared responsibilities, is in place.

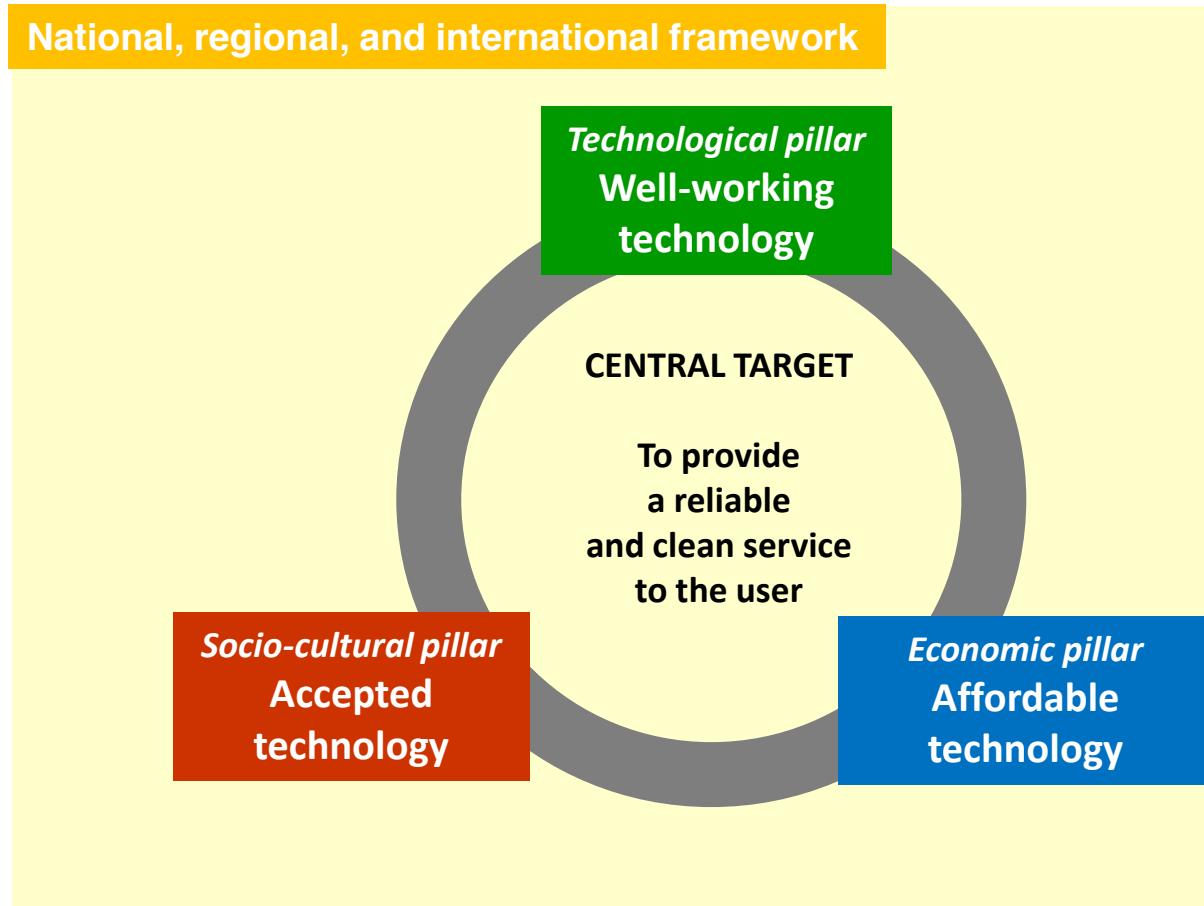
Conditions for a systematic analysis of needs, projects, and cookstoves are available.

Decision-makers have a clear understanding of the issues and challenges associated with cookstoves.

National funds are available.

*Final result:
cookstoves
are
implemented
and used.*

The success is measured by *the use* of the stoves



A unique cookstove will not satisfy the needs and preferences of all households, nor a unique supplier.
A diversified supply is key to success.

How to read the slides

Each intervention option is characterized by:

- 1) **Its contribution to the three pillars** of the cookstove strategy (Enabling Environment, Enhance Demand, Strengthen Supply) , identified by these pictograms:



- 2) **Its time horizon** : Short (<1yr), Intermediate (1-3 yrs), Long (>3 yrs)

- 3) **The main actors** to be involved in the implementation of the intervention option

Establish the institutional setting: Basis for action



Situation / Needs

Need for systematization

Guatemala has unique experience in ICSs, but without systematization of information.

A very recent policy

The new National Energy Policy (2013-2027) published in 2013 by the MEM opens the door for new initiatives and strategies to promote clean cooking.

It includes long term goals (2027), with clear targets such as :

- installation of 100,000 efficient biomass stoves,
- training to use firewood efficiently,
- reduction of 15% in industrial firewood consumption,
- increase of 10% in energy plantations,
- substitution of firewood by other energy sources in 25% of households.

Several government organizations are clearly identified, such as the Ministries of Energy, Environment, Agriculture, Forestry, Education, and Health.

Guidelines and Regulations now need to be prepared and approved, in consultation with all stakeholders (government, cookstove industry, implementers, and academia), and an appropriate budget must be allocated to the cookstove policies and programs.

The first regulation option is the creation of a Focal Point and of a National Multisector Cookstove Committee.



Intervention Options

IO1: Establish a Cookstove Focal Point

(FP) responsible for the integration of ICS efforts in the country.

Main actors: Government

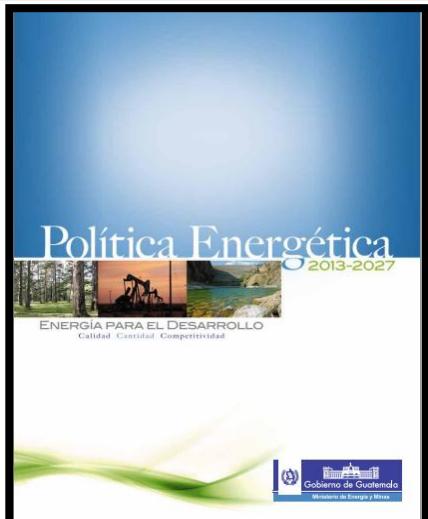
Time horizon: Short

IO2: Establish a National Multisector

Cookstove Committee (MCC), integrating all ICS stakeholders (government, industry, implementers, academia, civil society, etc.), coordinated by the Focal Point.

Main actors: Government, academia, suppliers, implementers, civil society.

Time horizon: Short



Establish the institutional setting: Focal Point and National Multisector Cookstove Committee



Focal Point (government)

- The FP will be established in a Government organization, headed by an expert. The appropriate budget will be allocated to it.
- It will be responsible for the integration of cookstove efforts in the country and the region.
- It will facilitate the establishment of the framework required for the establishment of policy guidelines and regulations to promote and an enabling Environment and consolidation of the value chain.
- It will be supported by the MCC.

*Coordination,
communications,
information, and updates*



*Multi sector advice,
information, suggestions, and
general guidance on integrated
actions for ICS*



National Multisector Cookstove Committee

- A national multisector committee for ICS will act as adviser of the FP and promote inter-institutional consultation, commitments, synergies and responsibilities.
- It will be composed of representatives of all cookstove stakeholders: governmental institutions and ministries (MEM, MAGA, INAB, MARN, MSPAS, SEGAPLAN, SEPREM, etc.), local authorities, universities, manufacturers, implementers NGOs.
- It will be coordinated by the FP.



*Institutional
awareness and
commitments*

Systematize and promote knowledge and opportunities



Situation / Needs

- There have been many projects in Guatemala, by the Government, NGOs and the private sector.
- Experiences remain isolated, and sometimes lack coherence.
- Several types of ICS have been used, but the level of appropriation, number of stoves, etc. are not known.
- There is a need to integrate available information and lessons learned, to keep track of projects, and to improve knowledge management.

Intervention Options

IO3. Coordinate studies and centralize the information

- Gather information on cookstove experience and projects in Guatemala, and keep track of projects and activities implemented by local, regional and international stakeholders.
- Conduct comprehensive surveys in all regions of Guatemala to enhance the understanding and statistical information available on energy for cooking (firewood, gas, availability, prices, etc.), cooking practices and preferences, income levels, culture, fuel perceptions. This information will also contribute to better understand and characterize the market segmentation, especially in a multi-fuel and multi-technology perspective.

Main actors: Government (FP), with support by stakeholders.

Time horizon: Short but with permanent updates.

IO4. Develop credible cookstove monitoring and evaluation systems

- Must be applied to all projects.
- Lessons learned should become part of the knowledge system.

Main actors: Government (FP), Suppliers, Universities

Time horizon: Intermediate

IO5. Establish and maintain lists and contacts

List of Stakeholders: NGOs, implementers, cookstove manufacturers, available cookstoves models, certified masons and mobile stove builders, sources of funding.

Main actors: Government (FP)

Time horizon: Short but with permanent updates.

Systematize and promote knowledge and opportunities (cont'd)



Situation / Needs

- Linkages between stakeholders remain weak.
- A communication plan is important to consolidate the sector, keep stakeholders informed and create a network.



Photo Fundación Solar

Intervention Options

IO6. Facilitate links between manufacturers, academia and research centers and encourage innovation

- Organize workshops, encourage research and/or practices on ICS for graduate students, encourage publication on lessons learned, good practices, launch concourse, etc. Encourage innovation (new models, new fuels).

Main actors: Government (FP), Suppliers, Universities

Time horizon: Intermediate

IO7. Publish a newsletter for general information periodically for all stakeholders.

- Since not all members of the MCC will be present in all meetings, the newsletter can keep all stakeholders informed.
- Provides opportunities to share experiences within the sector through publications or notices.
- Also useful for sharing information on new events, meetings, new projects, financing opportunities, etc.

Main actors: Government (FP), all stakeholders (provide information)

Time horizon: Short, but continuous in time

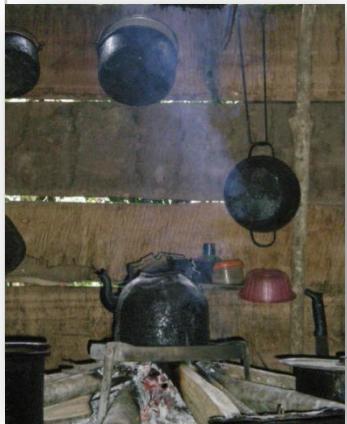
Create country-wide awareness on HAP and cookstoves



Situation / Needs

- Many people in the country have no idea of the harmful effects of smoke. Cooking over open fires has been the traditional way of cooking for centuries, and changing cultural patterns is not easy.
- The existence of clean cookstoves and their benefits remain unknown by most households.
- People with a steady income can purchase an ICS if they know that such a cookstove exists, see it working, and trust its use and benefits.
- There is a crucial need to inform populations about the existence of ICS,

the benefits of clean cooking
the ways to acquire these cookstoves.
The supply of cookstoves must be enhanced in parallel.



Intervention Options

IO8. Launch a national campaign on the health impacts of smoke and on available solutions

- Adapt existing campaigns, like WHO's "Killer in the Kitchen".
- Identify a champion (popular or respected national personality (like the first lady of Peru) to make ICS recognized by all as an attractive product.
- Use government institutions, such as extension services of the Health Ministry to reach people with the message.
- Use communal radios that broadcast in Mayan languages, so that all people can receive the message (the use of radio is very high in Mayan culture).
- Distribute information to teachers to make children aware of the harmful effects of smoke (Ministry of Education).

*Main actors: Government (FP, Ministry of Education, Ministry of Health), Donors
Time horizon: Short*

IO9. Create awareness of the decision-makers

- Disseminate information within each institution (using the MCC for example).
- It is important for government officials to have a basic knowledge of ICS. There is a tendency to associate ICS only with large plancha stoves.
- Mobile stoves can be installed anywhere, while only household owners can have a plancha built in situ.
- Put more emphasis on HAP in the agenda for Ministry of Health.

*Main actors: Government (FP, Ministry of Health), MCC
Time horizon: Short*

Establish stove certification, guarantee and availability of spare parts



Situation / Needs

- There are currently no certification requirements in Guatemala.
- Some stove makers have sent their models to Zamorano Stove Certification Center, to have a performance certification, providing particulate emissions and efficiency.
- The Center has tested 19 stoves to date, of which most are private manufacturers that have not made their data available.
- Stove certification has to be mandatory to secure quality and guarantee of the cookstoves and availability of spare parts. It will also support cookstove initiatives as a “trust building mechanism”: a written guarantee creates trust, and provides a protection of the purchaser. It will also help in securing financing since finance institutions usually have greater confidence in certified stoves and could even use the stove itself as a guarantee (if mobile).

Intervention Options

IO10. Devise and impose standards for cookstoves

- Define cookstove standards, following international standards.
- Decide if the Zamorano Center will be used as a certification center. If so, clear requirements for minimum stove standards in Guatemala are needed. If not, a center has to be identified, equipped and funded, possibly hosted by a University.
- Establish training and licensing of the masons who built in-situ stoves
- Make sure that suppliers include a guarantee that spare parts will be available, at least in one location in each department where they are sold.
- Make sure that users are informed that cookstoves must be certified and that they can request a written guarantee when purchasing.

Main actors: Government, with a focus on a regulation agency (FP), Certification Center, Universities, Suppliers, Donors

Time horizon: Intermediate

Promote well-trained and licensed masons and mobile stove workers



Situation / Needs

- Freelance stove building resulted from a need in the market. Products are introduced under a business sense without any technological background, negative outcomes for the product such as lack of efficiency, durability, product information, etc., result in a lack of trust from the consumer.
- Not only stoves need certification, but also the human component. Sales people sell stoves claiming certain levels of performance that are not guaranteed nor proven. To solve this situation, training of masons, NGOs and metal stove builders has to be a component of the national strategy to strengthen supply, and recover trust in ICSs.
- Zamorano Center has trained Justa builders, and they have to renew their licence every 6 months. Patsari builders, every year.

Intervention Options

IO11. Train and license masons and mobile stove builders

- A national accreditation program can be designed to reach masons and stove builders.
- Short programs can be offered in large, medium and small cities, providing basic thermodynamic concepts and hands on demonstrations to teach ICS efficiencies and basic principles. Hands on workshops are ideal, due to the fact that many workers can't read or write, but can work well.
- A certified mason or metal stove builder can present a accreditation document, valid for a defined period of time, which will help consumers identify certified stove personnel. Accreditation licenses will have to be renewed according to country specifications.
- Ideally the Government (FP) would have all the information centralized, and support the training process. Communications campaigns can broadcast the use of certified professionals for consumers that wish to buy a built in place cookstove.

*Main actors: Government (FP), Certification Center, Universities
Time horizon: Intermediate*

Enhance operations and maintenance and distribution channels



Situation / Needs

- Most projects include a training component, assuming beneficiaries will take care of the ICS, repair it if necessary, change parts that deteriorate, such as the chimneys. This is however not the common result, and follow-up is required.
- The cookstove must be perceived as a better option than the status quo.
- Using the stove is necessary but not sufficient: it must be used *well*.
- The importance of understanding the functions of the ICS is vital for care and continuous use.

Intervention Options

IO12. Offer clear information to users on instructions, contact and spare part availability

- Include pictorial instructions for users, given the multiple languages and usually low education level. Many times, people forget the basic steps of preventive maintenance, and/or simple doubts may jeopardize the correct use of ICS.
- Incorporate at least 2 visits after the ICS is installed in rural households part of the extreme poverty segment, to ensure a solid technology appropriation. Implementers should include this component in their work plan.
- Inform users about how and where to buy spare parts (provide contact information). It is therefore crucial that spare parts are available in nearby locations (see IO10 - Devise and impose standards for cookstoves). Make sure the users understand that each part has an expected life span, and it will need to be replaced in the future.

*Main actors: Suppliers, Implementers of ICS.
Time horizon: Short*



Photo Fundación Solar

The picture shows a former plancha stove: the fire chamber was destroyed, and the stove is now used as a *poyeton**, resulting in a loss of efficiency and air quality benefits.

* *Poyeton*: elevated base where the fire is ignited to cook.

Distinguish strategies for market and for integrated projects



Situation / Needs

- Within the policy guidelines, strategies based on ICS donations or on highly subsidized cookstoves have to be clearly separated from market development strategies: distinct guidelines must be established by the government, inspired by the experience of the different stakeholders.
- Indeed, stoves are often given for free to households part of any segment of the population (extreme poverty, poverty, even no poverty), without any clear discrimination, what creates market distortions.
- ICS donations for beneficiaries of the extreme poverty segment can be integrated into multi-sector programs without negative impacts on the development of a parallel market.

Intervention Options

IO13. Define an integrated intervention framework for extreme poverty

- Incorporate ICS in *Integrated Projects for poverty reduction and sustainable development* that include diverse components, such as clean water, education, agriculture, energy, or health (ICS as a solution to HAP).
- Identify the conditions which make Integrated Projects necessary and relevant (poverty levels, remote areas, needs and requests) in order to avoid the overlap with market-based strategies.
- Identify government projects and programs where ICS can have a role (gender, environment, energy, health, forestry, etc.). This information can help donors to add an ICS component to their projects and programs and promote an integrated approach.
- Mobilize financing by the Government of Guatemala through its institutions, by multilateral institutions, and by public-private partnerships.

Main actors: Multi-actors

Time horizon: Intermediate to Long

Integrated projects for extreme poverty



Design low cost models

- Built-in-place ICS for poyetones.
- Built-in-place ICS adapted to local needs.
- Mobile ICS.
- Off the shelf models (Envirofit, Eco-estufa, etc.).

Manufacturers, universities, research facilities, implementers, international models

Preparation and implementation

- Identify governmental institutions, programs, projects where ICS could be incorporated: Focus on poverty, health, energy services, all.
- Incorporate social component.
- Incorporate monitoring.

Government institutions, implementers, donors

Costs and funding

- Integrate the cost of the ICS component in the corresponding programs.
- Programs and projects funded by donors.
- Public-Private Partnerships.

Government institutions, international donors, multilateral partners, regional entities

Key success factors of integrated projects

Design low-cost options, adapted to user needs: Explore the idea of building an ICS around the rocket elbow (eg. Project of the NGO Trees, Water and People), using poyetones as a basis where to add an efficient combustion chamber, a plancha and a chimney, building low-cost mobile cookstoves, etc.

Project preparation and implementation: Incorporate a social component in all ICS programs and projects, making emphasis on commitment, sensibilization and technological appropriation (eg. ICS in exchange of work or community activities). Include cultural, religious and gender aspects. Give time to people so that they understand WHY smoke is harmful and how to avoid exposure. Provide solutions to compensate for the lost positive effects of open fires.

Follow-up: Establish monitoring, evaluation and systematization of the follow-up (visits) to secure technological appropriation through problem solving and support to questions, doubts, small technical problems, etc. this makes users more comfortable with the new technology, and contributes to provide feed back to implementers on possible enhancement of the cookstove)



Photo Energía sin Fronteras

Example of “poyeton” (elevated platform where fire is ignited)



Integrated projects for extreme poverty (cont'd)

Synergies with other intervention options

Knowledge on projects and technologies by stakeholders and Awareness campaign, Certification and Training will create the conditions for a growing demand and good quality supply.

- A need is created for people living in extreme poverty, and requests from populations living in extreme poverty are formulated.
- Synergies between local development projects and ICS implementation are identified.

- Contribution by the beneficiaries in terms of labor, community participation, forestry plantation, education programs etc., is incorporated into project design.
- Project managers can add to income producing activities the training of local masons, which also support the sustainability of the project.

-
- Firewood users have the knowledge of HAP effects and monetary savings*.
 - Information on types of stoves, certification and price is available.
 - Adapted financing options are available and accepted.
 - Cookstove is available, guaranteed and certified.
 - Project managers are aware of the needs and possibilities.
 - ICS are incorporated into integrated development projects, according to the needs of the target population.
 - Integrated projects offer the possibility to select an EM
 - Users can count on a reliable technology.
 - Implementers know they can count on a guarantee.



Market strategy: *Think customer, not beneficiary*

Situation / Needs

- Non-market based strategies (which must be well defined to avoid any distortion of the market based strategies) are relevant for the *extreme poverty segment* of the population, while the *no poverty segment* of the population is definitively part of a possible market-based strategy. The *no extreme poverty segment* is more uncertain. From 0.7 to 1.4 millions of households "could" buy an ICS, under appropriate conditions of payment.
- Willingness-to-pay by households with stable revenues close or over the poverty line and who buy firewood is demonstrated as soon as a) they know about the cookstoves, b) wood savings are proved and c) guarantee and technical support are provided.
- The usual idea of an ICS is a plancha, but information on mobile stoves can stir quite an interest.

Intervention Options

An awareness campaign and certification and training will create the conditions for the demand to grow.

Some other conditions are needed, related to portfolio demonstration and finance options for both consumers and suppliers (presented in next slides).

- A need is created for people living in poverty and no poverty segments
- Households know about financing options
- Firewood users have the knowledge of HAP effects and monetary savings.
- Information on types of stoves, certification and price is available.
- Adapted financing options are available and accepted.
- Cookstove is available, guaranteed and certified.
- Households can choose between different models according to their needs, preferences and capacity-to-pay
- Households can request licenses from masons and mobile stove suppliers
- Guarantees become part of demand, as well as spare parts availability



Market conditions: Willingness-to-pay drivers

“Willingness to pay” drivers

Economic accessibility and savings: economic savings when woodfuel is purchased; purchase cost must be reimbursed in a short time frame; ICS must remain accessible to people with limited incomes.

Time savings: in collecting firewood when applicable, in cooking (several plates cooked at the same time); time to be used as users want.

Credit access: reduction of the up-front cost barrier by the access to affordable credit from a bank or MFI, possibility to get a credit from the company or industry where people work

Health concerns: elimination of smoke from the kitchen, healthier children, reduced danger of burns, reduced eye irritation, breathing, better position of the women when cooking , reduce expenses in doctors and medicine.

Cleanliness: better look and overall cleanliness of the kitchen, utensils and home, reduction of odors (clothes and hair).

Aspirational technology: improving the look and overall cleanliness of the kitchen, attractiveness of the cookstove appearance.

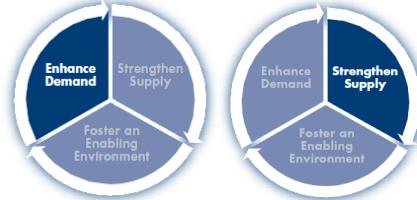
Acceptability, quality and guarantee: size adapted to the family needs, includes a cooking surface that allows the preparation of tortillas, durable stove, solid guarantee and maintenance (trust builder).

Demonstration: to give to users the opportunity of being exposed to cookstoves and see them functioning (trust builder)

The proposed intervention options will reinforce both the willingness-to-pay and the capacity-to-pay by supporting the different drivers.



Market conditions: Need to be exposed to cookstoves and opportunity to choose



Intervention Options

IO14. Install a show place with all the different types of stoves for hands-on testing.

- Local and international models can be displayed, and create the option to pre-order from the center.
- Users will have a choice to select what works best for them, and at a price they can pay. Groups of representatives from municipalities and rural areas can come and see the stoves, cook with them, and make a decision which suits their people better.

Main actors: Government (FP), Suppliers

Time horizon: Short



Onil stove demonstration. Photo: Fundacion Solar

Market conditions: Consumer and supplier financing



Situation/Needs

Microfinance (consumers)

Microfinance is centered on short term commercial loans. Many people prefer saving money until they can pay cash.

Two MFI are providing loans to buy ICS. Financial requirements are strict, most poor people don't qualify. Transaction costs are high due to money collection, supervision, training, travel, etc., making microfinance easier if banks have many local/rural offices.

Corporate and institutional financing (consumers)

Companies and institutions could offer financing for acquisition of an ICS, as part of social responsibility programs.

Commercial loans (suppliers)

Difficulty in proving the financial feasibility of the proposals, high guarantees required, high interest rates, uncertain market.

Grants (suppliers)

Dependence on external funding, Needs for an existing market so that the commercial activity becomes viable without the grant, must be well defined to avoid distortion of the market.

Intervention Options

IO15. Conduct a study on MFI requirements and possible solutions accessible and accepted by the users

- Guatemala's informal economy represents 75% of productive people.
- Adapted programs are needed to reach this part of the economy. Some barriers could be eliminated, such as the need for a tax number. Financial education of the beneficiaries is also needed.
- The possibility to involve cooperatives in the purchase of ICS and the distribution to their members could be explored (there are more than 880 active cooperatives under CONFECOOP).

Main actors: Government (FP), MFI, Bank of Guatemala, Cooperatives CONFECOOP (Confederación Guatemalteca de Federaciones de Cooperativas)

Time horizon: Intermediate - Long

IO16. Propose guidelines for Social Responsibility ICS interventions

- Having an in-house financing scheme to purchase an ICS and/or an LPG stove under flexible conditions could be very attractive for enterprises and institutions interested in social responsibility programs. High-level executives don't realize that most people working on the minimum salary level use firewood for cooking.

Main actors: Government (FP), Chamber of Commerce, Chamber of Industry, CONFECOOP, ANACAFE, Fundazucar, other business associations that work with low income people

Time horizon: Intermediate

Market conditions: Consumer and supplier financing (cont'd)



Situation/Needs

National funding

The availability of national funds is crucial to consolidate ICS projects and programs. Current programs usually depend on external funding.

Carbon finance

Experience in Clean Development Mechanism (CDM) projects and programs is available in Guatemala, including with cookstoves (under development). However, carbon markets remain complex and uncertain. Other climate finance opportunities such as the Nationally Appropriate Mitigation Actions (NAMAs) and forestry projects deserve more attention.

Intervention Options

IO17. Mobilize long-term soft financing for ICS national program

This could cover:

- Provision for Focal Point establishment and activities.
- Creation of a Guarantee Fund for ICS consumer loans and manufacturers' loans.
- Creation of line of credit for financing to manufactures.
- Creation of a revolving fund for NGOs and distributors (reinforce the role for intermediates and distributors in the value chain).
- Explore the opportunities offered by micro consignment (the entrepreneur is provided with the products at no cost. Once the product is sold, the entrepreneur pays back the organization, pockets a portion of the profit, and restocks in order to sell more).
- Establishment of a guarantee fund for MFI.

Main actors: Government of Guatemala, Banks, Donors

Time horizon: Intermediate

IO18. Consolidate the use of carbon financing for projects and programs, including NAMAs and forestry (REDD+) opportunities

- Reinforce the definition of CDM projects and programs based on cookstoves and forestry activities
- Explore the opportunity to insert ICS in Nationally Appropriate Mitigation Action (NAMAs). For example: *Scaling-Up Renewable Energy Program in Low Income Countries (SREP)*, in Honduras, supported by one of the Climate Investment Funds.

Main actors: Government (FP), MCC, Government of Guatemala, MARN, Suppliers, Implementers
Time horizon: Intermediate - Long

Encourage multi-fuel and multi-technology uses



Situation / Needs

A **unique cookstove** will not satisfy the needs and preferences of all households (nor a unique supplier, given the size of the market), hence the interest for a diversified supply of cookstoves

Fuel stacking is a common practice: using more than one fuel to cook, depending on the advantages of each fuel for certain types of food. The most common mix in Guatemala is firewood (prolonged cooking periods) and LPG (quick heating and making breakfast, especially for early workers). Where electricity is available, other mixes can be seen.

Many Guatemalans live abroad, and send money and gifts, many times including small electrical appliances, like microwaves, toasters, etc. (see picture)



But

- Lack of awareness about health benefits of LPG.
- In the Guatemalan market, LPG is sold in containers of 25 lbs and more: high upfront and filling up cost.
- Concerns about the safety of LPG, old and damaged cylinders remain in the market.
- No responsible actor for container security. In other countries, the gas companies are responsible and containers carry their name brand.

Intervention Options

IO19. Establish a well focused LPG program

- Include LPG in awareness campaign, or prepare one for LPG.
- Define responsibility and establish standards for LPG containers and implement tighter controls of containers.
- Incorporate, in official texts, the approval for using smaller containers, 5 to 10 lbs, that would be relevant to the specific uses of LPG and encourage LPG use by poorer segments (pay more frequently for smaller amounts).
- Contemplate a one time partial subsidy to purchase LPG stoves and container for poorer segments of population (to be defined in IO3 – Studies and centralization of information).

Main actors: Government (FP), Industry

Time horizon: Short to intermediate

Encourage multi-fuel and multi-technology uses (cont'd)



Situation / Needs

Biomass briquettes production and use are explored, with the advantage of lowering cost (compared to firewood).



Photo Fundación Solar

Biogas is being produced in rural areas. There are multiple small projects that use the biogas for cooking. It is not (yet) a common practice. The constraints are the cost of the installation and the limited user's acceptance for cooking.

Rural or remote areas present additional constraints (accessibility, insufficient volumes of sales)

Intervention Options

IO20. Explore other fuel opportunities for cooking

- Biomass briquettes: systematize the experience and share the information on successful projects.
- Biogas: Share knowledge and assess market possibilities.
- Solar: Might be a complement of other efficient stove and a retained heat device.

Main actors: Government (FP), Suppliers, Universities

Time horizon: Intermediate - Long

IO21. Explore the possibility of integrated energy services and products

- Both decentralized electrification (photovoltaic mostly) and clean cooking contribute to household air quality and access to energy for all. They also face the same accessibility barrier when applied to remote areas, what jeopardizes their success given the importance of monitoring and follow-up with the users (training, maintenance, payment) in both cases.
- Joint activities would benefit to the success of both, sharing for example distribution channels, capacity-building activities, monitoring, adapted payment options, etc.. This would also consolidate local markets in both sectors. However, it requires the collaboration between stakeholders usually working separately.

Main actors: Government (FP), MCC, Suppliers, Implementers

Time horizon: Intermediate - Long



Photo INDE

Establish policy guidelines: A regional perspective



Situation / Needs

- The Central American countries have ratified in 2007 the *2020 Central American Sustainable Energy Strategy* to move ahead on the energy regional integration.
- The actions are presented by area:
 - a) Rational Use of Energy,
 - b) Diversification of the Energy Matrix and Renewable Sources of Energy,
 - c) Access to Energy,
 - d) Energy and Climate Change,
 - e) Regional Integration,
 - f) Institutional re-inforcement.
- The regional goals for 2020 regarding ICS are:
 - ✓ Lower firewood consumption by 10%,
 - ✓ Install 1 million of ICS in the region.

Intervention Options

IO22. Coordinate with regional and international organizations

- Mandate FP to serve as focal point for SICA's regional coordination on Strategy 2020
- Coordinate with regional and international organizations.
- Coordinate with the regional institutions the removal of trade barriers for ICS that are manufactured in Central America.
- Coordinate with other projects of neighbor countries.

*Main actors: Government (FP), FPs in other countries, SICA, MEM
Time horizon: Intermediate*



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Overview of the roadmap

ENABLING ENVIRONMENT



ENHANCED DEMAND (VALUE CHAIN)



STRENGTHEN SUPPLY (VALUE CHAIN)



Each category of intervention options reinforce at the same time the Cookstove Value Chain (Supply / Demand) and the components of the Enabling Environment framework. Bigger size of the left pictograms indicates the dominant pillar(s) of each category.

Setting the institutional and knowledge basis

2020

Establish the institutional basis

Systematize and promote knowledge and opportunities

Enhance demand and strengthen supply

2020

Create country wide awareness on HAP and cookstoves

Establish certification, guarantee, training, operation & maintenance

Integrated projects for poorer

Encourage multi-fuel and multi-technology uses

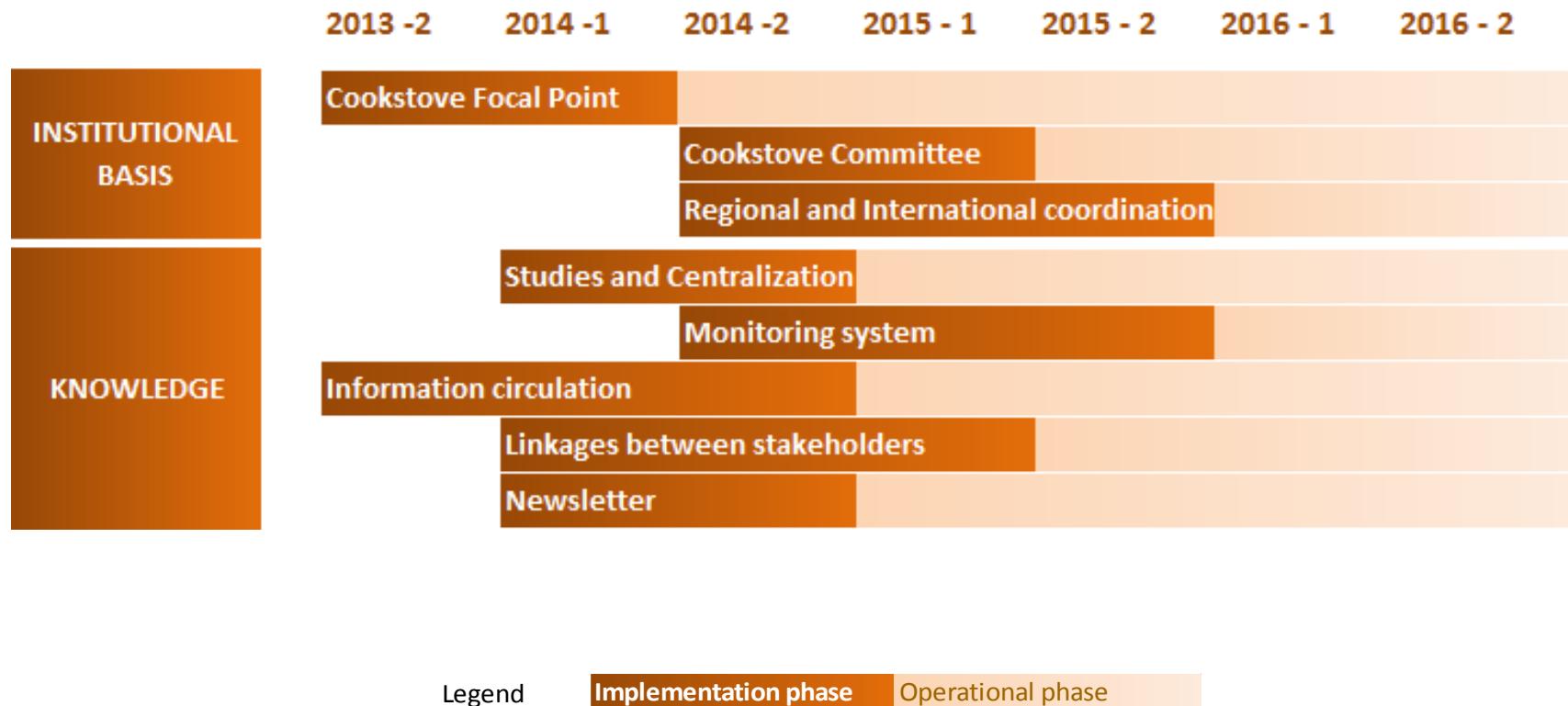
Transversal consolidation of funding

2020

Consumer and supplier financing

Setting the institutional and knowledge basis

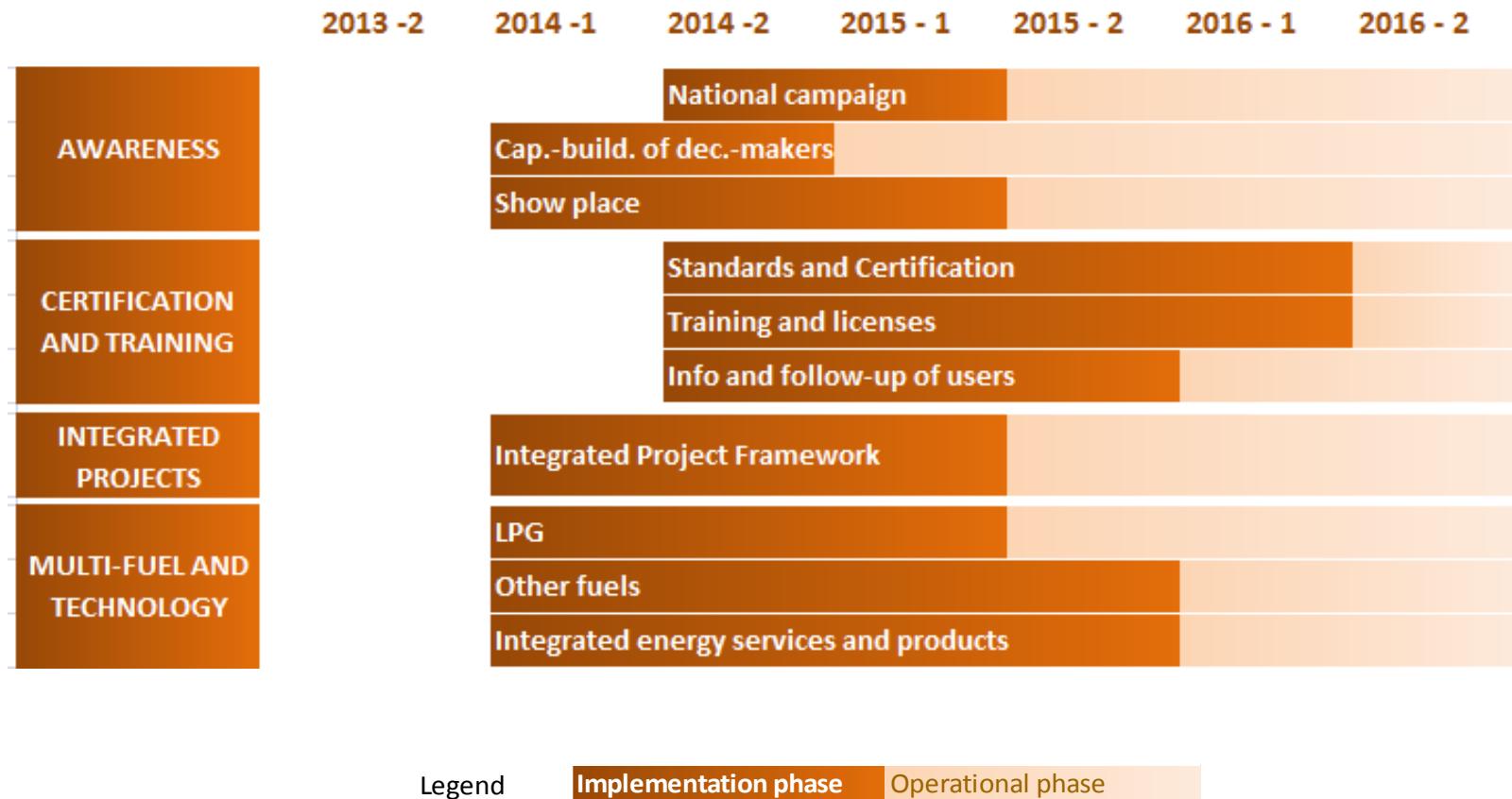
The institutional basis is the starting point. Once the first regulations are approved (establishment of the Focal Point and the National Committee), activities related to knowledge systematization can start, and other activities will follow.



Enhance demand and strengthen supply

The starting point for demand is the creation of a need, based on a motivation, being health and/or monetary savings. Designing and implementing an awareness campaign will take time, as well as its launch.

LPG promotion could start very quickly since it is already a fully commercial activity. The deeper understanding of the strategies based on integrated projects and sales of ICS is a parallel endeavor.



Transversal consolidation of funding

Adapted financial support may be needed for the purchase by the poorer segments, taking into account the characteristics of households living from the informal economy. The use of carbon finance opportunities, including not only CDM but also NAMAs and forestry, deserve attention at country level. Customer financing through corporate social responsibility is fairly easy. A new scheme for MFI will be more difficult, but opens excellent possibilities of development, supported ideally by a guarantee fund.





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Acronyms (1/3)

ACOFOP	Asociación De Comunidades Forestales (Forest Community Association)	CO	Carbon Monoxide (monóxido de carbono)
AECID	Agencia Española de Cooperación Internacional para el Desarrollo (Spanish Agency for International Development Cooperation)	CO2	Carbon dioxide (dioxido de carbono)
AIN	<i>Asociación de la Iglesia Noruega</i>	CONFECOOP	Confederación de Cooperativas de Guatemala. (Guatemalan Cooperative Confederation)
AMI		CRECER	Chronic Respiratory Effects of Early Childhood Exposure to Respirable Particulate Matter
ARCAS		CSR/RSC	Corporate Social Responsibility (Responsabilidad Social Corporativa)
AusAID		DICOR	Desarrollo Integral de Comunidades Rurales (Integrated Development of Rural Communities)
AVAD/DALY	Años de vida ajustados por discapacidad (Disability-adjusted life years)	DPI	Documento Personal de Identidad (Personal Identity Document)
BOE/BEP	Barrels of oil equivalent (bariles equivalentes de petróleo)	EC/CE	Elemental Carbon (Carbono elemental)
BC/CN	Black Carbon (carbono negro)	EDI/IDE	Energy Development Index (índice de desarrollo energético)
BUN-CA	Biomass Users Network of Central America	ENCOVI	Encuesta Nacional de Condiciones de Vida (National Survey of Living Conditions)
CABI	Central American Business Intelligence	ESMAP-WB	Energy Sector Management Assistance Program-World Bank (Programa de Asistencia a la Gestión del Sector de la Energía del Banco Mundial)
CCT	Controlling Boiling Test (Prueba de Ebullición Controlada)	FE/EF	Factor de Emisión (Emission factor)
CDM/MDL	Clean Development Mechanism (Mecanismo de Desarrollo Limpio)	FIS	Fondo de Inversión Social (Social Investment Fund)
CEDEC	Centro de Estudios Para el Desarrollo y la Cooperación (Centre for Development Studies and Cooperation)	FONAPAZ	Fondo Nacional para la Paz (National Fund for Peace)
CEPAL/ECLAC	Comisión Económica para América Latina y el Caribe (Economic Commission for Latin America and the Caribbean)	FODIGUA	Fondo para el Desarrollo Indígena de Guatemala (Fund for Indigenous Development in Guatemala)
CEPALSTAT	Base de datos de estadísticas e indicadores sociales, económicos y medio ambientales	FP/PF	Focal point (Punto focal)
ESMAP	Energy Management Assistance Program	GDP/PIB	Gross Domestic Product (Producto Interno Bruto)
CIA	Central Intelligence Agency	GHG/GEI	Greenhouse gas (Gas de efecto invernadero)
CIFGUA	Cifras del Sistema Estadístico Forestal de Guatemala (proyecto)	LPG/ GLP	Liquefied Petrol Gas (Gas licuado de petróleo)
CNEE	Comisión Nacional de la Energía Eléctrica (National Commission of Electric Energy)	HAP/CAH	Household Air Pollution (Contaminación del Aire en los Hogares)
		HIV/AIDS	Human immunodeficiency virus infection/acquired immunodeficiency syndrome
		HIVOS	Human Institute for Cooperation (Dutch)
		IADB/BID	Inter American Development Bank (Banco Interamericano de Desarrollo)

Acronyms (2/3)

IARNA-URL	Instituto de Agricultura, Recursos Naturales y Ambiente - Universidad Rafael Landívar (Institute of Agriculture, Natural Resources and Environment - University Rafael Landivar)	MW	Megawatt
ICS/EM	Improved CookStoves (Estufas Mejoradas)	MWh	Megawatt-hour
INSIVUMEH	Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología (National Institute of Seismology, Volcanology, Meteorology and Hydrology)	NAMAs	Nationally Appropriate Mitigation Actions (Acciones Nacionales de Mitigación Apropriadas)
INAB	Instituto Nacional de Bosques (National Forestry Institute)	Nb/No	Number (numero)
INTECAP	Instituto Técnico de Capacitación y Productividad (Technical Institute for Training and Productivity)	NGO/ONG	Non-Governmental Organizations (Asociación no Gubernamental)
IUCN/UICN	International Union for Conservation of Nature (Unión Internacional para la Conservación de la Naturaleza)	NIT	Número de Identificación Tributaria (Fiscal identity number)
kg	kilogram	NOx	Nitrogen Oxides (Óxidos de Nitrógeno)
KPT	Kitchen Performance Test	OECD/OCDE	Organisation for Economic Co-operation and Development (Organización para la Cooperación y el Desarrollo Económicos)
kt	kiloton (kilotonelada)	OLADE	Organización Latinoamericana de Energía (Latin America Energy Organization)
kt/yr	kiloton/year (kilotonelada per año)	OC/COr	Organic carbon (carbono orgánico)
Lbs.	Pounds (libras)	OM/MO	Organic Mattet (materia organica)
LIDER Party	Partido Libertad Democrática Renovada (Renovated Democratic Freedom Party)	PIEE	Plan Integral de Eficiencia Energética (Integral Energy Efficiency Plan)
MAGA	Ministerio de Agricultura y Ganadería (Ministry of Agriculture)	PM	Particulate Matter (Partículas)
MARN	Ministerio de Ambiente y Recursos Naturales (Ministry of Environment)	PM 2.5	Particulate Matter 2.5 (Partículas 2.5)
MCC/CME	Multisector Cookstove Committee (Comité Multisectorial de Estufas)	PM 10	Particulate Matter 10 (Partículas 10)
MDG/MDM	Millennium Development Goals (Metas de Desarrollo del Milenio)	PoA	Programme of Activities
MEM	Ministerio de Energía y Minas (Ministry of Energy and Mines) (Ministry of Energy and Mines)	PPP/APP	Public Private Partnership (Alianza Publico-Privada)
MFI/IMF	Micro Finance Institutions (Instituciones Micro Financieras)	PREPCA	Programa Regional de Energía y Pobreza en Centro América (Regional Energy Programme and Poverty in Central America)
MIDES	Ministerio de Desarrollo (Ministry of Development)	ProRural	Programa Nacional de Desarrollo Rural (National Rural Development Programme)
MINECO	Minsterio de Economía (Ministry of Economy)	Q.	Quetzal
MSPAS	Ministerio de Salud Pública y Asistencia Social (Ministry of Health)	REDD+	Reducing emissions from deforestation and forest degradation (Reducción de Emisiones de la deforestación y la degradación de bosques)
		RESPIRE	Randomized exposure study of pollution indoors and respiratory effects
		SEDAC	SocioEconomic Data and Applications Center

Acronyms (3/3)

SEGEPLAN	Secretaría de Planificación y Programación de la Presidencia - Gobierno de Guatemala (Secretariat of Planning and Programming of the Presidency - Government of Guatemala)
SEPREM	Secretaría Presidencial de la Mujer (Presidential Secretariat for Women)
SICA	Sistema de la Integración Centroamericana (Central American Integration System)
SIECA	Secretaria de Integración Comercial de Centramérica (Central American Secretariat of Economic Integration)
SIFGUA	Sistema Estadístico Forestal Nacional de Guatemala (Statistical National Forest System Guatemala)
SO ₂	Sulfur Dioxide (Dióxido de Azufre)
SREP	Scaling-Up Renewable Energy Program in Low Income Countries
tCO ₂ e	Ton of CO ₂ equivalent (tonelada de CO ₂ equivalente)
TSP	Total Suspended Particles (Partículas Totales en Suspensión)
ug / m ³	microgram per cubic meter
UN/NNUU	United Nations (Naciones Unidas)
UNCTAD/CNUCD	United Nations Conference on Trade and Development (Conferencia de las Naciones Unidas sobre Comercio y Desarrollo)
UNDP/PNUD	United Nations Development Programme (Programa de las Naciones Unidas para el Desarrollo)
UNEP/PNUMA	United Nations Environment Programme (Programa de Naciones Unidas para el Medio Ambiente)
UNFCCC/CMNUCC	United Nations Framework Convention on Climate Change (Convención Marco de las Naciones Unidas sobre el Cambio Climático)
URL	Universidad Rafael Landívar
USAID	U.S. Agency for International Development
USD	US Dollar
VOCs/COV	Volatile Organic Compounds (Compuestos orgánicos volátiles)
WBT	Water Boiling Test (Prueba de Ebullición de Agua)
WHO/OMS	World Health Organization (Organización Mundial de la Salud)