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Global Alliance for Clean Cookstoves

Vietnam Market Assessment

Intervention Options

Accenture Development Partnerships

April 2012

Introduction

- This Market Assessment was conducted by Accenture Development Partnerships (ADP), the not-for-profit arm of the global management consultancy, Accenture, on behalf of the Global Alliance for Clean Cookstoves (the Alliance).
- It is intended to provide a high level snapshot of the sector that can then be used in conjunction with a number of research papers, consumer surveys and other sources (most published on the Alliance's website) to enhance sector market understanding and help the Alliance decide which countries and regions to prioritize.
- It is one of sixteen such assessments completed by the Alliance to:
 - Enhance sector market intelligence and knowledge.; and
 - Contribute to a process leading to the Alliance deciding which regions/countries it will prioritize.
- Full slate of market assessments include studies in: Bangladesh, Brazil, Colombia, East Timor, Ethiopia, Ghana, Indonesia, Kenya, Mexico, Nigeria, Peru, Rwanda, South Africa, Tanzania, Uganda and Vietnam.
- 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.
- In each Alliance study a combination of ADP and local consultants spent 4-6 weeks in country conducting a combination of primary (in-depth interviews) and secondary research. They used the same Market Assessment 'Toolkit' for each country so that comparisons can be made. The Toolkit is available free of charge to all organizations wishing to use it in other countries.
- **The Alliance wishes to acknowledge the generous support of the following donors for the market assessments: Barr Foundation, Dow Corning Corporation, Shell Corporation, Shell Foundation, and the governments of Canada, Finland, and Spain.**

This market assessment was produced by Accenture Development Partnerships (ADP) on behalf of the Alliance. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of the Global Alliance for Clean Cookstoves or its partners. The Alliance does not guarantee the accuracy of the data.

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Sector Mapping Summary (1/2)

Executive Summary

Vietnam is well on its way to becoming a middle-income country by 2020, having made incredible economic strides across the board in the past decades. GDP increases of 18% per year have sustained until recently due to progressive economic opening and modernization, and Vietnam is expected to meet most of the MDGs prior to 2015, including those around relative gender equality. Despite these significant gains, 46.4% of people still rely on solid fuel for cooking, causing 10,600 deaths per year.

Despite this ongoing issue, there has not been much interest in the funding of end-to-end, full-scale ICS programs by either the Government or NGOs. Most programs are small in scale (under 1000 cookstoves, sometimes as low as 40) and focus on demonstration and design. Two examples of large scale projects do exist, with the influential rural distribution organization, Vietnam Women's Union, having distributed 29,300 cookstoves in the North, and SNV's Biogas program having the goal of installing 140,000 biogas digesters from 2003-2012.

Smaller cookstove components have been integrated into the broader renewable energy, deforestation, food security/cropland salinization programs. This has led to many cookstove researchers being involved in biomass energy production, biochar production, or sustainable forest initiatives. With a relatively undeveloped private sector, this locally-relevant innovation finds it difficult to make the leap to market-based solutions in the consumer market.

In general, the challenge in creating a self-sustaining market in Vietnam lies around effectively managing a highly fragmented and adolescent industry sector. It is somewhat difficult to find improved cookstove manufacturers, marketers, and service providers to produce, sell, and service the cookstoves. That being said, there is little issue with distributing to the last mile in Vietnam, other than cost, with the Women's Union having reached many locations, and the government and local and international NGOs continuing to provide support.

Sector Mapping Summary (2/2)

Executive Summary

	Findings
<i>Social and Environmental Impact</i>	Solid fuel usage and the associated health impact in Vietnam is highly dependant on income (above \$50/mth, people use LPG) and location (rural more than urban). That being said, people generally do not spend a high portion of their income on fuel, and can largely afford a cookstove purchase as required. Recent local innovations in cookstoves are therefore working to additionally address supplemental environmental concerns such as food security, deforestation, and emissions.
<i>Consumers</i>	The segment most in need of ICS are the highly inaccessible and largely ethnic groups in the North. However, this segment is expensive to reach, relatively small and shrinking every day. The true challenge is to reach the highly demanding 9 million rural households and farmers that are leapfrogging to new living standards. These consumers need cookstoves to be functional, affordable, and aspirational products that they are as proud to own as their new satellite TV.
<i>Cookstove Industry</i>	With no standards or leading cookstove organizations, the value chain is highly fragmented. Multiple design innovations in portable biochar cookstoves have linked with government institutions and NGOs for conducting distribution pilots and are largely able to reach to the last mile. However, there is a gap in the private sector market, where there are no identified factories producing at scale, private marketing efforts, integrated maintenance programs, or ICS suppliers known to have made a sustainable profit.
<i>Carbon Financing</i>	Most carbon financing is industrial in Vietnam, with no cookstove programs. However, several relevant projects involving biogas and biomass are in the process or have been registered with the CDM, and there are experienced organizations operating in Vietnam. The future will have to rely on the voluntary market.

Intervention Options Summary

Executive Summary

The relatively high number of people affected by IAP along with innovative cookstove designs and the desire for action makes Vietnam an attractive market for clean cookstoves and fuels. Vietnam's energy problems will only worsen if no action is taken. The Alliance can contribute by fostering an enabling environment, enhancing demand, and strengthening supply.

Nine opportunities to create an enabling environment for the Vietnamese cookstove sector were identified. As in most countries, there is a need for a stronger testing capability and cookstove standards. Regional knowledge gaps, as well as those around health and IAP must be overcome in order to design the most effective programs and gain agreement across the fragmented industry sector. Additionally, programs will only be seen as effective if they are designed with a strong longitudinal monitoring and evaluation component moving forward.

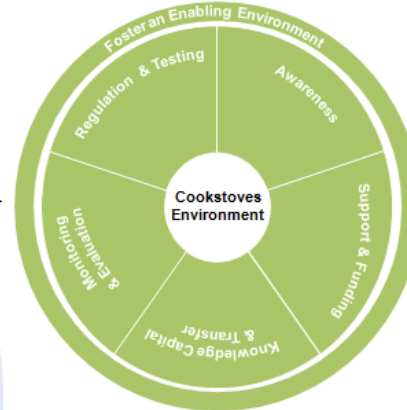
An additional nine recommendations have been identified to strengthen supply and enhance demand. There is a recommendation for some more research around effective pellets/briquettes for improved fuel, but the main needs currently exist in production, sales & marketing, and repair and replacement. Some production efforts exist, and the interventions focus on helping those efforts to be identified, scaled, and made more efficient. The sales interventions focus on taking the knowledge gained from the research interventions to better direct targeted sales efforts with a tailored message in specific regions with demonstrated need and a high likelihood of success. In order to ensure the longevity of these interventions, it is also suggested to incorporate a repair and replacement after-sales service component to interventions.

Executive Summary

Executive Summary

As a result of the Vietnam cookstove market assessment, 9 intervention options have been identified through the sections of Fostering an Enabling Environment and 9 intervention options have been identified through the Enhancing Demand and Strengthening Supply

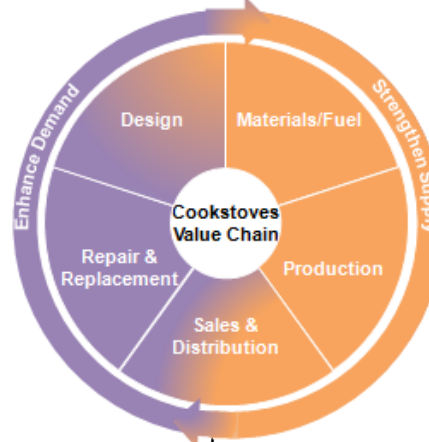
Fostering an Enabling Environment



9 Fostering an Enabling Environment Intervention Options

- Regulation and Testing (3)
- Monitor & Evaluate (3)
- Knowledge Capital Body of Research (3)

Enhancing Demand and Strengthening Supply: Cookstoves Value Chain



9 Enhancing Demand and Strengthening Supply Intervention Options

- Materials/Fuel (2)
- Production (3)
- Sales & Distribution (3)
- Repair & Replace (1)

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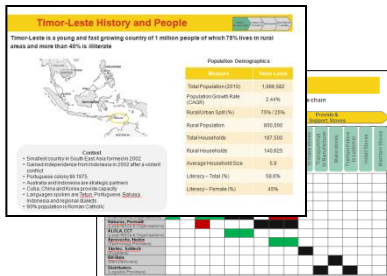
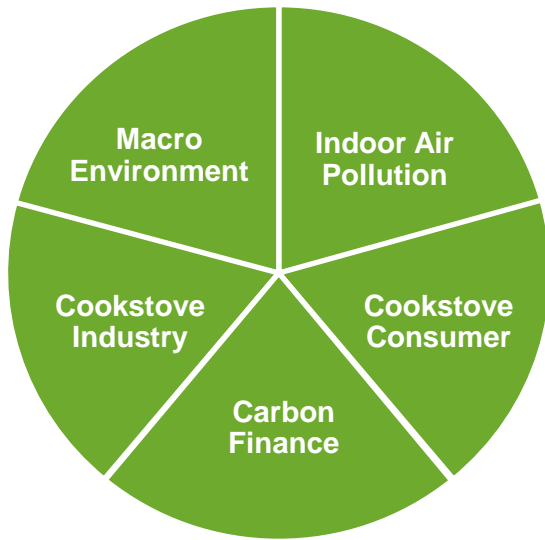
Conclusion

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Project Approach

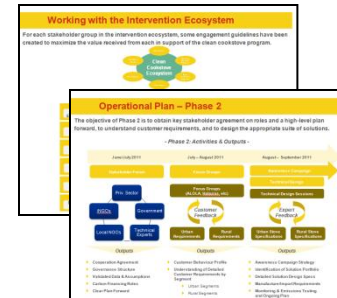
A structured approach for assessing the cookstove industry involves using sector mapping output to develop intervention options and relative roadmap.

Sector Mapping



Sector Map

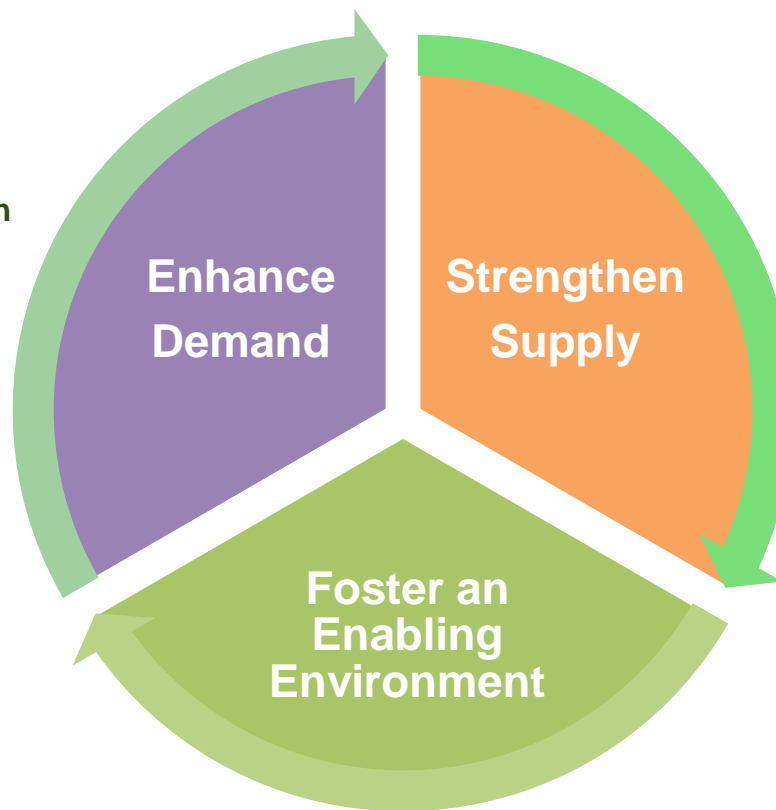
Focus of This Deliverable



Intervention Options And Relative Roadmap

A three-pronged strategy has been developed to spur the clean cookstoves market

- Understand and motivate the user as a customer
- Reach the last mile
- Finance the purchase of clean cookstoves and fuels
- Develop better cookstove technologies and a broader menu of options

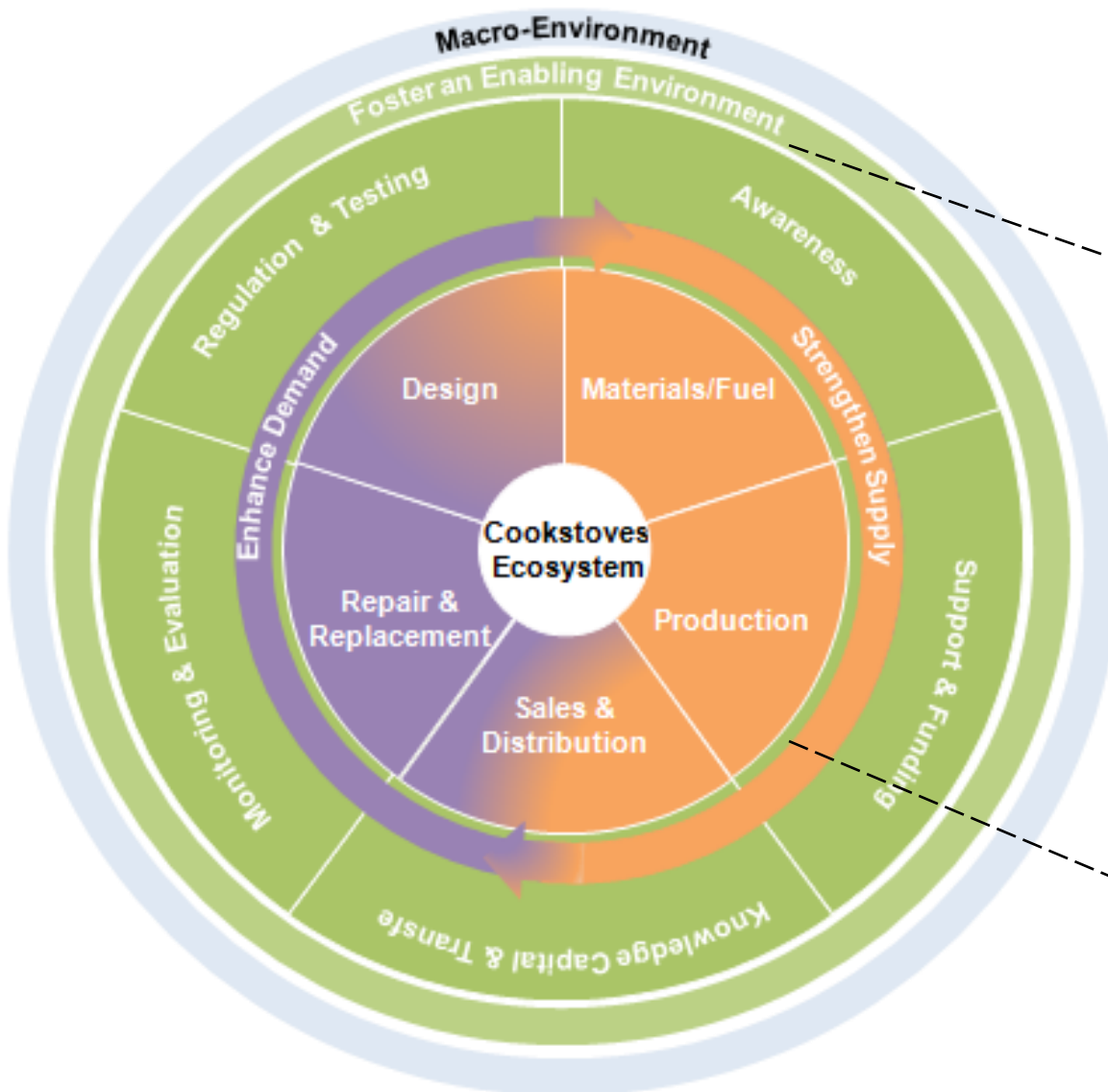


- Finance clean cookstoves and fuels at scale
- Access carbon finance
- Build an inclusive value chain for clean cookstoves and fuels
- Gather better market intelligence
- Ensure access for vulnerable populations (humanitarian)

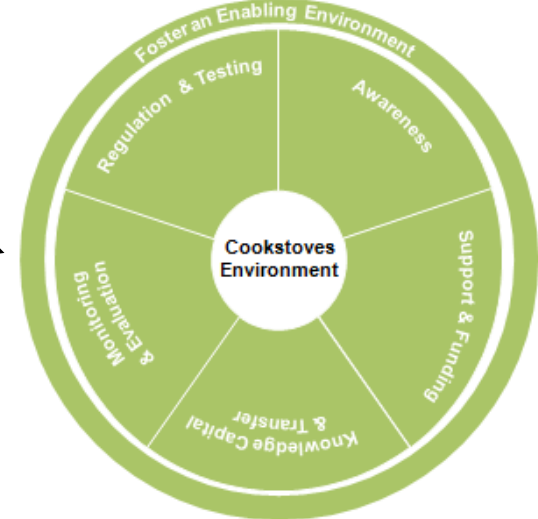
- Promote international standards and rigorous testing protocols, locally and globally
- Champion the sector to build awareness
- Further document the evidence base (health, climate, and gender)
- Engage national and local stakeholders
- Develop credible monitoring and evaluation systems

The Interventions are analyzed according to their impact to the three-pronged strategy

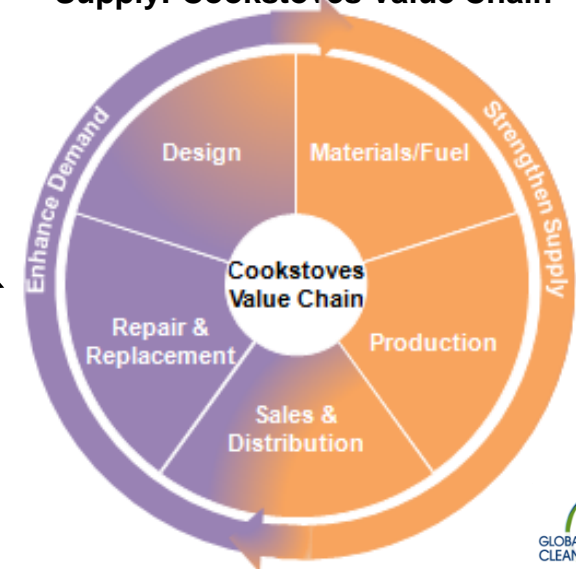
Project Approach and Background



Fostering an Enabling Environment



Enhancing Demand and Strengthening Supply: Cookstoves Value Chain



Macro-Environment: Not in Scope for Intervention Options

The Case for Action

Project Approach and Background

Vietnam is a fast developing country, but people still have a need for improved cookstoves.

What's Happening?

Although Vietnam's economy is growing rapidly, some people are still without access or cannot afford the rising cost of clean fuels

Since Vietnam is heavily dependent on agriculture (48% of labor force), climate change and loss of natural resources has the potential to have a significant impact on the economy

There is high interest in conserving energy, because in the next 10 years energy demand will increase five-fold

So What?

As costs of LPG are rising in urban areas, people have no alternative for clean cooking, and are increasingly reverting to cheaper but toxic coal cookstoves

Smoke from burning agricultural residue is polluting the environment, and could be otherwise productive as cooking fuel

Efficient cookstoves reduce the need for fuel, which can be alternatively used to generate electricity for the national grid

Why Now?

The cost of LPG is likely to keep rising, and more people will be forced to use unclean cookstoves

Organizations are working on indoor and outdoor air standards, and working towards a solution to reduce pollution from burning crop residue after harvest time

In 2011, the Law on Energy Efficiency and Conservation was enacted, which mandates wide-scale energy savings initiatives



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Fostering an Enabling Environment

Intervention Options

The market today

The story in Vietnam is one of growth, with one of the most impressive reductions in poverty across the globe over the past decade. Incomes have steadily made double-digit increases; nearly everyone has electricity access and over $\frac{3}{4}$ of the population has access to all-weather roads. Millions of people have moved toward cooking with clean fuels such as LPG simply as a result of economic development and their increased capacity to afford an improved life.

However, in the past several years, Vietnam has also suffered from inflation that has outpaced income gains in some places. Consumers who could once afford LPG as their main fuel source have started to slip back to solid fuel use, and many more who had aspired to switch to LPG have found it unattainable. That leaves 10.7 million households still impacted by indoor air pollution.

The current dedicated cookstoves efforts pale in comparison to the scale of the problem. Less than 200,000 cookstoves have been distributed in the past decade, with nearly 140,000 of those coming from SNVs Biogas Programme for the Animal Husbandry Sector alone.



Biogas System, Thai Nguyen

There is a base level awareness amongst government, NGOs and academia that cooking needs to be cleaner and more efficient. The relationship of cleaner cooking to a reduction in GHG emissions and deforestation, and thus an improvement in soil and crop quality is well-understood. The issue is being considered holistically, with cooking as a component to wider programs focusing on protecting forests and recycling crop waste more efficiently into natural fertilizers. However, funding to support these programs is expected to come internationally or from local foundations.

Fostering an Enabling Environment

There are multiple international and local NGOs and academic institutions working to design small-scale pilots for clean cookstoves, and a variety of innovative program models and cookstove designs have emerged. Everything from solar to biogas and portable biochar to fixed cookstoves have been tested, mostly in the north. However, these programs have mostly been very small and have not had funding or resources to scale up. When there is international funding to scale up, the Vietnam Women's Union has been integral in program implementation and cookstove distribution.

These government and NGO programs have added to the knowledge capital in Vietnam, particularly around consumer usage trends in the north. However, significant knowledge gaps still exist, especially relating to consumer needs in the South, as well as an understanding of gender and health impacts of cookstoves.



Portable ICS Workshop

With the exception of a few social enterprises, there has been virtually no private sector involvement in the cookstoves industry, and, as such, there lacks a vibrant market for improved cookstoves. The market is hindered by a high degree of producer fragmentation and lack of capabilities, with most cookstoves being produced in hand workshops in the outskirts of major cities. The lack of standards, testing, or enforcement of standards leaves the few improved cookstove producers without mechanisms to prove the superiority of their cookstoves to the consumer. Enforced standards are generally difficult in Vietnam, with it having taken seven years to achieve an enforced rule around motorbike helmet usage.

For their part, consumers have a strong desire to upgrade to cleaner cooking, with 61% of surveyed consumers in the North citing that their next cookstove purchase will be an LPG cookstove. However, the appeal for an improved cookstove is limited, as it does not bring the same status benefits as an LPG cookstove. Cookstoves in general are seen more as a commodity, with disposable household income tending to be prioritized toward more visible, modern branded goods, such as satellite TVs and motorbikes, before cookstoves.

Fostering an Enabling Environment

Building the market for the future

The intervention options presented with regard to fostering an enabling environment focus on three areas: Regulation & Testing, Knowledge Capital & Transfer, and Monitoring & Evaluation.

Across many Vietnamese industries, the lack of enforced quality standards remains a key barrier to market development; cookstoves are no exception. It is not often clear either how efficient the wide variety of available cookstoves are, or if the cookstoves in the marketplace are authentic. Regular standards testing with a branded, reliable quality label, reminiscent of the successful Geres program in Cambodia, would be a good place to start to improve willingness to pay and purchasing of cleaner cookstoves. Rather than shunning successful knock-off producers, they can be integrated and educated to make better standard cookstoves.

Although there have been a few regional consumer usage studies, such as SNV's study in North Vietnam, there is a noticeable gap in knowledge in gender and health knowledge with relation to cookstoves and IAP. Also, there is a dearth of consumer research in the Southern region of the country, leaving no clear path to understanding or addressing need in that area. Existing studies can be expanded upon, such as the SNV study or NIOEH's IAP

study, and new studies can be commissioned. The new studies will help to better target consumers and geographies with true need, where continued long-term benefits of the program will be able to be realized.

Programs themselves need to be designed to measure and monitor success over the long term. Best practices of programs with a strong longevity component globally can be shared through a portal, and guidelines for specific, recommended metrics for long-term benefits can be developed on the back of that best practice. Longitudinal tracking should be integrated into program design, with a component of program funding or carbon financing dedicated to long-term monitoring. Members of the community, especially Women's Union members, can be the easiest to work with to gather findings.

Foster an Enabling Environment

Intervention Options

Through gaps identified in the Enabling Environment, Intervention options will focus on Regulation & Testing, Monitoring & Evaluation, and Knowledge Capital & Transfer

Regulation & Testing

- ✗ Indoor Air Quality Standards
- ✗ Cookstove Standards
- ✗ Fuel Standards
- ✗ Standard Enforcement

Monitoring & Evaluation

- ✗ Monitoring implementations
- ✗ Tracking and Quantifying Success



Awareness

- ✓ Consumer Awareness
- ~ Stakeholder Awareness
- ✓ Government
- ✗ Private Sector

Support & Funding

- ✓ Government
- ✓ INGOs and Associations
- ✓ Local NGOs and Associations
- ✗ Private Sector
- ✓ Academics

Knowledge Capital & Transfer:

- ~ Health
- ✓ Environment
- ✗ Gender
- ✗ Consumer Research

KEY: ✓ Advanced/ Favorable ~ Has Potential/ Neutral ✗ None/ Unfavorable ■ Focus Area

Regulation and Testing

There are no regulations relevant to cookstoves, and the process for achieving regulations and national standards is lengthy and challenging.

Situation

- There is a lack of regulations and standards across all sectors, including cookstoves. The backlog is significant and risky. For example, medical degrees were just recently required for practicing medicine.
- The effort required to lobby and enact standards is lengthy. After tremendous NGO and private sector campaigning, it still took 7 years for motorbike helmets to become regulated. Even after regulations were passed, there is little enforcement of helmet manufacturing standards and enforcement of user compliance.

Rationale

- While regulations are still critical, it will not ensure people will comply with cookstove standards
- There have been knock-off products in the market so testing is essential
- The concept of quality testing is still new, and will require significant capacity development

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Create cookstove standards for Vietnam	Alliance, Gov	Low	High	7 years
2. Initiate cookstove testing centers	Alliance, Gov, Academia	High	Med	1 years
3. Create enforcement of cookstove standards	Gov	Low	High	2 years

Regulation and Testing

Intervention Options around Regulation and Testing are aimed at creating a regulatory environment that encourages cookstove producers to distribute high-quality cookstoves.

- Intervention Options-

- Actions -

- Outcomes-

1. Create cookstove standards for Vietnam

- Identify relevant government institution to create standards
- Task a research institution, either Institute of Energy or a University with creating standards adapted from global best practice
- Facilitate knowledge transfer on existing standards or hypothesis of best practice in other countries

Will be able to formalize the characteristics of high-quality cookstoves

Customers will have access to higher-quality cookstoves

2. Initiate cookstove testing centers

- Collaborate with organizations that have had experience with cookstove testing, such as Institute of Energy
- Facilitate knowledge transfer on latest equipment and processes for testing
- Provide funding to purchase or repair facilities

After being able to fairly evaluate the quality of current cookstoves, it will be possible to direct support to cookstove programs with the highest-quality product designs

Will be able to evaluate many small scale manufacturers with varying levels of quality

3. Create enforcement of cookstove standards

- Provide a quality marker, such as those used by Geres in Cambodia, to manufacturers who meet cookstove standards
- Offer “knock-off” producers to participate in ICS training to get the quality up
- Fine manufacturers and distributors for misrepresenting cookstoves as ICS

Manufacturers are encouraged to produce high quality cookstoves since they are incentivized to earn the quality marker

More high-quality and efficient cookstoves will reach the market, instead of just cookstoves that simply look improved

Knowledge Capital Body of Research

Intervention Options

There is a lack of knowledge capital across most areas of the cookstove sector, with the exception of user preferences in Northern Vietnam.

Situation

With the exception of one cookstove study about Northern Vietnam (completed by SNV), there is a vacuum of knowledge about user needs and preferences. Even supporting research on health and gender is hard to locate between the various government ministries and institutes.

Rationale

- Cannot extrapolate Northern ICS study to Central and Southern Vietnam since GDP, climate, cooking habits, culture and consumer needs are different
- Studies on health effect of cookstoves on respiratory and heart diseases are lacking
- Indoor air quality research is limited since it is a new focus

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Conduct an ICS User Study in Central and South Vietnam	Alliance, NGO	High	Medium	6 months
2. Conduct a study on the health effects of cookstoves	Alliance, Gov	Low	High	1 year
3. Support ongoing research related to enacting indoor air quality standards	Alliance, Gov	Med	High	2 years

Knowledge Capital Body of Research

Intervention Options

Comprehensive research will inform product design, encourage support from government and adoption from end users and help to inform policy decisions.

- Intervention Options-

- Actions -

- Outcomes-

1. Conduct an ICS User study in Central and South Vietnam

- Understand and improve upon best practices from the SNV ICS User Study for Northern Vietnam
- Conduct market research on user preferences of people living in Central and South Vietnam

Have baseline understanding of all regions in Vietnam, instead of incorrectly extrapolating from anecdotal data

Help to inform cookstove designs and distribution to suit unique regional needs

2. Conduct a study on the health effects of cookstoves

- Quantify health costs and savings related to traditional and improved cookstoves, especially to women and children, who are most vulnerable
- Create awareness campaign based on the results to both government and end users mimicked on the successful clean latrine program from the Ministry of Health

Ability to quantify health savings of cookstove programs, which may garner more support from government stakeholders

Have scientific basis to create messaging for awareness campaign

3. Support ongoing research related to enacting indoor air quality standards

- Collaborate on a study to evaluate the effect of cookstoves and indoor air pollution, potentially with NIOEH
- Facilitate knowledge transfer from the Alliance on enacting indoor air quality standards, including support on testing equipment

The study will give a clearer indication of where cookstove IAP is most severe, which will help focus efforts to specific provinces

External support will quicken the pace that indoor air quality standards will be enacted (currently end of 2012 or 2013), and ensure enforcement is possible with appropriate testing equipment

Monitor & Evaluate

Most programs show success during the course of the project, but have not traditionally been sustainable after funding ends.

Situation

Most programs do not yet track longevity of impacts past the funding period. There is no long-term monitoring of usage, or continued research and development based on customer feedback.

Rationale

- Organizations do not have strategies for maintaining longevity of program effects after funding ends
- Pilots were close to access roads in areas where economic growth propelled the shift to LPG
- It is not clearly understood what metrics a successful program should meet

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Share best practices of organizations that have managed longevity of program effects	Alliance, NGO	High	Low	1 year
2. Develop guideline metrics of "successful" cookstove programs	Alliance, NGO	Low	Med	1 year
3. Design programs to track longitudinal effects	NGO	Low	High	3 years

Monitor & Evaluate

Intervention Options

Globally, there is much knowledge that could benefit Vietnam cookstove programs on how to structure their programs to be able to monitor and evaluate their lasting impact.

- Intervention Options-

1. Share best practices of organizations that have managed longevity of program effects

2. Develop guideline metrics of “successful” cookstove programs

3. Design programs to track longitudinal effects

- Actions -

- Compile a case study of global sustainable cookstove programs and their best practice for setting up programs with good baseline, monitoring components, and post-program analysis
- Host an online seminar and post the seminar materials online

- Institute a working group to develop a set of guidelines defining key aspects of successful cookstove programs globally, and how it can be relevant for Vietnam
- Encourage organizations to report metrics to a central database

- Raise supplemental funding to track continued usage of cookstoves
- Encourage organizations to plan for longitudinal tracking and training in their program design
- Encourage key women to serve as information collectors

- Outcomes-

Organizations will understand how to structure their cookstove programs to have longevity of effects from the on-set

Consumers will have access to improved cookstoves after the organization funding runs out

Implementers will understand when to refocus efforts if a region improves economically and can afford LPG or electricity

Provide organizations clearer goals to work towards

Ability to compare “success” across programs

Ability to understand the long-term benefits of ICS

Continued interaction with the community will increase likelihood of using the cookstoves

Key women can gather local intelligence to make reporting more consolidated

Enhance Demand and Strengthen Supply: Cookstoves Value Chain

Intervention Options

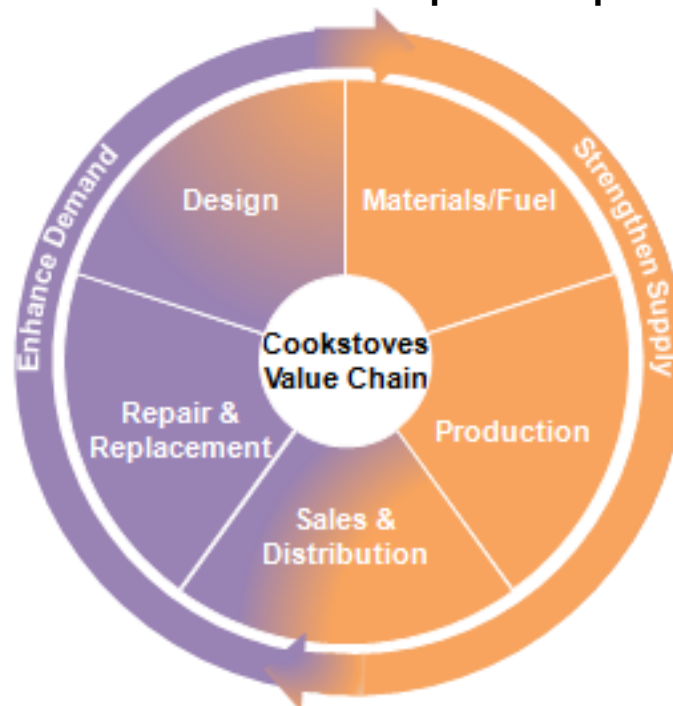
Through gaps identified in the Cookstoves Value Chain, Intervention options will focus on **Materials/Fuel, Production, Sales & Distribution and Repair & Replacement**

Design

- ✓ cookstove Type
 - ✓ Fixed
 - ~ Portable
 - ✓ Biogas Digester
 - ~ Solar
- ✓ R&D
 - ~ Private
 - ✓ Gov't/Academics

Repair & Replacement

- ✗ Supply of Repair Skills and Parts
- ✗ Post-sales Service



Materials/Fuel

- ✓ cookstove Raw Material
- ✓ Supply
- ✗ cookstove Raw Materials Cost
- Fuel
 - ✗ value Chain
 - ✓ Biomass
 - ✗ Clean Coal
 - ✗ Solar/Biogas
 - Petro based

Production

- ✗ Scalability
 - ~ Handmade
 - ~ Masons
 - ✗ Factory
- ✗ Producer Fragmentation
- ✗ Producer Financing
 - ~ Access to Capital

Sales & Distribution

- ~ Financing Purchasing (micro-credit)
- ✗ Carbon Financing
- ~ Customer Segmentation
- ✓ Last Mile Distribution
- ~ Reach Vulnerable Populations

KEY: ✓ Advanced/ Favorable ~ Has Potential/ Neutral ✗ None/ Unfavorable ■ Focus Area

Sales & distribution

Last-mile distribution capabilities are very strong in Vietnam, with the Vietnam Women's Union having a presence in nearly every village. While the Women's Union has provided distribution for several cookstove programs in the past, there is significant capacity still going unused. In addition to the Women's Union, several NGOs and social enterprises (such as Xanh Shop), have a wealth of experience in rural development and implementation. Any program could leverage these existing distribution channels, but privatized distribution of improved cookstoves has not yet happened in a market-based way.

Affordability is not the biggest concern in Vietnam, where a cookstove purchase is within the monthly saving target for all but the poorest of families. For the very poor and poor women, there are two micro financing schemes available in most provinces that make credit available for household improvements.

As cookstoves are affordable and able to be distributed to needy populations, the biggest hurdle is finding companies willing to sell and market the cookstoves, thus creating demand and spurring a viable clean cookstove market. Right now, no such market exists, with clean cookstoves failing to compete with the allure of many other consumer products and appliances.

Due to the lack of customer information, target customers have not been identified or segmented. Therefore, the cookstove that best meets their needs is unknown to the consumer, and unavailable for purchase. There are no large-scale active campaigns to such consumers, leaving consumers with a higher propensity to spend their disposable income on other household purchases.

Repair & Replacement

Existing programs have not included funding for follow-up or for supporting longer-term repair and replacement facilities. There is nowhere to turn once an installed cookstove breaks, as no project infrastructure remains and, in the case of fixed cookstoves, masons move on to other post-project work. Projects have also not traditionally included training on servicing, repair, or replacement of cookstoves. When the cookstove does break, families do not know what to do with it. Thus, they go back to their previous cookstove or purchase a market-available traditional cookstove.

Due to the lack of scaled programs in Vietnam and the loss of LDC status in 2012, carbon financing is challenging to use for cookstoves. The lack of a market makes additionality even further difficult to prove.

Materials & Fuel

Fuel usage differs in rural and urban areas, with solid fuel in urban areas being dominated by beehive coal, and solid fuel in rural areas being dominated by a mixture of wood and crop residue. A minority of animal husbandry farmers also use biogas.

There has been an increase in innovation toward cleaner fuels in both rural and urban areas. There are several options for clean briquettes to replace coal, but they are currently just beyond the research phase, and are much more expensive than regular coal. Improved wood cookstove research has also branched off into several types of biochar improved cookstoves and gasifiers, which take crop residue and wood and create fertilizer as well as a cooking fire. Still, there is no solution for the vast majority of crop residue that is being openly burned after harvest.

Though there is a clear desire to switch to LPG among consumers, the rapid price inflation of LPG has made it unattainable for many. Though the government has made recent efforts to reduce LPG price by removing the 5% import tax, many city dwellers have moved back to coal cookstoves to save money. This creates a household hazard, as coal releases toxic gases when burned indoors.

Production

Production of portable cookstoves is occurring largely in hand workshops, but, due to the lack of a market for improved cookstoves, there are very few dedicated improved cookstove producers.

A couple ICS producers have shown business model sustainability, such as CRD/TXT and Solar Serve, but have been unable to scale up their program or industrialize through the purchase of factory equipment.

A major barrier to scaling up is reasonably affordable funding. Though there are several important microfinance programs targeted at poor residences, there is no known program to provide favorable lending terms to small, social impact businesses looking to scale up.

Even if funding were available either through a 'patient' investor or microloan, there is still a lack of human capital capability, especially among existing cookstove producers, to be able and willing to run a larger-scale cookstoves factory.

Supply and demand enhancement

Improved cookstoves will be more viable if there are more options in the marketplace for both fuel and cookstoves.

Further innovation can be undertaken to reduce price of clean coal so that it can replace dirty coal in urban areas, reducing immediate deaths from toxic gases. Existing small-scale pilots of energy pellet production (such as that at HCMUT) can be scaled up to an industrial level, alleviating crop residue GHG emissions issues. These energy pellets can be used in some newly developed improved cookstoves.

Production of cookstoves also needs to be scaled up so that there are cookstoves in which to burn this clean fuel. Several existing ICS businesses could use a little push through affordable micro financing and lending in order to industrialize. Additionally, new producers need to be encouraged to come to the market and traditional cookstove producers need to be given capabilities to produce cleaner cookstoves. Producers need to gain capabilities not only for producing cleaner cookstoves, but also on how to run much larger business operation with greater scale and efficiency.

Demand for improved cookstoves needs to be created

among the segments that most need the cookstoves. Once more knowledge is gathered on consumer needs and segments, communities with the greatest anticipated long-term need for improved cookstoves can be targeted more specifically. These communities might not be near easily-accessible roads or close to NGO headquarters, as was often the case before, but might also include areas anywhere from the Central Highlands to the Mekong Delta. The specific cookstove design(s) optimal for the target community also need to be identified.

Program implementers (NGOs, government, or private businesses) that are best suited to address the target communities need to be identified and express interest. These implementers then need to focusing on a targeted marketing campaign, addressing the specific buyer values and needs of the community. Successful campaigns will target women and their needs, and will employ a healthy dose of word-of-mouth, a method more successful in Vietnam.

Programs should also be designed to include components of repair and replacement, with a follow-up check at least 6 months after project completion. Members of the community to monitor repair needs should be identified early, and repair training should be integrated into all programs.

Vietnam is abundant in natural and imported resources, but it needs additional support to produce cleaner fuel from agricultural residue and coal.

Situation

Vietnam has sufficient natural resources and access to imports, so raw materials for producing cookstoves is not a problem. But fuel supplies need effort: agricultural residue is not being used productively as cooking fuel, and existing coal briquettes are toxic. The rising high cost of LPG is forcing households to turn back to unclean cooking.

Rationale

- Vietnam is caught between its aspiration for LPG and the reality of needing cheaper clean cooking fuels
- There is insufficient focus on scaling up agricultural residue pellets and cleaner coal briquettes

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Industrialize supply chain of pellets made from crop residue	Private Sector, Academia	High	High	3 years
2. Lower the cost of clean coal briquettes	Private Sector, Academia	Med	High	2 years



By scaling up production of agricultural residue pellets and clean coal briquettes, there will be alternative options to the rising cost of LPG.

- Intervention Options-

- Actions -

- Outcomes-

1. Industrialize supply chain of pellets made from agricultural residue

- Design large scale supply chain to collect agricultural residue from farmers, and return pellets back to them
- Work with existing pellet manufacturers to scale up production (i.e. HCMUT)
- Collaborate with industrial buyers, such as factories, rice mills and brick kilns

Agricultural residue will no longer be burned without purpose, reducing smoke pollution at the end of each harvest time

Farmers can receive very low-cost efficient fuel, since they supply the agricultural waste to make the pellets

Industrial buyers can purchase fuel more cheaply and contribute to reducing climate change

2. Lower the cost of clean coal briquettes

- Work with technical experts (i.e. from Japan) to develop lower cost methods to produce clean coal
- Conduct emissions tests on existing clean coal production through the newly initiated testing centers (refer to Testing Initiatives)

Replace existing beehive cookstove coal briquettes, which are toxic

Competitive pricing will encourage people to make the switch to clean coal

Understand if current coal production is indeed clean, or if additional technology transfer is required

Minimize disruptions to customer cooking habits by making clean coal briquettes similar in look and use to traditional briquettes



Coal briquettes are discarded after use and contribute to litter

Vietnam is lacking in large-scale production, due to difficulty in accessing capital for scale up and lack of qualified human capital.

Situation

Manufacturing is highly fragmented across small scale producers, with little ability to scale up. Commercial funding is relatively difficult to receive because it requires documentation that small scale producers do not possess. Human capacity to run large-scale production is also limited.

Rationale

- Social enterprises are not recognized by the government, and private enterprises are still largely in infancy under the socialist government
- Small business loans are available for buying pigs or making rice paper, but much harder for building factories
- There is lack of managerial skills among human capital

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Scale up cookstove projects that have shown sustainability	Alliance, Private Sector	Med	Large	1 year
2. Work with financiers to create favorable loan terms for social enterprises	Alliance, Private Sector	Low	Large	2 years
3. Develop commercial leaders who are capable of running large-scale production	NGO, Private Sector	Med	Large	5 years

Production (1/2)

Scale-up support is essential to reach a larger population. Improving access to commercial loans will encourage organizations to move towards factory production.

- Intervention Options-

1. Scale up cookstove projects that have shown sustainability

2. Work with financiers to create favorable loan terms for social enterprises

- Actions -

- Identify cookstove programs (i.e. GRET/CRD/TXT and Solar Serve) who have been able to be sustainable without consistent external funding
- Work to identify barriers to scalability, likely funding, but perhaps also skills
- Develop an implementation plan to scale up including securing funding and building skills (below initiatives)

- Identify potential partners who have micro financing (TYM, Agribank, Social Policy Bank) to develop a commercial loan program at attractive rates more aligned with 'patient investor' principles
- Provide administrative support to cookstove manufacturers to secure commercial loans

- Outcomes-

Share sustainable business models with other cookstove programs

Reduce barriers to scaling up to provide benefits to a larger population

Create additional jobs and work during the scale-up

Small manufacturers will have access to capital to expand their production

Successful cookstove programs will be able to reach more households

Shift from hand-made to factory production will ensure lower cost and consistent quality

Production (2/2)

Scale-up support is essential to reach a larger population. Improving access to commercial loans will encourage organizations to move towards factory production.

- Intervention Options-

3. Develop commercial leaders who are capable of running large-scale production

- Actions -

- Learn from business training programs, such as International Management Institute of Vietnam
- Develop pipeline of high-potential business leaders to run cookstove factories
- Provide business capability training, perhaps through an organization focusing on supporting social enterprises such as CISP
- Focus on woman entrepreneurs

- Outcomes-

Build human capacity and develop skills needed to run large-scale cookstoves production

Ensure there are succession plans through developing a pipeline of leaders

Women are more receptive to user design feedback and attention to detail

Once appropriate cookstove designs are completed, Vietnam has strong existing sales and distribution channels which can be utilized.

Situation

Once customer-centric cookstove designs are produced, there are several distribution networks that can be utilized (i.e. Women's Union, MARD National Extension Centers, Xanh Shop, SNV, etc.) A market-based system is possible since most customers can afford to pay cash for cookstoves, with the exception of biodigestors.

Rationale

- As a socialist society, the government (MARD, MOH) and organizations with a long history of government cooperation (Women's Union) have strong reach into rural areas
- SNV has networks of masons who are building biodigestors
- Xanh Shop has reach into rural communities through its food program

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Determine which target regions will serve as market-based pilots	Alliance Gov, NGO	High	Med	6 months
2. Determine which organizations and specific promoters have the best reach within target regions	Gov, NGO	High	Med	6 months
3. Create marketing campaign to establish branding and generate awareness	Gov, NGO	Med	Med	2 years

Sales & Distribution (1/2)

Choosing the right sales and distribution partners will be critical for the success of the cookstoves program. Incentives must align to program goals.

- Intervention Options-

- Actions -

- Outcomes-

1. Determine which target regions will serve as pilots for market-based cookstove solutions

- Review consumer user studies to understand where there is the greatest need for cookstove interventions, hypothesis being the Northern Highlands, Central Highlands, and Mekong Delta
- Target regions that can afford cookstoves with little to no subsidies
- Avoid working in areas that will shortly switch to LPG due to economic growth, such as those on a main road

Choosing the right pilot regions is critical for buy-in and key to future support

Realistic pricing will encourage a market solution

Choose regions that have potential for longitudinal effects, which will not occur if they quickly switch to LPG

2. Determine which organizations and specific promoters have the best reach within target regions

- Hold introductory meetings with National Extension Center, Women's Union, local NGOs to find female community promoters and female run businesses in the target region, focusing on women as community promoters for cookstoves, as many rural distribution programs do (e.g., Unilever in India, Xhanshop for nutrition)
- Create incentive commission structure that motivates the promoter to encourage wide-scale adoption

Work with the strongest and more credible woman partner in each region to improve rates of adoption

Choose woman promoters who are intrinsically motivated to improve their community, which will improve sustainability of program

Sales & Distribution (2/2)

Choosing the right sales and distribution partners will be critical for the success of the cookstoves program. Incentives must align to program goals.

- Intervention Options-

3. Create marketing campaign to establish branding and generate awareness

- Actions -

- Create a brand around the 'high standard' cookstoves, and generate awareness around benefits and quality
- Understand which channels have the best reach within target communities
- Focus on word-of-mouth marketing, which is key in Vietnam culture

- Outcomes-

Branding will create market-based competition

Benefits of ICS need to be instilled before people will purchase

Women want to see other women using it first, before they buy

Repair & Replace

Repair and replacement strategies were not common in previous cookstove program designs, and therefore people stopped using cookstoves when they broke.

Situation

Past cookstoves programs did not instill longevity of the program, and therefore consumers were unable to repair or obtain replacement cookstoves once the organization's cookstove distribution ended.

Rationale

- Many cookstoves were distributed with large subsidies or given for free, which is not sustainable
- Without a market-based system, there is no incentive for local trained manufacturers to continue production or provide after-sales service

Intervention Options

	Involved Parties	Likelihood of Success	Budget	Estimated Time
1. Encourage cookstove implementers to incorporate after-sales service and repair into their business model	Private Sector	Med	Med	3 years



Repair & Replace

Intervention Options

Support for repair and replacement of cookstoves will maintain local jobs long after the cookstove program ends.

- Intervention Options-

1. Encourage cookstove implementers to incorporate after-sales service and repair into their business model

- Actions -

- Share global best practices of other programs which have incorporated sustainable repair and replacement (i.e. in Mexico a team of husbands built the cookstoves so they can repair and rebuild)
- Educate communities about the need for cookstove maintenance at the time of purchase
- Build into programs to have the rural implementer, often an organization like the Women's Union, return 6 months post program for in-community maintenance refresher awareness

- Outcomes-

Communities will have access to cookstoves for more than the 2-4 years (average life span of portable cookstoves)

Local masons will be empowered to continue production and have continued market demand from the community

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Roadmap

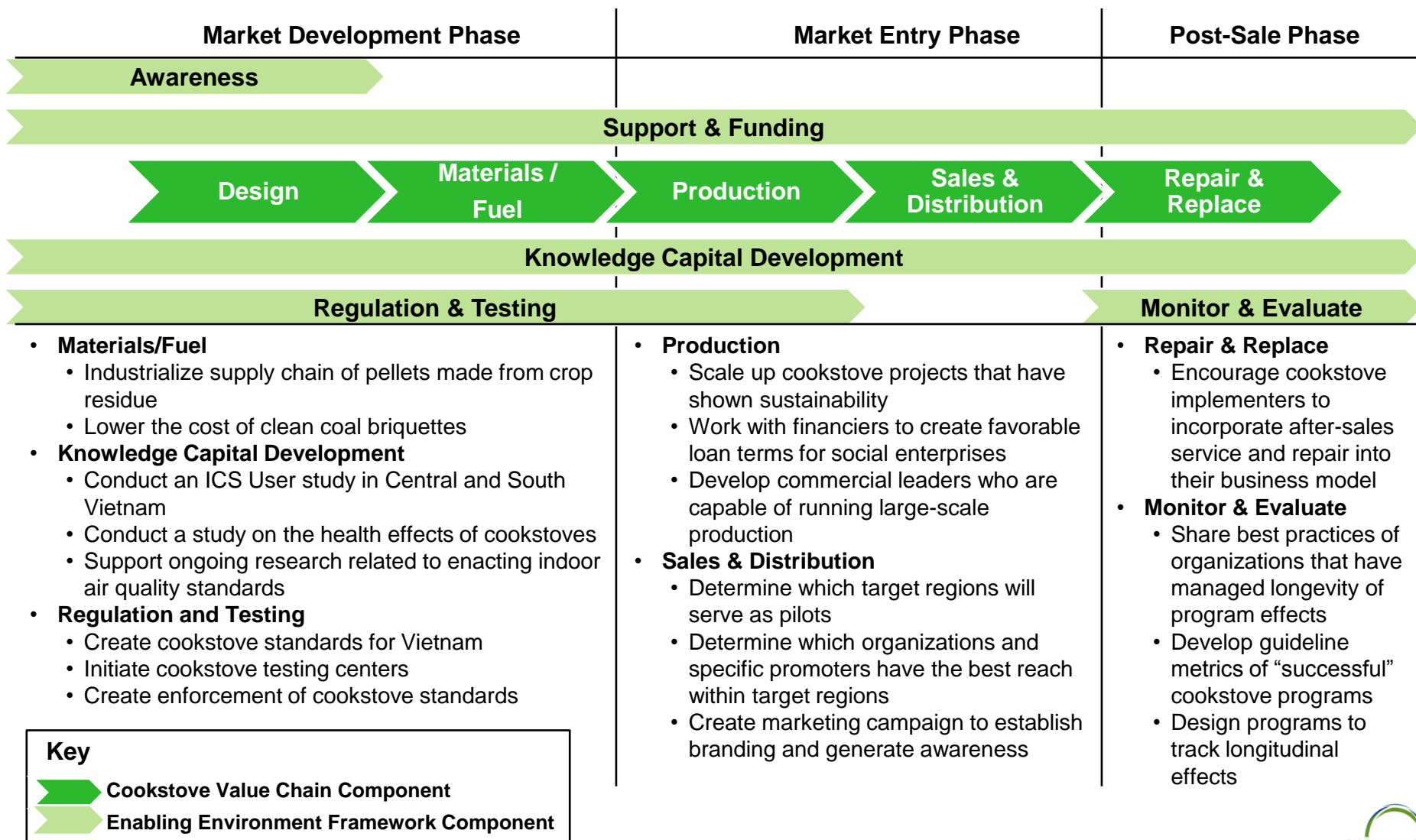
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Appendix

Intervention Options Relative Roadmap Overview

Roadmap

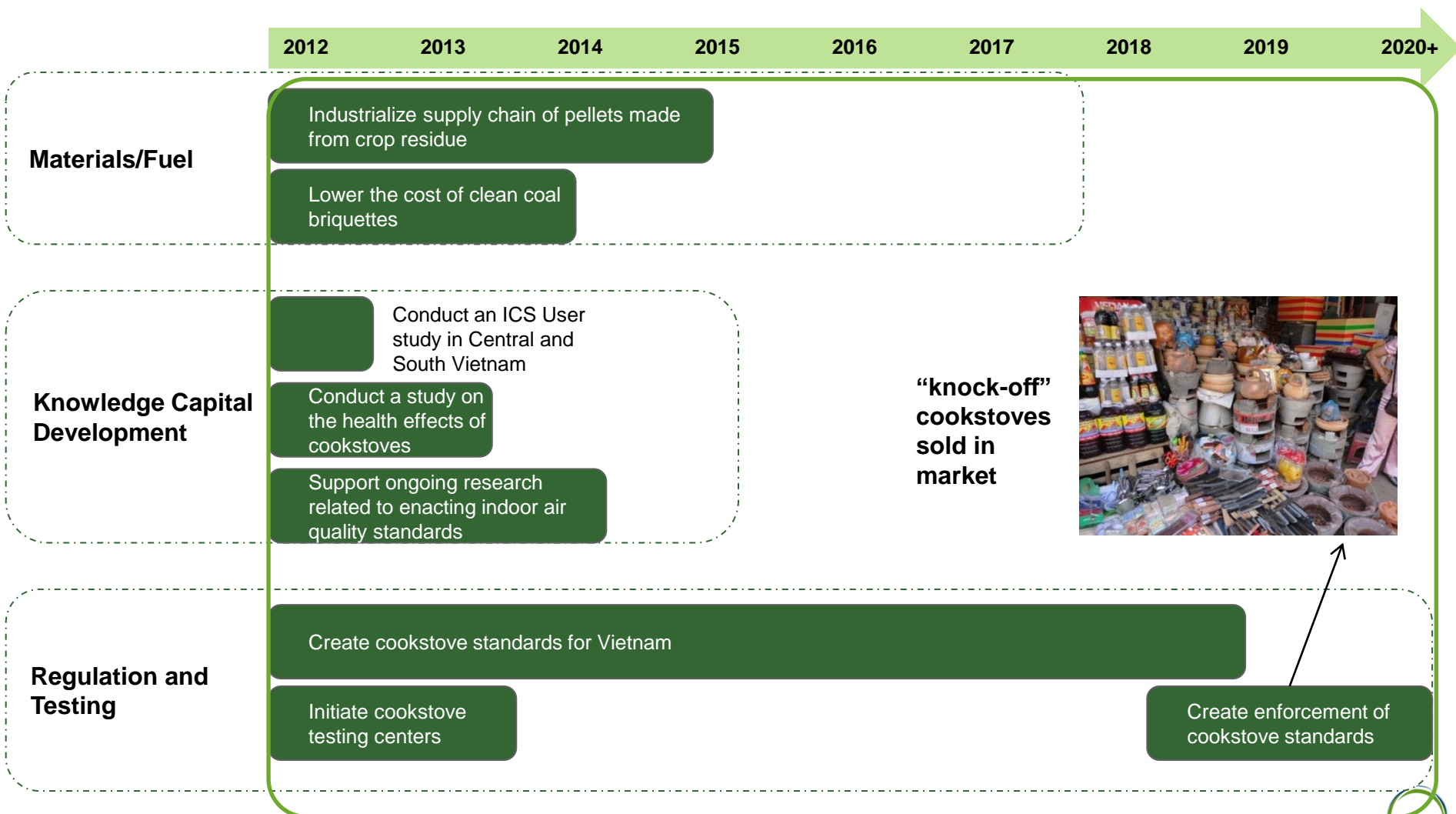
The Cookstove Value Chain is a sequential process, and contains interdependencies. Similarly, the Enabling Environment Framework components should be done in lock-step with the value chain.



Market Development Relative Roadmap

Roadmap

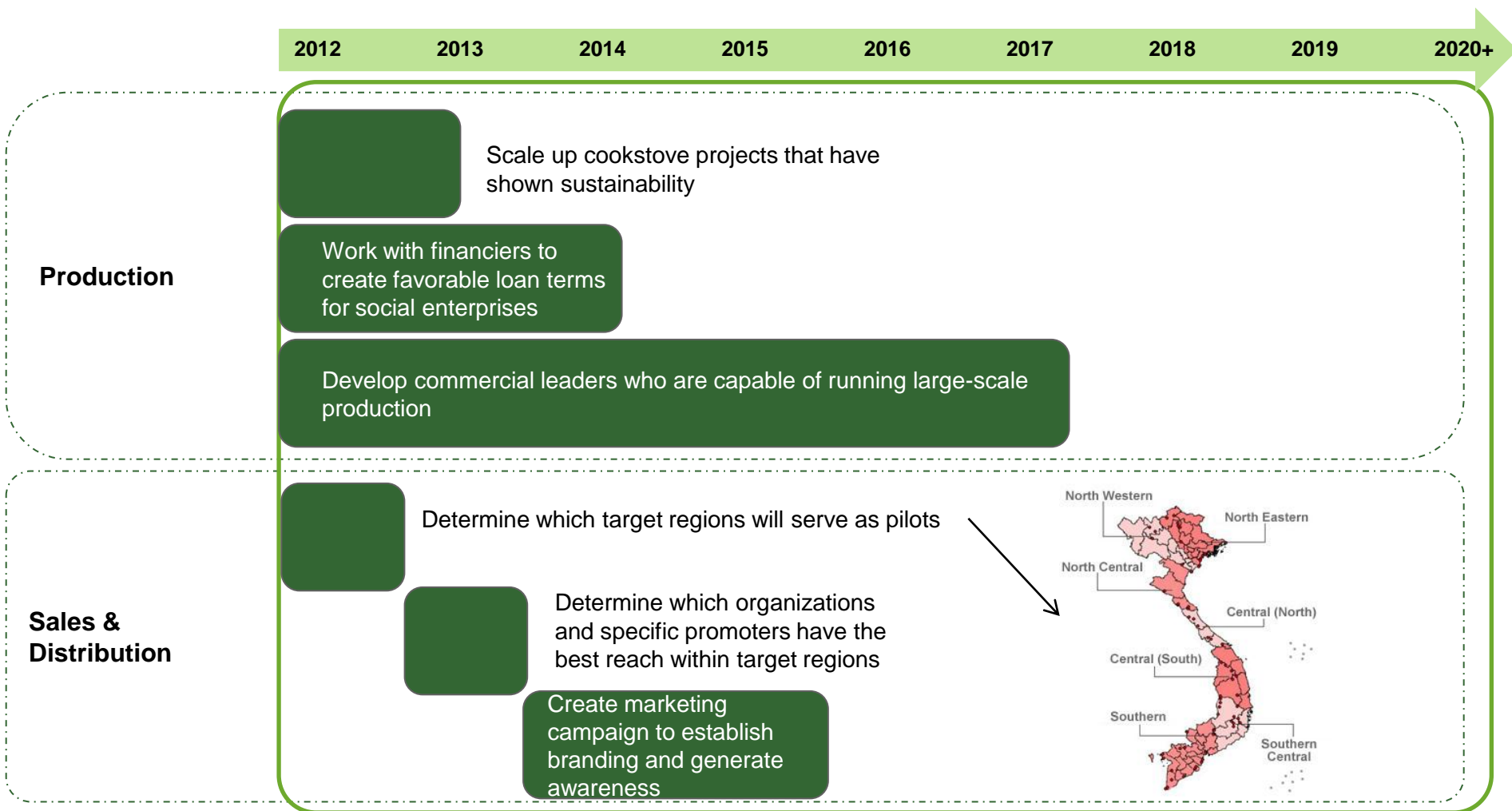
In the Market Development Phase, intervention options will focus on cultivating a market-based environment to support cookstoves.



Market Entry Phase Relative Roadmap

Roadmap

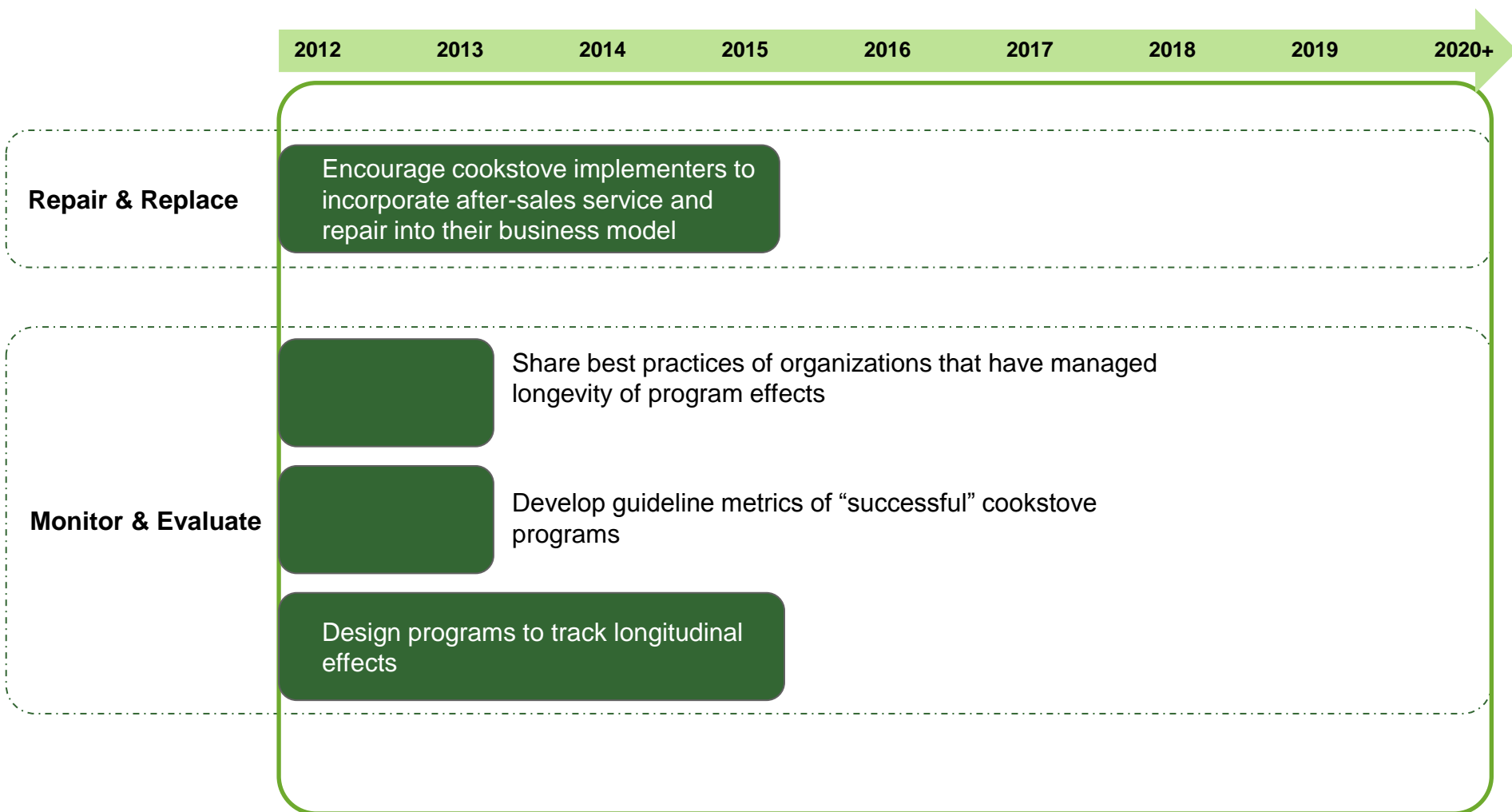
In the Market Entry Phase, intervention options will focus on supporting manufacturers to get their cookstoves to end users, including scale-up activities.



Post-Sale Phase Relative Roadmap

Roadmap

In the Post-Sale Phase, intervention options will focus on supporting repair and replacement of cookstoves, as well as monitoring and evaluating the program.



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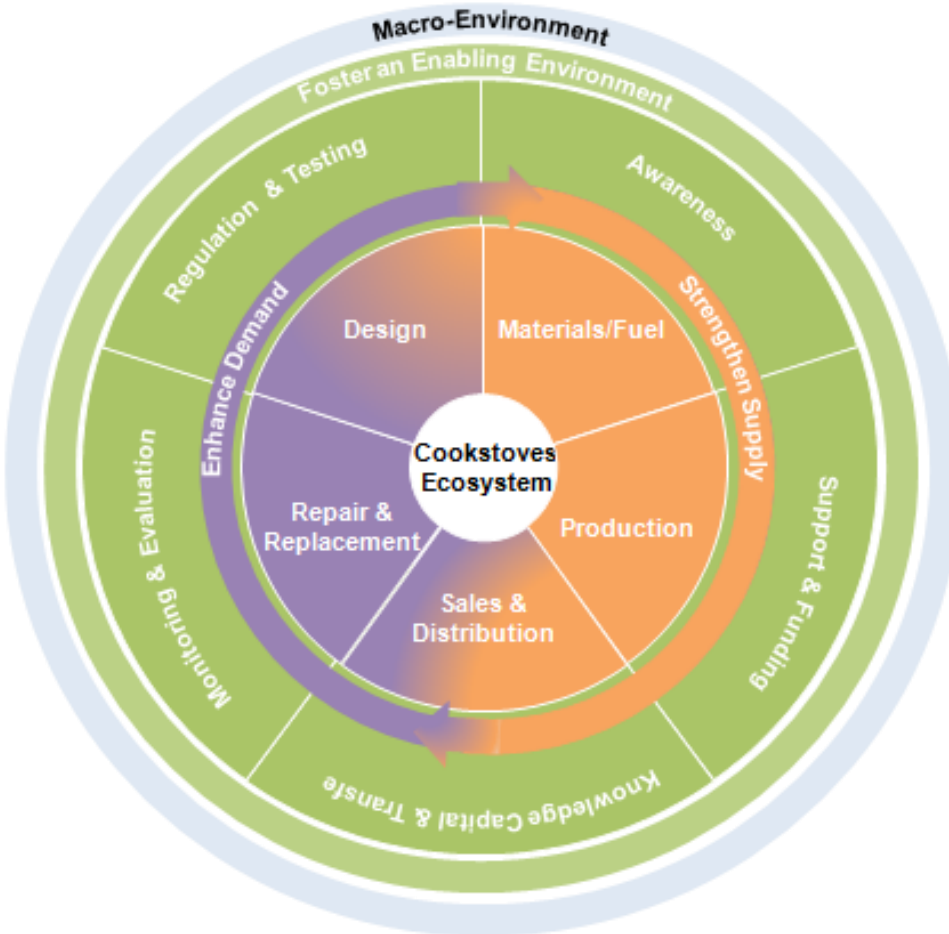
Conclusion

Appendix

Conclusion

Conclusion

In Vietnam, the cookstove sector is fragmented and mostly led by NGOs. There is a need to develop private sector interests so cookstove production can be scaled-up.



Enabling Environment

- Pending sufficient funding, a generally supportive enabling environment would allow relatively easy lift-off of an INGO-driven program, integrated with local partners and government

Cookstoves Value Chain

There are strong fundamentals for a market in Vietnam, but significant effort is required to:

- Create products that go above and beyond to demonstrate a multi-faceted value proposition for the consumer
- Develop capabilities of producers and marketers of clean cookstoves and fuels

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Case Study: Dr. Paul Olivier / Nong Lam University / Xanh Shop

Appendix

- Dr. Olivier is designing a gasifier that has dual benefits of utilizing waste agriculture residue as cheap cooking fuel and creating biochar for improved crop yield. Nong Lam University is testing the cookstove design and finding optimal uses for the biochar. Xanh Shop is an expert in distribution of socio-eco friendly products to rural areas, and has piloted gasifier distribution.
- **Best Practices:**
 - This is a good example of collaboration between research, academia and commercialization, a microcosm of what other partnerships in the future could look like
 - The cookstove design has received a lot of feedback and has undergone subsequent changes such as: ability to use motorbike as generator, low heat-transfer handles, ability to use several crop residue types and reduced relighting times
 - The distribution channel is prepared and ready to be activated as soon as a suitable product design is available
- **Challenges:**
 - Has not conducted comprehensive user feasibility testing to understand user acceptance
 - Current product design is not user friendly: cooking must stop every 40 minutes to empty biochar and reload agricultural residue, and relight the cookstove



Case Study: GERES

Appendix

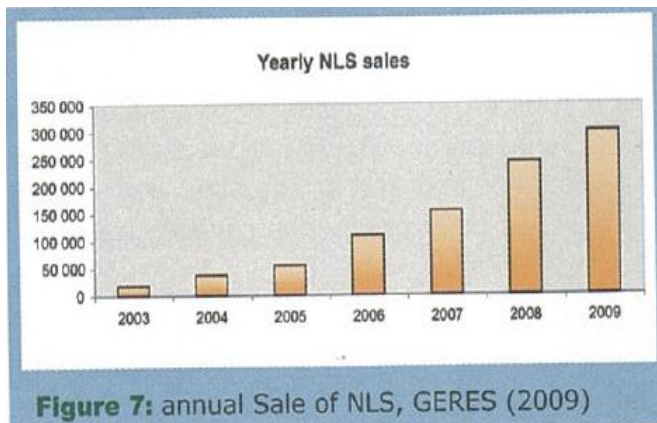
- GERES is a French NGO working in Cambodia and Laos. They have experience in scaling up cookstove programs, with over 2M distributed. Rural cookstoves are sold for under \$3 USD and urban cookstoves are sold for \$3.5-\$5 USD.
- **Best Practices:**
 - Keeps low fixed costs for local producers by providing community kilns for firing the cookstoves
 - Identified a community that had natural resources and experience working with pottery. GERES encouraged the community to switch to making cookstoves
 - Created awareness by purchasing billboards to advertise the improved cookstoves
 - Focus on training, with several weeks dedicated to instilling quality values
 - Uses carbon financing to fund sustainability of the program. Nexus was incubated within the GERES program before recently becoming independent
 - GERES has their own R&D facilities in lab and field environments to improve product design, as well as randomized quality tests
 - Women in groups of 6-8 are trained together, and then support each other after training is complete
- **Challenges:**
 - Product Diversion-utilizes system of quality stickers and tracking stamps to prevent diversion and maintain high quality



Case Study: GERES (Continued)

- **Outcomes:**

- Sales of the New Lao cookstove grew exponentially between 2003-2009
- In 2009, 31 production centers were registered New Lao cookstove producers, including 5 exclusively producing this type of cooking cookstove
- In 2009, the number of families using the New Lao cookstove is estimated at 160,000 (in 2012 it has reached 2M). It represents a theoretical savings of \$2.5M USD on charcoal purchase, and 212,000 tons of green wood not cut
- The program has received international acclaim:
 - 2006- Ashen Award for Sustainable Energy in London
 - 2007- US Environmental Protection Agency in Phnom Penh
 - 2008- Energy Global Award in Brussels



Case Study: GERES (Continued)

Appendix



Clay composition is critical to cookstove durability



Cookstoves utilize the same oxen cart distributors that were used for pottery



Molds encourage standardization and less human error



Women work together in family factories to assemble the cookstoves

Stickers signify quality



Simple bookkeeping helps GERES and producers keep track of progress

Case Study: GRET / CRD/ TXT

- GRET is a French NGO who partners with local NGO CRD and social enterprise TXT. Cookstoves is part of a larger Green Bamboo project, which focuses on forest plantation, management, livelihood development and transforming bamboo waste into renewable energy. Almost 2000 portable cookstoves have been produced.
- **Best Practices:**
 - One of the only sustainable cookstove programs that continues production past program funding support
 - Developed TXT, a social enterprise bamboo products company, that produced 400 cookstoves
 - Supported CRD, a local NGO that produced 1600 cookstoves, and has a current contract for 300 cookstoves
 - CRD and TXT have different provinces that they target
 - Out of 2000 cookstoves, only 300 partial (1/3 of price) subsidies were given. Others were purchased for \$4-\$5 USD
 - Recognized importance of finding ethical entrepreneurs who want to make a difference in their community
 - Conducted survey of cookstoves before choosing the optimal design
- **Challenges:**
 - Profit margin is not high enough to motivate producers (\$0.50-\$0.75 USD per cookstove)
 - Lack of funding to develop clean charcoal briquettes



Case Study: PED / CARE International

Appendix

- PED and Care International are piloting 40 biochar improved cookstoves in the northern Thai Nguyen Province. The cookstoves are being partially subsidized during the pilot phase, but could be sold at \$15-20 USD. PED has had prior experience working with fixed cookstoves and portable cookstoves.
- **Best Practices:**
 - Working with Women's Union for support in distribution
 - cookstove design incorporates customer needs, such being large enough to cook food for pigs
 - Has network of trained masons from work with fixed cookstoves
 - Large focus on training, and “train the trainer” activities
- **Challenges:**
 - Working with research institutions to understand the optimal composition of biochar to promote agricultural growth



Biochar is an important by-product that increases crop yield

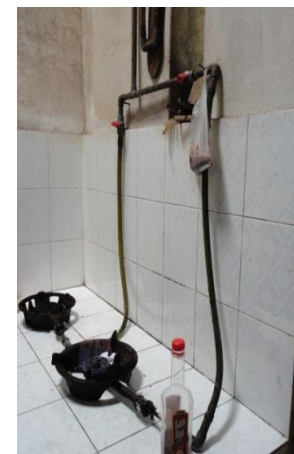
Case Study: Solar Serve / CSIP

- Solar Serve is a social enterprise based in central Vietnam. It receives mentoring from CSIP, which supports social entrepreneurs in their early stages.
- **Best Practices:**
 - One of the only social enterprises that has succeeded in staying in business for more than a decade
 - Working to develop complementary technology for rainy season. The new rocket cookstove will complement solar cookstoves when the sun is not strong, or at night
 - Commitment to serve disabled people through vocational training and creating stable jobs
 - Able to cook customary meals like rice, vegetables and meat
- **Challenges:**
 - Lack of funding to invest in factory equipment for scale up
 - Not able to achieve profitability, although social impact has been delivered to solar cooker users and the environment
- **Outcomes:**
 - In 10 years, Solar Serve has produced and provided more than 1500 solar cookers for poor and minority groups
 - Second prize in 2008 National Competition of Scientific and Technological Innovation Vietnam
 - Set up 2 model solar villages in Hoa Qui and Cam Nam Island to promote solar cookers



Case Study: SNV

- SNV is a Dutch NGO which has been successful in wide scale distribution of biogas digesters. To date, more than 115,000 biodigesters have been distributed throughout Vietnam.
- **Best Practices:**
 - Extensive network of 1,200 trained masons from biogas program
 - Completed Improved Cookstoves User Study in Northern Vietnam
 - Beginning pilot for fixed cookstoves in Northern Vietnam, and in final rounds of funding discussions to support scale-up
 - Biogas end users pay 88% of the cost, and the 12% subsidy is only used to promote quality
 - Close working relationship with government, including MARD and Institute of Energy
 - Evaluating feasibility of carbon financing
- **Challenges:**
 - Lack of funding to implement full-scale cookstoves program
 - Consumer education of the safety and sanitation of biogas
 - Continual repair to maintain quality and safety
 - Not able to reach households without pigs, and therefore is considering biomass improved cookstoves



Case Study: SNV (Continued)

Outcomes:

- Over 15,500 biogas units were installed in 48 provinces in Vietnam benefitting over 80,000 people with improved livelihoods and clean energy.
- Held cookstove Design and Testing workshop in Laos in March 2011
 - Exchange between 34 experts LMI countries
 - Experience on testing methodologies
 - Increase testing capacity and skills
 - Understanding about importance of proper testing
- Completed several research reports:
 - Biomass Business Opportunities Viet Nam- March 2012
 - Survey on Cookstove Usage in Northern Vietnam- Aug 2011
- Awards and Accolades
 - 2006 International Energy Globe (the world award for sustainability)
 - 2010 Ashden Award for Sustainable Energy

