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Lao PDR Market Assessment
Sector Mapping

July 2013

Introduction

- This Market Assessment was conducted by the Lao Institute for Renewable Energies (LIRE), under the supervision of Nexus, Carbon for Development and Nexant, Inc.
- It is intended to provide an overall analysis of the Lao market and opportunities for improved cookstove (ICS) dissemination.
- Each Market Assessment has two parts:
 - Sector Mapping – an objective mapping of the sector
 - Interventions Options – suggestions for removing the many barriers that currently prevent the creation of a thriving market for clean cooking solutions.
- This report represents the Sector Mapping for Lao PDR.
- This Market Assessment is based on the Market Assessment Toolkit provided by Global Alliance for Clean Cookstoves, which also provided valuable input during the design of the assessment.
- The conclusions presented here are based on a preliminary literature review, as well as on extensive local stakeholders interviews. In addition, LIRE also conducted a field survey across 2 provinces (Luang Prabang and Vientiane) on a 400 household sample (25% urban, 25% peri-urban, 50% rural) in order to gather updated data. Data from the LIRE survey is represented by a mark (*) in order to differentiate it from national census data. Several focus group discussions with consumers were also organized.

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	Findings
<i>Social and Environmental Impact</i>	<p>An ICS program could have very high social and environmental impacts in Lao PDR, where 90 percent of households rely on solid biomass fuels for cooking. There is a very limited level of awareness about the adverse health impacts associated with cooking-related indoor air pollution (IAP), which is linked to roughly 6,000 premature deaths per year.</p> <p>An ICS program could also help curb deforestation, which is a major issue in Lao PDR. Charcoal production is a significant driver of deforestation. Fuel wood collection also exacerbates deforestation but to a lesser extent given that most fuel wood is collected off the ground (waste and residues).</p>
<i>Consumers</i>	<p>Rural households (especially those not connected to a road network) are the most exposed to the adverse impacts associated with household cooking, since they often use the least efficient devices (e.g. tripod) and cook with wood. They also more difficult to reach, earn less, and are less likely to see the advantage of saving fuel when fuel wood is available for free.</p> <p>Urban households commonly use bucket stoves and mostly cook with charcoal and therefore are more interested in fuel savings. Generally, urban consumers seem to be willing to pay for improved stoves, provided stove durability and efficiency performances are guaranteed.</p>
<i>Cookstove Industry</i>	<p>The industry suffers from a lack of national standards and testing centers that provide policymakers, donors, investors, stove experts, and program managers with a credible basis for comparing stove performance and safety and providing experts with a common set of terms for communicating and understanding stove performance.</p> <p>Greater coordination between the various ICS projects in Lao PDR is needed. There is a willingness among ICS producers to receive training that will allow them to produce newer generation cookstoves which users have more confidence in.</p>
<i>Carbon Financing</i>	<p>Lao PDR is a Least Developed Country (LDC), and therefore all carbon accounting standards are eligible. Currently there are no cookstove projects registered.</p> <p>There are experienced carbon finance service providers available to service the sector. There is also some baseline and monitoring data available for the country.</p>

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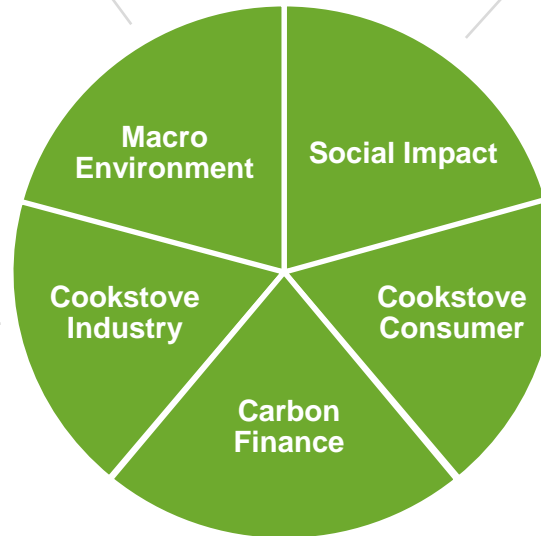
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Sector Mapping Approach

Sector Mapping of the cookstove sector was conducted across five dimensions:

- *Social:* What is the country demographics & population distribution across regions?
- *Political:* How stable is government & what political risks will any program face?
- *Economic:* How much money do our potential customers have & what is the economic cycle?
- *Technological:* How sophisticated is the infrastructure & what is the plan for progress?
- *Environmental:* How do ecological conditions impact the success of cookstove programmes?
- *Gender:* How does gender play a role in clean cookstove use and purchase?



- How do people cook and what fuels are used in the region?
- What is the current IAP exposure profile of our target market? (Primary cause of IAP and size of problem)
- What are the other impacts caused by the use of poor cooking stoves?
- How does the impact of cookstoves stack up against other health & social priorities?

- What cooking devices are currently used within the region?
- Who are the main players active in the cookstove sector?
- What are the opportunities / threats for current & future cookstove programmes?
- How commercially attractive is the sector & what are likely to be some of the industry challenges?

- What carbon financing options exist for the country?
- What structures exist which can be leveraged for future carbon financing components?
- Which entities are likely to fill the required roles in the carbon finance operating model?

- What is the profile of the target population?
- How can the customer population be segmented / categorized?
- How big is each customer segment and what are its characteristics?
- What are the specific needs of each customer segment?

Acknowledgements

Many organizations made valuable contributions to this study based on their knowledge of Lao PDR and/or experience in cookstove initiatives. Special thanks go to the Global Alliance for Clean Cookstoves who provided their Toolkit Templates and Information Guidance Notes, Lao stakeholder lists and PowerPoint templates for use in this study.



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Geography and climate

Lao PDR is a landlocked and mostly mountainous country. Plains are located in the center and in the south of the country, along the Mekong. The climate is tropical, with two distinct seasons - rainy and dry.



Indicator	Value
Population	6.29 million
Surface area	236,000 km ²
Population density	27 habitants per km ²
Arable lands	4%
Forest cover	42%
Elevation extremes	70m (Mekong) / 2817m
Climate	Tropical ; Monsoon patterns
Dry season	October - April
Rainy season	May-November
Neighboring countries	Thailand; Cambodia; Vietnam; China; Myanmar

- Implications -

Colder climates in the mountainous areas and seasonal fluctuations in weather have a strong influence on cookstove uses (e.g. heating). The large availability of wood also influences the type of cookstoves and fuel used by households.

Social environment

Lao PDR's social environment is complex. The population is ethnically very diverse, with more than 49 ethnic groups. Only 50% of the population belongs to the actual Lao ethnic group.

Context

- Low population density: 27 habitants per km² - the lowest population density in the region.
- Strong ethnic diversity: Lao-Thai (65%); Mon-Khmer (24%); Hmong-Mien (8%); Sino-Tibetan (3%). The government acknowledges the existence of 49 ethnic groups, composed of more than 200 sub-linguistic subgroups.
- Low level of education: The official literacy rate is 73%. However, 51% of household heads have no or incomplete primary education.
- Religion: Buddhist (67%); Unspecified (31.5%); Christian (1.5%). Animism is also widespread, being commonly mixed with other religions.

Indicator	Value
Population	6.29 million
Population growth rate	1.4%
Urban/Rural split	35%/65%
Population density	27 per km ²
Population under 24	57%
Literacy rate	73%
Literacy rate (women)	63%
Life expectancy	67.5 years
Population below poverty line	26%
Average household size	5.9
HDI (ranking)	0.543 (138/187)

- Implications -

A successful ICS program requires local “but in” to overcome the barriers of strong ethnic diversity. Low population density makes accessibility and economies of scale harder to achieve.

Political Environment

Macro Environment

The Communist People's Republic was adopted in 1975, and a new constitution adopted in 1991. The only legal party is the Lao People's Revolutionary Party (LPRP).



Political Structure

- Communist one party state.
- President and vice president elected by National Assembly for five-year term.
- Unicameral National Assembly (132 seats; members elected by popular vote from a list of candidates selected by the Lao People's Revolutionary Party to serve five-year terms).

Current Government

- Lao People's Revolutionary Party (LPRP) is the only legal party.
- Head of State and LPRP General Secretary: *Choummaly Sayasone*
- Head of Government and Prime Minister: *Thongsing Thammavong*

Administrative Structure

- The country is divided into 16 provinces.

- Implications -

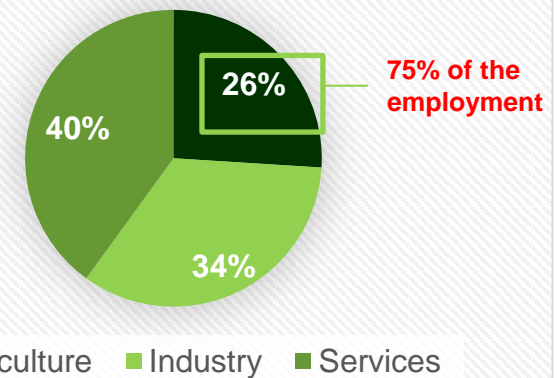
Cooperation with all levels of government is crucial to the success of an ICS program.

Economic environment

In the last few decades, Lao PDR has experienced tremendous growth and foreign investments. Yet, the country remains mainly rural, with 75% of the population working in agriculture.

- GDP growth (8%) is the highest in the region and has averaged 6% over the last few decades.
- Decentralization and government support of the private sector began in 1986.
- Strong foreign direct investments in the economy's main sectors:
 - Copper and gold mining
 - Hydropower
 - Construction
 - Timber
- However, labor force still relies largely on agriculture (over 75% of the employment).
- Poverty has decreased from 46% in 1992 to 26% today.
- Lao is still classified as a LDC.

GDP Composition



Indicator	Value
GDP (current US\$)	8.3 billion
GDP growth	8%
GDP per capita (PPP, current US\$)	2,800

- Implications -

Fast paced growth is likely to boost development levels, but also expose the population and the environment to numerous threats.

Gender inequality persists in Lao PDR despite strong economic growth and poverty reduction.

Representation and Participation

- Primary school attendance in Lao PDR is relatively high. However, in rural areas school enrolment rates drop significantly, especially for girls.
- Women are underrepresented in the National Assembly as well as local decision-making bodies, yet have higher representation than in most countries in the region.
- More women are part of the labor force than before. This is especially true in urban areas where women follow a trade. Women's wages, however, are still lower than those of men.

Cultural Background

- Women are traditionally responsible for most domestic tasks (e.g. cooking, carrying water and wood). This is especially true in rural areas.
- Increased rural electrification (>70%) has reduced the time women spend on domestic chores.
- In rural areas, women from ethnic groups where the Lao is not the native language often do not speak Lao, whereas men do.

Gender equality statistics

	Male	Female
Primary school attendance	94%	96%
Progression to secondary school	83%	80%
Representation in National Assembly	75%	25%
Literacy	83%	63%
Employment rate	78%	73%

Lao Women Union

- Each village has an association of women. Previous cookstove programs successfully managed to leverage them as a powerful vector of diffusion.

- Implications -

While gender inequality still exists in Lao PDR, community-based programs mobilizing Lao Women Unions are an opportunity to leverage their influence to promote ICS programs.

Ecological Environment

Deforestation and wildlife destruction are the main environmental challenges in Lao PDR. The country is a minor contributor of GHG emissions, however, that is likely to change due to strong economic growth and increased air pollution in urban areas.

Deforestation

- Widespread use of wood fuel and slash-and-burn agriculture.
- Loosely regulated timber industry exacerbates deforestation.
- Forest cover decreased from 70% in 1960 to 42% in 2002 , resulting in significant soil erosion.
- 70% of Lao PDR's GHG emissions come from deforestation.

Wildlife Destruction

- Hunting for subsistence consumption is widespread.
- Domestic and international illegal wildlife trade.
- Loss from habitat through deforestation.

Other Issues

- Urban environment degradation.
- Waste collection and treatment.
- Water access and protection.

Causes	Impact
Logging and fuel wood	Very High
Slash and burn cultivation	Medium
Agriculture expansion	Very High
Plantation	High
Dams	Medium
Mining	Medium



An Incomplete Legal Framework

- Increasing political actions in favor of environment protection:
 - Environmental Protection Law (1999)
 - Forestry Law (2007)
- However, institutions still strongly need to strengthen their ability to enforce and implement their action plans.

- Implications -

Although there is a great need to limit deforestation, the government has little capability to do so.

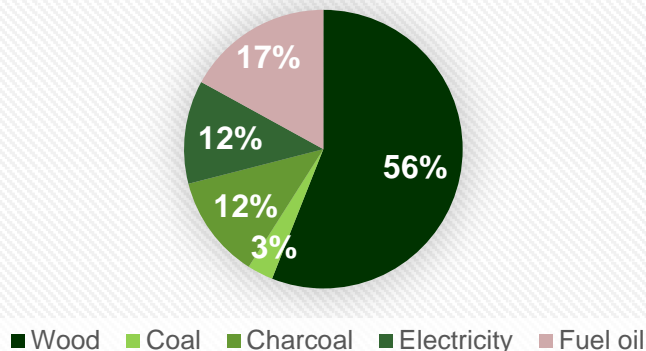
Infrastructure and energy

Lao PDR's infrastructure is very limited. The road network only covers a portion of the country and 14% of roads are paved. However, large foreign investments in construction, as well international cooperation programs, are improving the situation.

Energy

- High hydropower potential
 - 97% of power generation in Lao PDR, export oriented (90%)
 - 15 MW installed (potential : 23 GW)
- Electricity access: 70% (15% in 1995)
- Significant share of wood fuel

Energy consumption in Lao PDR



Transportation

- Road network is very limited
 - 39,000km versus 180,000 km in Vietnam and Thailand
 - Paved roads: 14% versus 84% in Vietnam
- No railways

Health care and sanitation

- Improved sanitation: 89% (urban) ; 50% (rural)
- Improved water source: 77% (urban) ; 62% (rural)

Telecommunications

- 5.41 million cellphones
- 300,000 internet users

- Implications -

Infrastructure limitations are likely to raise challenges concerning the retailing and transportation of improved cookstoves and their associated materials.

Millennium Development Goals

Macro Environment

Although Lao PDR has experienced advances in social development in recent years, and significant progress has been made towards achieving the MDGs, the country still faces many development challenges.



1 Eradicate Extreme Poverty and Hunger

Poverty in Lao PDR declined steadily from 46% to 33% during the decade 1992-2002 and the country is on course to attain the MDG target of halving poverty by 2015.

Big Challenge



2 Achieve Universal Primary Education

Enrolment rates and literacy levels increased significantly. However, the primary completion rate increased very slowly and the MDG target looks beyond reach.

Big Challenge



3 Promote Gender Equality and Empower Women

Because of the very slow pace at which the gender gap is closing, achieving the MDG targets for elimination of gender disparity at all levels of education by 2015 seems ambitious.



4 Reduce Child Mortality

The 2015 MDG targets seem within reach, although mortality rates are much higher in rural areas, particularly in the most remote districts.



Big Challenge

5 Improve Sexual and Reproductive Health

The maternal mortality rate is one of the highest in the region. It is doubtful if Lao PDR can reach the MDG 5 target given the current levels of investment in maternal health.

Big Challenge



6 Combat HIV/AIDS, Malaria and Dengue

There is low HIV prevalence in Lao PDR however a lot of ground still has to be covered to meet the MDG target regarding Malaria.

Big Challenge



7 Ensure Environmental Sustainability

Lao PDR has made good progress on expanding access to safe water and sanitation over the last decade. However, economic growth linked to the country's natural resources threaten the environment.



8 Develop a Global Partnership for Development

Lao PDR needs continued commitment from its development partners to achieve the MDGs by 2015.

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Cooking Habits

Lao food is less diverse and complex than food found in neighboring countries like Vietnam and Thailand. Rice accounts for a large part of alimentation, together with vegetables and meat cooked in simple dishes.



Type of Food

- Despite strong ethnic diversity, Lao food is not extremely diverse.
- Khao Niaw (sticky rice) is a typical Lao dish. It is eaten throughout the Mekong Valley, where Lao-Thai is dominant. It is less popular in the North and mountainous regions (Hmong do not eat sticky rice).
- Dishes are usually simple, and cooked with fresh ingredients. Base products are vegetables, fish, chicken, duck, pork, and beef.
- Laap, one of the most common dishes, is a salad of minced meat (usually raw), mint leaves, lime, onions, chili and rice (sticky or steamed).

Cooking Habits

- Most households cook with solid fuel cookstoves (wood or charcoal).
- Several stoves are usually used when cooking a meal. Sticky rice takes a lot of time to cook.
- Households rely mainly on wood as a fuel source, however charcoal is preferred when cooking grilled meat and is also used for special occasions.
- The use of rice cookers is widespread. However, sticky rice cannot be cooked with a rice cooker.
- Cooking is usually the responsibility of women (74%).

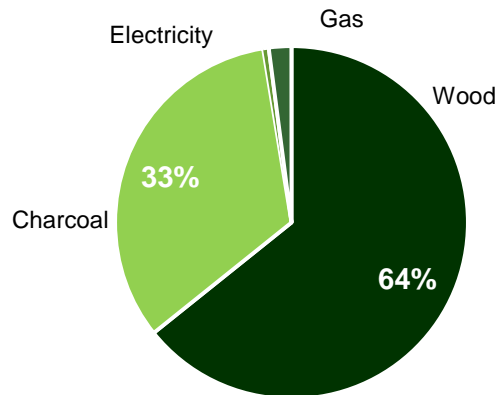
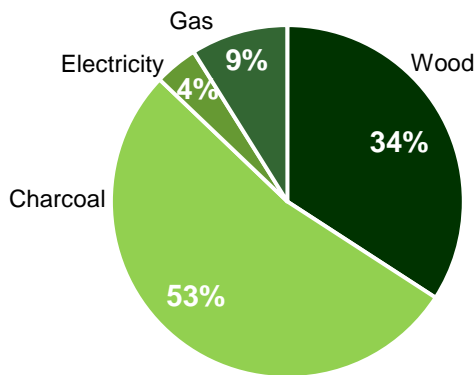


Fuel Usage & Availability (1/2)

Solid fuels are the prevailing cooking fuel in rural and urban areas. They are used by more than 90% Lao households. For most users, charcoal represents an alternative cooking fuel to wood.

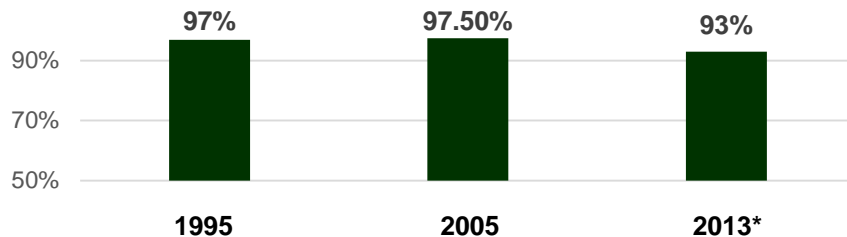
Main Fuel Used - Urban Users*

Main Fuel Used - Rural Users*



Note: These figures are similar to those reported in the 2005 National Census except for rural areas, where according to the 2005 National Census, 88% of rural users use wood and 10% use charcoal.

% of Solid Fuel Users Over Time



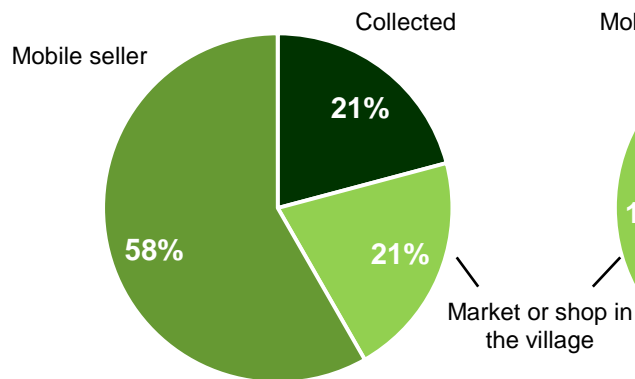
Fuel Use for Cooking

- The use of electricity or LPG is very limited in urban and rural areas, especially as a **primary cooking fuel**.
- The low penetration of electricity and LPG is a function of their higher costs and the cultural attachment households have to cooking with wood or charcoal. Concerns over the safety of LPG are also a factor but to a lesser extent.
- Among solid fuel users, charcoal tends to be the preferred fuel source however it is more expensive than wood. Most households use a mix of charcoal and wood.
- In urban areas, wood users are mostly located in peri-urban areas.

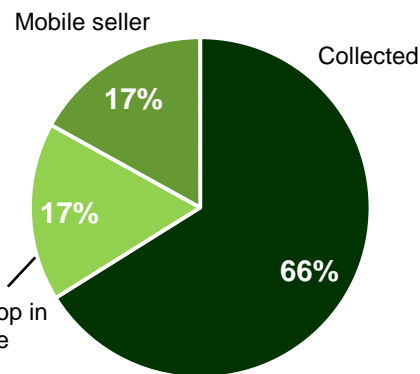
Fuel Usage & Availability (2/2)

Lao PDR's large forest cover (42%) makes wood an abundant and cheap fuel available in rural areas, as well as in some peri-urban areas.

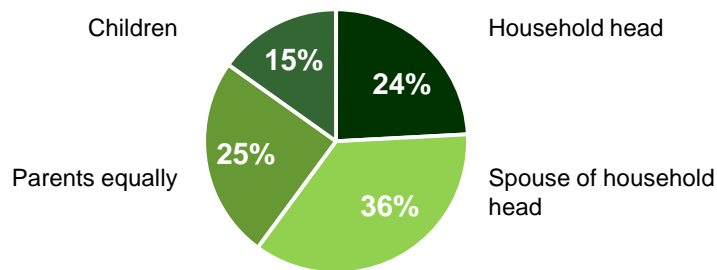
Fuel Purchase - Urban Users*



Fuel Purchase - Rural Users*



Person Responsible for Fuel Collection*



Fuel Purchase

- **In urban areas**, mobile sellers make solid fuels (especially charcoal) easily accessible. They supply about 58% of households.
- **In rural areas**, more than 65% of the fuel used for cooking is wood collected in nearby surroundings. Wood collection requires less time than in other countries where wood is more scarce – **typically rural households spend 0.3 hours per day for wood collection.**
- Women and children were said to be mainly responsible for wood fuel collection in 35% and 15% of rural households surveyed, respectively.

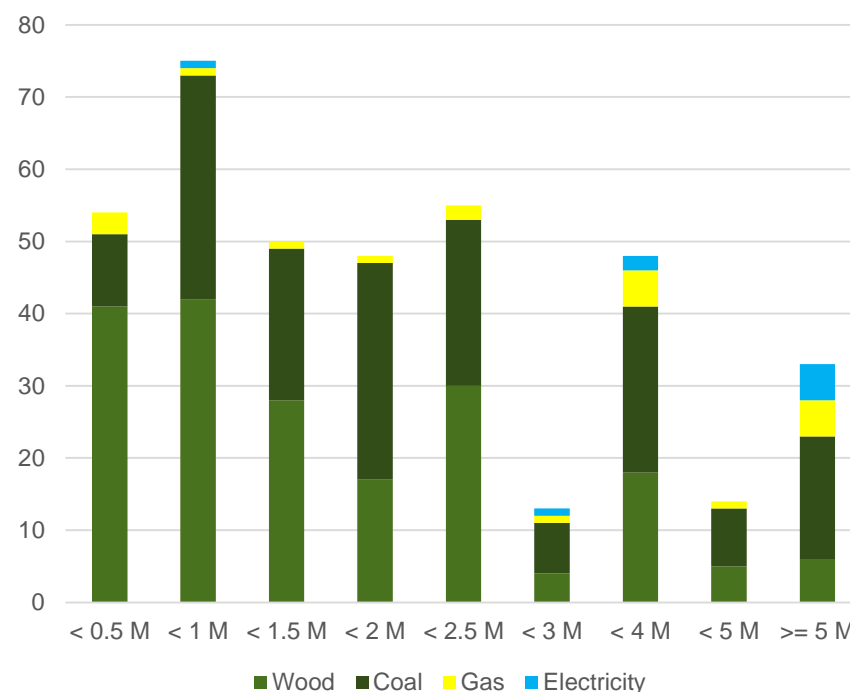
Available Fuel Cost

The use of solid fuels for cooking is not limited to low income populations and can be found across various income categories. There are no piped gas networks in Lao PDR. Most of the gas is imported from Thailand.

- Fuel switching from solid fuels to more modern fuels among wealthier households is limited.
- Electricity use begins to appear in households earning 3 million kip/month or more.

Fuel	Quantity/mth	Price per unit	Yearly exptr.
Wood	25 to 35 kg	Free	Free to \$6
Charcoal	25 to 40 kg	0.02\$ – 0.04\$	\$6 to \$19.2

Types of Cooking Fuels by Household Income*



Indoor Air Pollution (1/3)

Almost the entire Lao PDR population is exposed to IAP, as cooking with solid fuels is still the norm among urban and rural households.

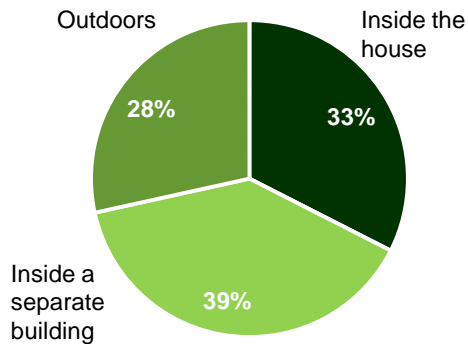
# Households Affected			
	Population (Households)	% Using Biomass	Households Exposed to IAP
Rural (65% of total pop.)	4.08 million →	99 % →	4.05 million
Urban (35% of total pop.)	2.20 million →	91.5 % →	2.01 million
Total →			6.06 million (96% of total households)

Health Impact
<ul style="list-style-type: none"> • A large share of the Lao PDR population is exposed to IAP because of the prominent use of solid fuel for cooking. • There is very limited national data regarding the linkages between health and IAP. Most data are based on a 2000 national health survey. • A report by WHO and UNDP released in November 2009 noted that 1,200 out of 1,777 child deaths per year are from pneumonia could be directly attributed to solid fuel use. The same report also notes that 1,300 deaths per year are from Chronic Obstructive Pulmonary Disease.

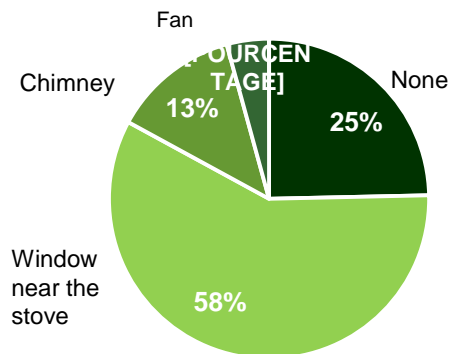
Indoor Air Pollution (2/3) – Exposure and awareness

There is very limited awareness about the linkages between health and IAP. In most households, cooking takes place indoors, with poor ventilation.

Cooking Place*



Ventilation System (if cooking indoors)*



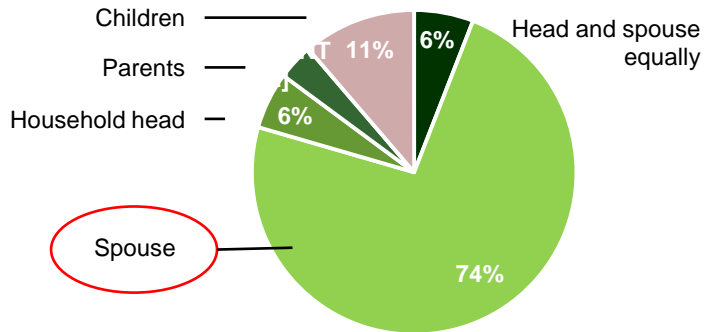
Household Habits and Awareness

- Awareness of the dangers of IAP s extremely limited .
- Cooking often takes place outdoors or in a separate building, mainly to avoid the annoying effects of smoke rather than out of a concern for health.
- When cooking inside the house, there is usually a dedicated room for cooking (87%).
- When cooking indoors, ventilation systems often include cooking near the window.
- Based on available data, there appears to be no significant differences between rural and urban habits.

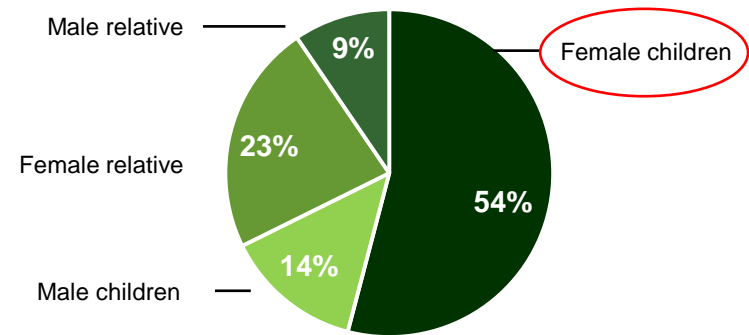
Indoor Air Pollution (3/3) - Gender issues and children exposures

Household members are unequally exposed to IAP. Women and children are significantly more exposed.

Person Primarily Responsible for Cooking*



Who Else Helps Cook*



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Consumer Landscape in Lao PDR

To understand and derive insight into the consumer landscape in Lao PDR the population can be segmented into two key areas:

**Market
(Rural / Urban)**

**Access to road network
(Connected / Non connected)**

The customer segmentation in this section is an illustrative example of how the market in Lao PDR could be grouped. They are based on the following assumptions:

- The customer segmentation is designed to provide a high-level view of the market and strengthen the understanding of the customer base in Lao PDR.
- The customer segmentation is based on a preliminary market assessment and has used a combination of both primary and secondary research. Further refinement of customer segmentation and customer profiles will be required for specific programmes and regions.
- Customer usage trends is the biggest gap in robust knowledge and research, therefore segment knowledge is sometimes based on consistent anecdotes from stakeholder interviews.

Note: The attributes of the segmentation are illustrative based on only initial research

Segment Profiles (1/2)

The targeted population can be segmented into three groups: (1) Rural households well connected to the road network; (2) Rural households not well connected to road network; and (3) Urban and Peri-urban households (see next slide)



Not Connected to Road Network



Connected to Road Network

	Not Connected to Road Network	Connected to Road Network
Size (# of Households)	<ul style="list-style-type: none"> 1.2 million (19% of population) 	<ul style="list-style-type: none"> 2.88 million (46% of population)
Profession	<ul style="list-style-type: none"> Sustenance farming, Odd jobs 	<ul style="list-style-type: none"> Sustenance farming, Government workers, Odd jobs
Cooking Device & Fuel	<ul style="list-style-type: none"> Traditional Stove (3 stones fire), sometimes bucket shaped stoves Fuel: Firewood, sometimes charcoal 	<ul style="list-style-type: none"> Traditional Stove (3 stones fire), sometimes bucket shaped stoves, however prevalent than among households not connected to the road network Fuel: Firewood, sometimes charcoal
Cooking Location	<ul style="list-style-type: none"> Both indoors and outdoors 	
Cooking Frequency	<ul style="list-style-type: none"> Three meals per day 	
IAP Exposure	<ul style="list-style-type: none"> High when cooking indoors 	
IAP Awareness	<ul style="list-style-type: none"> Low: Villagers are used to it and are only aware of the short term effects 	
Deforestation Impact	<ul style="list-style-type: none"> Low: Most of the time firewood is just collected off the ground as waste or residues 	
Barriers to Switch	<ul style="list-style-type: none"> Availability of alternative stoves and fuels Affordability 	
Willingness to Pay	<ul style="list-style-type: none"> Medium if expectations are met 	
Purchase Drivers	<ul style="list-style-type: none"> Convenience (quick heating, fuel availability, easy to find) Fuel consumption 	

Segment Profiles (2/2)

The targeted population can be segmented into three groups: (1) Rural households well connected to the road network; (2) Rural households not well connected to road network; and (3) Urban and Peri-urban households



Urban and Peri-urban Households

Size (# of Households)	<ul style="list-style-type: none"> • 2.2 million (35% of population)
Profession	<ul style="list-style-type: none"> • Small businesses, Government workers, Private sectors employees
Cooking Device & Fuel	<ul style="list-style-type: none"> • Bucket shaped stoves 3 stones fire to a lesser extent • Fuel: Mainly charcoal and sometimes firewood; the use of gas is still very limited
Cooking Location	<ul style="list-style-type: none"> • Both indoors and outdoors
Cooking Frequency	<ul style="list-style-type: none"> • Two meals per day
IAP Exposure	<ul style="list-style-type: none"> • High when cooking indoor
IAP Awareness	<ul style="list-style-type: none"> • Low: villagers are used to it and are only aware of the short term effects
Deforestation Impact	<ul style="list-style-type: none"> • High: Charcoal use is widespread
Barriers to Switch	<ul style="list-style-type: none"> • Availability of alternative stoves and fuels • Affordability
Willingness to Pay	<ul style="list-style-type: none"> • High if expectations are met
Purchase Drivers	<ul style="list-style-type: none"> • Convenience (quick heating, fuel availability, easy to find) • Price

Customer Segmentation Summary

Urban households (HHs) seem to be the easiest segment to target, with a clear demand for improved cookstoves and good accessibility. Reaching the rural segment (65% of households) will require more effort, particularly in promotion and retailing.

Customer Segment Characteristics

Segment	Size	IAP Exposure	IAP Awareness	Affordability	Willingness to Pay	Alternative Use	Distribution Access
1) Rural HHs not connected to the road network	Low	Medium	Low	Medium	Medium-High	Medium-High	Minimal
2) Rural HHs connected to the road network	High	Medium	Low	Medium	Medium-High	Medium	Medium
3) Urban and Peri-Urban HHs	Medium	Medium	Low	High	Medium-High	Low	High

Key | ○ Minimal | ◐ Low | ◑ Medium | ◒ Medium-High | ● High

Rural households that are connected to the road network are by far the largest segment

When conditions allow them, people cook on the outside

IAP awareness is low overall however affordability is high as is willingness to pay if the stove match user's expectations

Secondary uses are important for people using stoves for heating in the Northern Provinces of Lao PDR

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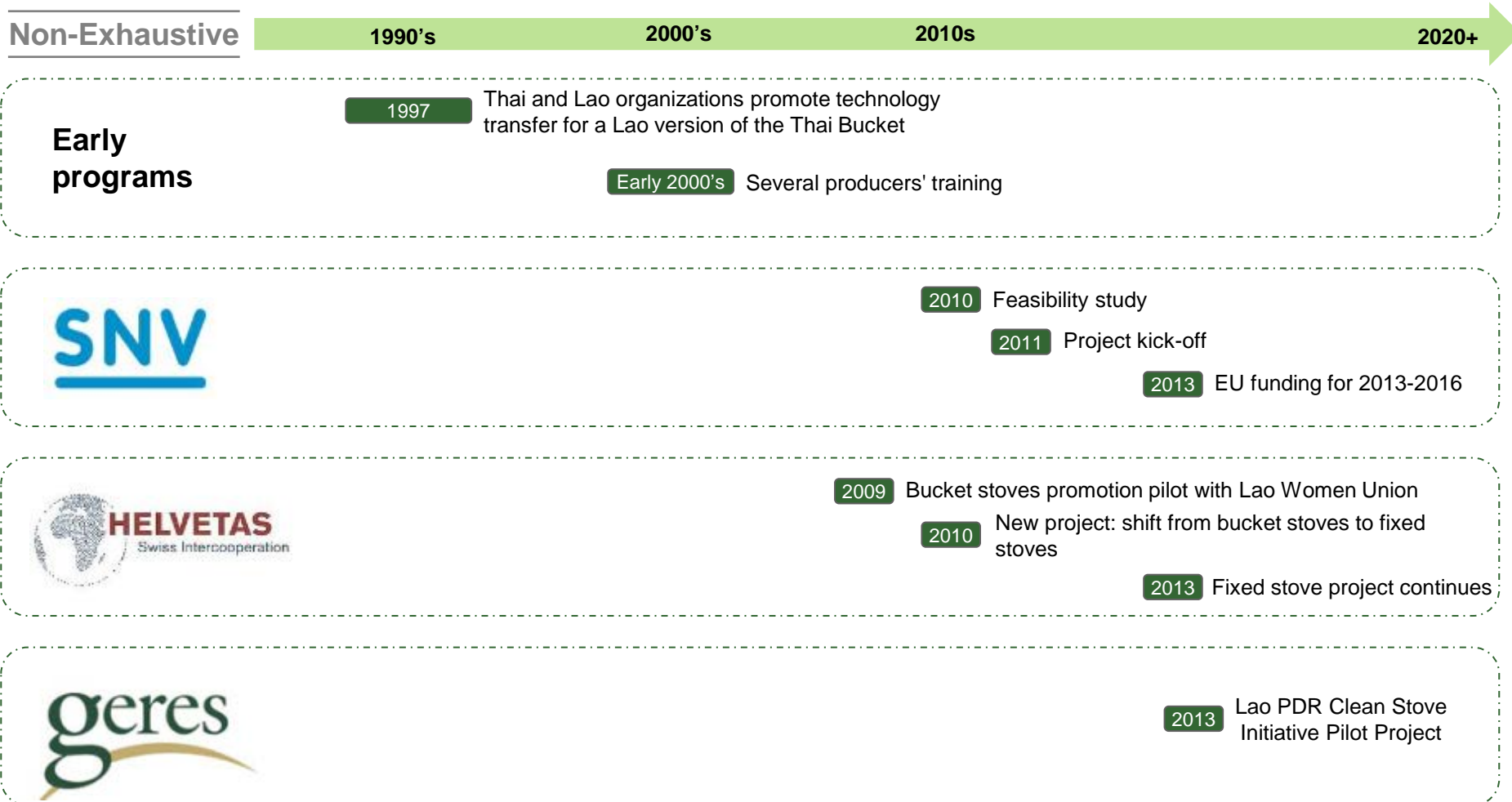
Cookstove Industry Assessment

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History of Cookstoves in Lao PDR

Cookstove initiatives have only recently been implemented in Lao PDR and have led to limited results. The main existing projects are lead by Helvetas (2009) and SNV (2010). GERES is to start a project in 2013.



At the moment, there is almost no legal framework for efficient and clean energy promotion. Objectives are still being defined. Some programs exist, but lack coordination.

Main Actors

- Ministry of Energy and Mines (MEM)
- IREP (Institute for Renewable Energies Promotion)
- The Science, Technology and Environment Agency
- The Committee of Investment Management and Foreign Economic Cooperation

Main Challenges

- No specific policies or strategies
- Lack of coordination between stakeholders
- Lack of specific regulations and laws
- Lack of public funding support
- Insufficient information on renewable energy potential for provincial level

Objectives for 2020

- 30% of the national consumption coming from renewable energies
- Reducing the fossil fuel imports by replacing 10% of transport energy consumption with bio-fuels
- No targets concerning a National Energy Efficiency policy
- 90% rural electrification (by 2025)

“Lao PDR does not yet have a comprehensive institutionally supported approach to the planning and implementing of energy programs in general, although many energy subsectors appear to have their policies/strategies for their own sector.”

From the Rural energy development and utilization, 2011

Key Project Elements

- **Organization:** Normai (Project Management), SNV (Advisor)
- **Approach:** ICS (Tao Payat) dissemination through value chain development
- **Region:** Southern Lao (Savannakhet and Champasak)
- **Stove & Fuel:** Tao Payat - designed for charcoal
- **Price:** \$5 (not subsidized)
- **Funding:** Oxfam Novib, Blue Moon
- **Stoves Distributed:** 20,000 (next objective: 150,000)
- **Number of producers:** 3 in Savannakhet



Achievements

- ✓ Collaboration with Lao Women Union promotion and marketing
- ✓ Sustained demand (20,000 stoves)
- ✓ High importance given to testing (field and laboratory)

Challenges

- Supplying demand
- Scaling up production while guaranteeing quality
- Establishing standards



Case B :



Key Project Elements

- **Organization:** Helvetas
- **Approach:** Subsidized fixed stove installation
- **Region:** Northern Lao (Xieng Khouang province)
- **Stove & Fuel:** Fixed stoves (flexible design), wood
- **Price:** unknown (high); subsidy
- **Funding:** Diverse
- **Stoves Distributed:** 50
- **Number of producers:** Several producers trained



Achievements

- ✓ 50 fixed stoves implemented
- ✓ 6 demonstration stoves

Challenges

- Requires high upfront investment from buyers
- Lack of resources to sustain the project
- Stove performance issues
- Wood is abundant and free: poor incentive to save fuel



Standards & Testing

There are no established standards for stoves in Lao PDR, nor is there a testing center. Testing has occurred occasionally but might occur more frequently in a short term thanks to the launch of new projects.

No Standards Regarding Stove Production

The lack of a national agreement on standards has made it challenging for stove manufacturers, distributors, investors, and users to rate the quality and efficiency of cookstoves in different markets. Because improved stoves are not necessarily significantly cleaner, safer, or more efficient, having a set of standards in place that clearly define how technology impacts fuel use, emissions, durability and safety will allow consumers to make more informed choices, spur manufacturers to build higher quality stoves, and increase the level of overall investment in the sector.

The introduction of the Tao Prayat improved cookstove reflects the consequences of the lack of national standards. Indeed specific specifications have been implemented in collaboration with stove producers in order to improve the regular bucket stoves. But when it appeared that profit margins were low, producers started to cut down the cost of production by reducing insulation, the thickness of grates and the number of grate holes. The absence of standards could not guarantee the quality of the stoves produced, and so user confidence in the stove decreased.

Creation of national standards will give stove makers affirmation of product quality, let users know they are making a worthwhile investment, and drive industry innovation.

No Continuous Testing of Biomass Stoves

There are very few testing facilities in Lao PDR, and no real coordination between them. Testing initiatives were mainly dedicated to water boiling tests and controlled cooking tests. The main actors are LIRE, SNV and the Ministry of Science and Technology. New testing facilities are now under development under the supervision of SNV and LIRE-GERES. Both initiatives are coordinating their activities.



Current Technology Landscape (1/2)

These types of stoves are the most commonly used in Lao PDR. Different versions can also be found, with varying sizes and additional features, such as hatches for wood users.

3 Stone Fire & Metal Tripod



- Basic technique still widely used in remote rural areas.
- Metal tripods are also very common, and based on the same principle.
- Highly inefficient, but the difference is smaller when larger pots are used to cook for a group.

- Use
- Availability

Tao Dam



- One of the most commonly used type stove. Cylinder shaped stove made of clay.
- More efficient than tripods, but still very inefficient in terms of ICS standards.

- Use
- Availability

Tao Prayat



- Design was derived from the Thai Bucket in 1997 (clay) - more efficient than the Tao Dam.
- More expensive than the Tao Dam and therefore usually used by higher income households.
- Lack of standards and control lead to a significant decline of the efficiency and durability of these stoves – usually last 6 months instead of the years

- Use
- Availability

Key | Minimal Low Medium Medium-High High



Current Technology Landscape (2/2)

These types of stove are the most commonly used in Lao PDR. Different versions can also be found, with varying sizes and additional features, such as hatches for wood users.

Tao Cement





- A basic cubic cement stove.
- Cheapest type of stove after tripod, used mainly by poor households.
- Poor efficiency, inferior to Tao Dam and Tao Prayat.

- Use 
- Availability 

Electric Rice cooker



- Electricity powered.
- Convenient to use but usually used in addition to a biomass cookstove.
- Cannot be used to cook glutinous rice, which is usually preferred over steamed rice.

- Use 
- Availability 

Gas Cooker



- Used by few households who have high incomes.
- There is no gas network in Lao PDR. Households have to rely on expensive bottled liquefied petroleum gas (LPG) imported from Thailand.

- Use 
- Availability 

Key |  Minimal  Low  Medium  Medium-High  High

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Market Attractiveness

Lao PDR has no registered cookstove programs, but at least two programs are under development. Laos is classified as a LDC, which makes it eligible under both voluntary and compliance carbon markets.

	Designated National Authority (DNA) & Programs of Activities (PoA)	Stove & Program Accreditation	Carbon Baseline	Country Classification	Scale of Program	Monitoring & Evaluation
Best Case ↑	Pre-existing DNA & related PoA	Pre-existing CDM-accredited stove program in country	Previous cookstove projects to leverage for baselining	Least Developed Country	Estimated income will significantly outweigh costs of registration & monitoring	Approved cookstove monitoring methodology in use in country
	Pre-existing DNA; No PoA	Pre-existing GS-accredited stove program in country	Similar projects (e.g. Biomass) to use as proxy for baselining	Advanced developing country	Unclear business case for carbon financing activities	Approved monitoring methodology in use in country
	Clear organizational candidate for role of DNA					Clear monitoring partnership opportunities and capabilities
	No clear candidate or competing agencies	No accredited stoves or stove programs in country	No previous projects to use as reference	Developed Country	Costs of registration & monitoring will likely outweigh income generated by carbon credits	Lack of monitoring capabilities or partnership opportunities
Worst Case ↓						

- Implications -

The mechanisms for carbon financing are available and should be explored by cookstove programs in Laos.

Legend: Lao PDR

Carbon Finance Programs

One industrial biogas project is currently registered in Lao PDR, and one cookstove program has initiated the steps to access carbon finance for national scale-up

TBEC LIG Biogas Project

NORMAI/SNV Improved Cook Stove Program Lao PDR

Description

- The TBEC LIG Biogas Project involves the construction of an anaerobic wastewater treatment facility at the Lao-Indochina Group Company's (LIG) tapioca starch factory in Vientiane, Lao PDR. The factory processes cassava to produce starch powder.

- Partnership of SNV Laos and NORMAI
- Program has developed and promotes the Tao Payat stove that uses up to 20% less wood and charcoal than traditional stoves.
- Goal: To become sustainable in the long term through carbon finance and to disseminate efficient biomass cookstoves throughout Laos.

Participants

- TBEC (Lao) Co., Ltd
- Carbon Bridge Pte Ltd

- SNV Laos
- NORMAI
- Nexus – Carbon for Development

Progress

- CDM and GS registration 2012

- Carbon finance pre-feasibility studies complete.
- Goal: To disseminate 420,000 stoves over 8 years

- Implications -

Though there is limited precedent for carbon financing, new projects are moving forward with the hope that carbon finance can help them to achieve national scale in the long term.

Example Laos PDR Carbon Financing Organizations (1/2)

Carbon Financing

Several organizations have the capacity to develop carbon projects or offer carbon finance services in Lao PDR.



- SNV is an international not-for-profit development organisation that believes that no-one should have to live in poverty and that all people should have the opportunity to pursue their own sustainable development.
- SNV works in 38 of the poorest countries worldwide with specialist expertise in agriculture, renewable energy, and water, sanitation and hygiene.
- SNV has experience implementing carbon finance projects in Vietnam.
- SNV Laos is now pursuing carbon finance for the Improved Cook Stove Program in Laos in partnership with Nexus – Carbon for Development.



- LIRE is a Social Professional Non-Profit Organisation dedicated to the sustainable development of a self sufficient renewable energy sector in Lao PDR.
- LIRE strives to support the development of the country by exploring commercially-viable means to establish long-term alternatives to conventional practices.
- LIRE identifies projects and work with developers to help them realize the carbon value of their projects.



- A cooperative of development organizations that support vulnerable communities by scaling up successful climate-friendly projects.
- Members share expertise and services, access technical assistance and international funding opportunities such as carbon finance.
- Nexus members benefit from economies of scale, reduced risks, and a strong voice in the global community.
- Nexus has experience with carbon asset and technical assistance experience on carbon projects in Laos, including the SNV/NORMAI ICS program and a ceramic water purifier program.

Overall Carbon Finance Feasibility

Lao PDR is eligible for compliance and voluntary standard projects and has a high potential for emission savings.

- Supportive Market Criteria -

Existing Designated National Authority (DNA): Department of the Environment

Well-developed stove market with high demand for ICS

There are multiple, competitive carbon financing organizations to implement the work

LDC country where impact will be high

- Potential Risks-

The carbon market is still very new to the national and local government(s) (few carbon projects)

Differentiation important; Stove “copy cats” available with lower efficiency

Pending approval by the DNA for the fraction of Non-Renewable Biomass may create delays in assessing the correct baseline

Monitoring of decentralized projects raises the transaction costs of carbon finance, and makes stoves with small increases in efficiency unattractive in the long term

Opportunities

- Lao PDR is an LDC country, and therefore all carbon standards are eligible. Currently there are no cookstove projects registered.
- Experienced carbon finance service providers exist; some baseline and monitoring data is available
- There is a potential to scale up cookstove projects, making it attractive for carbon finance as overhead costs can be reduced.

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Lao PDR is a complex country, with an ethnically diverse population and where free wood fuel is widely available. However, there is a clear market for ICS. In addition, there are basic cookstove production and distribution capacities.

Macro	Social Impact	Consumer	Cookstove Industry	Carbon Finance
<ul style="list-style-type: none">+ Increased attention to environment by the government+ Deforestation is a major issue- Government bodies lack capabilities and resources- Very diverse population scattered across a large country with mountainous regions- Limited infrastructure (14% paved roads)- Large availability of free wood	<ul style="list-style-type: none">+ Health impacts of IAP are very large as more than 95% of the population cooks on solid fuels+ Lao Women Unions could be a “vehicle” for stove promotion+ Women and children are particularly exposed- In rural areas, fuel for cooking is generally collected from the ground and does not directly result in deforestation	<ul style="list-style-type: none">+ Willingness to pay for ICS in urban areas and some rural areas+ Existing demand for more durable and efficient stoves+ Long lasting habits of cooking with solid fuels- No IAP awareness- Use of tripod/three stone fires is still common	<ul style="list-style-type: none">+ High production of clay stoves to supply a large demand+ Existing network of clay cookstoves producers- Limited previous programs on ICS	<ul style="list-style-type: none">+ Experienced carbon finance service providers available- Limited carbon financing precedent, no registered cookstove project
Unfavorable	Favorable	Favorable	Moderately favorable	Moderately Favorable

Acknowledgements

This market assessment was conducted by Lao Institute for Renewable Energies (LIRE), under the supervision of Nexus, Carbon for Development and Nexant, Inc. and with the generous support of the Global Alliance for Clean Cookstoves

