

# Pathways to Cleaner Household Cooking in Lao PDR

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EAP CLEAN STOVE INITIATIVE KNOWLEDGE EXCHANGE SERIES

## Key Messages

- Today most households in Lao PDR still rely on fuelwood—mainly firewood and charcoal—as their main source of cooking energy, highlighting the vital role that improved stoves can play in mitigating the health risks linked to household air pollution from biomass cooking smoke.
- Stocktaking activities under the Clean Stove Initiative indicate a technical potential for improved stoves as high as 900,000 and favorable conditions for promoting them, suggesting a high market potential among urban and peri-urban households.
- Ensuring the ongoing availability of more and better stove choices at affordable market prices that meet and maintain standards of technical specifications requires building public-sector and supply-chain capacity and coordination among stakeholder institutions.



## Slow Transition to Modern Cooking Energy

The Lao People's Democratic Republic (PDR) has witnessed a steady rise in electricity service coverage over the past two decades, yet prospects for using modern fuels as alternative sources of household cooking energy remain limited. From 1995 to 2005, urban household use of electricity as the main source of cooking energy declined by 6.6 percent to just 3.8 percent, reflecting the rising retail electricity tariff for cost recovery (NSC 2005). All liquefied petroleum gas (LPG) must be imported, and the distribution network is limited to major cities along the Thai and Vietnam borders. As a result, the price of LPG fuel is high relative to household income, limiting use to a small segment of financially better-off urban households. By contrast, firewood is abundant and can often be freely collected, suggesting that the switch to modern forms of cooking energy may not be easily achieved.

## Commitment to Renewable Energy Development

The 2011–25 roadmap of the Government of Lao PDR's Renewable Energy Development Strategy identifies improved cookstoves as a specific area for promotion and development (Lao PDR 2011). Given that biomass cooking fuels represent an estimated 70 percent of the country's total energy consumption—with major implications for human health, quality of life, and the global climate—the strategy calls for the development and market deployment of the most energy-efficient, culturally appropriate cookstoves. It also envisions promoting the scaled-up use of biogas systems to further reduce the country's heavy reliance on fuelwood, as well as imported LPG, for household cooking (TABI 2011).

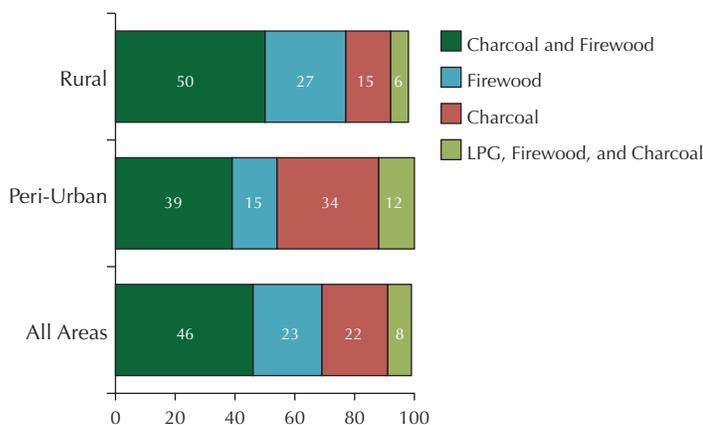
## Clean Stove Initiative

The Clean Stove Initiative (CSI) for Lao PDR promotes clean, energy-efficient cooking solutions, contributing to achieving the goals of the government's Renewable Energy Development Strategy, including its related health concerns.<sup>1</sup> Under phase one, initial stocktaking activities included a field survey, while development of the intervention strategy comprised stakeholder consultations and two consultation workshops.

The CSI field survey, conducted in Vientiane capital and the provinces of Bolikhamsai, Khammouane, and Vientiane, consisted of (i) a household cooking energy survey conducted separately in peri-urban and rural areas and (ii) a market survey of biomass cookstoves and the supply chain. The household survey focused on demand for cooking fuels and cookstoves, including questions about the types of fuels and stoves used, cooking practices, and household members' awareness of the

1. The CSI comprises four phases: (i) initial stocktaking review and market study, followed by development of the intervention strategy; (ii) strategy implementation; (iii) implementation of pilot programs; and (iv) impact evaluation and generation of lessons learned (World Bank 2011).

**Figure 1. Household Cooking Fuel Mix in Rural and Peri-urban Areas of Lao PDR (percent)<sup>a</sup>**



Source: CSI field survey.

Note: Results are from rural and peri-urban areas in Vientiane capital and Vientiane, Bolikhamsai, and Khammouane provinces.

a. About 1 percent are unidentified, including some combination of firewood, charcoal, biogas, electricity, and other fuel types.

health risks from biomass cooking smoke. The market survey, which aimed to better understand the entire market supply chain, was conducted among stove retailers, wholesalers and traders, and producers.

## Cooking Fuel Profile

The CSI survey results confirm data from the recent national census, showing that most households in Lao PDR use a complex mix of cooking fuels. These consist primarily of firewood and charcoal, supplemented by LPG and electricity. In rural areas, firewood predominates, while charcoal has become increasingly popular in peri-urban areas. Sixty-nine percent of survey respondents agreed that electricity is too expensive for cooking, and less than half of the 6–12 percent of households that cook with LPG said they use it regularly, owing to its high price. In line with the national census results, the CSI survey findings confirm that about 92 percent of rural households rely on firewood, charcoal, or a combination of the two as their main source of cooking fuel, compared to about 88 percent of peri-urban households (figure 1).

## Drivers of Cooking Fuel Choices

The key determinants of households' choice of cooking energy are resource availability and fuel pricing, along with ease of use, convenience, and cleanliness. About 96 percent of rural households and 79 percent of peri-urban ones indicated that firewood is freely available. About 5 percent of rural households make their own charcoal. Those that purchase it, typically buy

it in large fertilizer bags, each weighing about 25–30 kg. The average retail price per bag is only about LAK 25,000–30,000.

Urban households in economically advanced areas are rapidly switching from firewood to charcoal. Even in the northern provinces, urban households are slowly shifting from firewood to charcoal. But the lowest-income households continue to use firewood, along with charcoal, suggesting that most households in Lao PDR will continue to meet their cooking needs using a mix of fuelwood, supplemented by limited amounts of modern cooking energy, in the foreseeable future.

## Indoor Pollution: Who's At Risk?

Continued reliance on fuelwood for household cooking underscores the vital role of improved cookstoves in mitigating the health risks linked to indoor air pollution (IAP). Smoke resulting from the incomplete combustion of solid fuels using low-quality stoves in poorly ventilated kitchens contributes to IAP, presenting a significant health risk to family members who spend a disproportionate amount of time in the household cooking area—primarily women and their young children (Ekouevi and Tuntivate 2011). A recent IAP study conducted in Lao PDR confirms the strong association between high levels of indoor air pollutants and respiratory illness in women and children (Mengersen et al. 2007).

In 98 percent of the households surveyed, women are responsible for preparing the daily meals. Typically, women who cook for family members are about 38 years old and spend about 2.25 hours each day on meal preparation. While cooking, they also tend to their young children (i.e., under 6 years of age). Thirty percent of rural households, compared to 16 percent of peri-urban ones, reported the presence of young children in the cooking area when women are cooking. This finding, combined with rural households' greater use of firewood for cooking—which emits more smoke than charcoal—suggests that rural children are more vulnerable to IAP exposure than their peri-urban counterparts.

## Cooking Environment Deficiencies

Contributing IAP risk factors include whether the cookstove has a chimney or hood, household cooking practices, kitchen ventilation, and family members' awareness of the link between IAP and cooking smoke. One-fifth of the CSI survey respondents had deficiencies in both their cookstoves (lacking a chimney and/or hood) and physical cooking area (lacking a window and/or vent). Only 8 percent had both a chimney and/or hood and a window and/or vent. In addition, a relatively large percentage did not clearly recognize the harmful effects of breathing smoke emitted from the incomplete combustion of solid fuels used for cooking. These findings highlight the need for a

### Box 1. Evidence of Potential Demand for Better Stoves

When introduced to Lao PDR in the 1990s, the tao prayat, the Lao version of the Thai bucket stove, had a durability of up to two years. Today, however, most types and models sold on the commercial market in Lao PDR last only about six months. Faced with stiff market competition and low profit margins, stove producers have cut costs in recent years by reducing the tao prayat's needed insulation, grate thickness, and number of grate holes, thus compromising the stove's durability. Despite this market failure to conform to original specifications to ensure quality and durability, the tao prayat remains quite popular among buyers, reflecting their willingness to pay for what they perceive to be a better stove. Producers continue to make the tao prayat, albeit in small quantities, while retail shop owners lack sufficient supply to meet customer orders, suggesting a large potential market for truly improved cookstoves.

Sources: CSI market survey and interviews with stove producers in Vientiane capital and Bolikhamxay, Khammouane, and Vientiane provinces.

well-targeted awareness-building campaign to educate family members on the health hazards of IAP and the importance of changing their current cooking practices.

## Potential Demand for Better Stoves

Current patterns and trends of cookstove ownership reveal favorable conditions for promoting better stove alternatives (box 1). In the CSI survey areas, most households purchase their cookstoves. More than half own and use more than one cookstove, and household income is positively associated with the total number owned. Most households could afford improved cookstoves, even if the prices doubled.

## Supply-Side Issues

The CSI market survey reveals key deficiencies in cookstove production, including slow processes and weak quality control. Commercially available stove types and models are individually made by local artisans in small family-owned businesses. Production processes are slow and labor-intensive, with weak quality control. Producers have a thin profit margin and rely on quick turnover; thus, they may not be interested in stove durability. Most lack appropriate training and technological know-how, relying instead on trial-and-error methods. Many lack capital and access to credit, yet virtually all are keenly interested in learning how to improve their stove production techniques and processes.

Stove producers rely on two channels to market their stoves: (i) direct delivery to retail shop owners and (ii) wholesalers/traders. Using the first channel requires that producers own a truck to transport their stoves to the shop; however, they receive a better price. Using the second channel, wholesalers/traders purchase the stoves in bulk from the producers and transport them to the retail shops, where they are sold. The supply-chain analysis confirms that producers require assistance in learning how to better market and sell their products. Currently,

producers lack access to user feedback—wholesalers/traders (middlemen) usually screen this information—which would give them a better idea of how to improve their stoves to satisfy customers' needs and preferences.

## Scaling Up: Market-Based Strategy

To correct for market deficiencies in both supply and demand, the proposed intervention strategy uses a market-based mechanism, which is widely considered the most efficient way to sustainably promote improved cookstoves. Ensuring the ongoing availability of improved cookstoves at affordable prices in the market requires building public-sector and supply-chain capacity and ensuring multisector cooperation.

### Building Public-Sector Capacity

This includes advising staff of national and local governments and academic institutions on establishing and enforcing cookstove standards, labeling, and certification; setting up a national cookstove testing laboratory; and educating consumers on the fuel-efficiency and durability standards they should expect from stove types and models and offering better stove choices to meet all segments of market demand.

### Building Supply-Chain Capacity

This includes training stove producers in new technologies, techniques, and processes; ensuring producers' access to financing; improving efficiency of the market chain, including helping producers develop business plans and a network to gain access to market information and intelligence; establishing an alliance for clean cookstoves whose members can share knowledge and experience with other alliances in the region and globally (e.g., through the Global Alliance for Clean Cookstoves); and fostering partnerships and cooperation to develop and implement public-awareness campaigns on the links between cookstove use and the health impacts of IAP and marketing campaigns for retailers of improved cookstoves.

## EAP Clean Stove Initiative

The East Asia and Pacific (EAP) Clean Stove Initiative is a follow-up regional program to the Flagship Energy Report, *One Goal, Two Paths: Achieving Universal Access to Modern Energy in East Asia and the Pacific* (1G2P). The EAP CSI focuses on achieving access to modern cooking and heating solutions in the EAP region, particularly through scaled-up access to advanced cooking and heating stoves for poor, primarily rural households, who are likely to continue using solid fuels to meet their cooking and heating needs beyond 2030.

The EAP CSI is a multicountry, multiphase program, with funding support provided by the Australian Agency for International Development (AusAID). The initiative includes four country-specific programs (China, Indonesia, Mongolia, and Laos) and a regional forum to promote collaboration, learning, and knowledge-sharing on access to modern energy at the household level. A three-pronged approach is used, focusing on (1) strengthening institutional capacity and creating an enabling policy and regulatory environment for scaling up access to clean stoves, (2) supporting supply-side market and business development, and (3) stimulating demand for clean and efficient stoves.

### Ensuring Multisector Cooperation

This entails close coordination among multiple stakeholder institutions with clearly defined roles and responsibilities. Through stakeholder consultations, the inter-ministerial CSI task force was established by the Ministry of Energy and Mines (MEM). The task force is headed by the Director General of the MEM's Institute of Renewable Energy Promotion (IREP), which serves as the CSI focal point and coordinating agency. The task force ensures that CSI policy and strategic directives are in line with national policy and the country's Renewable Energy Development Strategy. Task force members include key representatives of the following ministries, educational institutions, and organizations with grassroots-level support: Ministries of Agriculture and Forestry, Science and Technology, Health, Finance, Industry and Commerce, Natural Resources and Environment, and Information, Culture, and Tourism; National University of Laos; and Lao Women's Union.

### Pathways to Cleaner Cooking

Summing up, achieving universal access to clean household cooking solutions in Lao PDR requires a holistic approach. The results of this assessment indicate that a small proportion of wealthier households will be able to access LPG and increasingly more urban households will transition to purchasing charcoal as their incomes rise. There is also a niche market for biogas systems among qualified farming households. However, for most households—including those in the lowest income groups—who will continue to rely on firewood to meet their daily cooking needs, the proposed approach to creating a thriving stove market offers an important pathway to cleaner cooking. The benefits are fewer premature deaths, healthier and more productive lives, less drudgery for women, and less pressure on the environment.

#### CSI Update: Geographic Focus of Phase Two

In recent months, various local and international nongovernmental organizations (NGOs), funded through the European Commission's SWITCH-Asia program, have begun accelerating their efforts to promote improved cookstoves in Lao PDR; their work targets selected central and southern provinces, including several covered by the CSI field survey. In addition, the Asian Development Bank has stepped up efforts to promote improved cookstoves in the country. To complement these ongoing activities, the CSI strategy implementation (phase two) will focus on Lao PDR's northern provinces.

### References

- Ekouevi, K., and V. Tuntivate. 2011. Household Energy Access for Cooking and Heating: Lessons Learned and the Way Forward. Energy and Mining Sector Board Discussion Paper No. 23. Washington, DC: World Bank.
- Lao PDR (Lao People's Democratic Republic). 2011. Renewable Energy Development Strategy in Lao PDR. Vientiane: Government of Lao PDR.
- Mengersen, K., Lidia Morawska, Hao Wang, Fengthong Tayphasavanh, Kongkeo Darasavong, and Nicholas Holmes. 2007. Investigation of Indoor Air Pollution and Relationship to Housing Characteristics and Health Effects Observed by Occupants in Lao PDR. Executive Summary, Project for World Health Organization, International Laboratory for Air Quality and Health and Queensland University of Technology.
- NSC (National Statistics Center). 2005. Population and Housing Census 2005. Vientiane: National Statistics Center.
- TABI (The Agrobiodiversity Initiative). 2011. Info Sheet, Biogas Facilities Development, Lao PDR.
- World Bank. 2011. "Clean Stove Initiative in the East Asia and Pacific Region." Concept Note. World Bank, Washington, DC.

**ABOUT THIS NOTE:** This note summarizes the 2013 report, *Pathways to Cleaner Household Cooking in Lao PDR: An Intervention Strategy*, published by the World Bank's Asia Sustainable and Alternative Energy Program (ASTAE).

The findings, interpretations, and conclusions expressed in this summary note are those of the authors and do not necessarily reflect the views of the Executive Directors of the World Bank or those of the Australian Agency for International Development.