THE WORLD BANK

Australian Aid
Asia Sustainable and Alternative Energy Program

EAST ASIA AND PACIFIC CLEAN STOVE INITIATIVE SERIES

Clean Stove Initiative Forum Proceedings

Beijing, China

April 26–29, 2014

ASTAE

Australian AID

The International Bank for Reconstruction and Development/
The World Bank Group
1818 H Street, NW
Washington, DC 20433
USA

First printing: November 2014
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This proceedings was prepared by Yun Wu under the supervision of Yabei Zhang, with inputs from Natsuko Toba, Gailius Draugelis, and Robert van der Plas. This publication was edited by Norma Adams and typeset by Yuhong Mi. Special thanks go to Kun Cao and Tianxiu Kang for coordinating the production of the publication. Finally, the team wishes to acknowledge the generous funding support provided by the Australian government through the AusAID grant and ASTAE.

Overview

Today some 2.8 billion people—more than a third of the world's population—continue to rely on open fires or inefficient stoves to meet their daily household cooking and heating needs. Globally, household air pollution (HAP) resulting from the use of solid fuels for cooking and heating contributes to 4 million premature deaths each year (Lim et al. 2010).[1] Achieving universal access to modern energy services by 2030, including access to clean cooking and heating solutions, is a key objective of Sustainable Energy for All (SE4All), the global initiative of the United Nations. The World Bank is fully committed to meeting this objective, which is central to its mission of poverty reduction and improving people's quality of life.

EAP CSI Forum Context

Despite the East Asia and Pacific (EAP) region's impressive economic growth, every other household in the region still depends on solid fuels for cooking and/or heating, which has significant health consequences. According to the Global Burden of Disease 2010 study, more than 1.4 million premature deaths each year are attributable to HAP. The EAP Clean Stove Initiative (CSI) Forum is part of the World Bank's EAP CSI regional program, which focuses on achieving access to modern cooking and heating solutions in the EAP region, particularly through the 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 multi-country, multi-phase program, launched in early 2012 with funding support provided by the Department of Foreign Affairs and Trade (DFAT) of the Australian government through the World Bank's East Asia and Pacific AusAID Infrastructure for Growth Trust Fund (EAAIG), Asia Sustainable and Alternative Energy Program (ASTAE), and Energy Sector Management Assistance Program (ESMAP). The initiative includes four country-specific programs (China, Indonesia, Lao People's Democratic Republic, and Mongolia) and a regional forum to promote collaboration, learning, and knowledge-sharing on access to modern energy at the household level. The first CSI forum was held in Phnom Penh, Cambodia on March 18, 2013, concurrently with the International Clean Cooking Forum (March 18–22, 2013).[2]

The objectives of the second EAP CSI Regional Forum are twofold. The first is to share the progress, findings, and challenges of implementing the initiative's second phase. The second is to promote South-South collaboration, learning, and knowledge-sharing, with a focus on China's experiences. The forum is being held in Beijing on April 28, 2014, as part of a four-day event (April 26–29, 2014). A two-day, pre-forum event held April 26–27 focuses on participation in the 8th China Clean Stoves Expo in Langfang, Hebei province. Post-forum, South-South knowledge-exchange activities, scheduled for April 29, feature a meeting with officials of China's Rural Energy and Environment Agency (REEA) on South-South collaboration, tour of the stove-testing center at China Agriculture University in Beijing, and field visits with local stove manufacturers in Gaobeidian, Hebei province. The forum is co-organized by the China Alliance for Clean Stoves (CACS) and the REEA, Ministry of Agriculture, with funding support provided by the Australian government's DFAT, through the World Bank's EAAIG, and ASTAE.

The EAP CSI Forum comprises delegations, sector experts, donors, and regional and international partners. In all, participants include more than 50 delegates representing East, South, and Southeast Asia (Cambodia, China, Indonesia, Lao PDR, Mongolia, Nepal, and Vietnam), Central America (Guatemala and Honduras), and Sub-Saharan Africa,[3] as well as international experts. The morning session includes progress updates on the four CSI country programs, followed by a panel discussion on plans, progress, and challenges of national programs in scaling up access to clean cooking and heating. The

[1] S. S. Lim et al., "A Comparative Risk Assessment of Burden of Disease and Injury Attributable to 67 Risk Factors and Risk Factor Clusters in 21 Regions, 1990–2010: A Systematic Analysis for the Global Burden of Disease Study 2010." *The Lancet* 380(9859): 2224–60, 2012.

[2] ASTAE (Asia Sustainable and Alternative Energy Program), *Clean Stove Initiative Forum Proceedings*. Phnom Penh, Cambodia, March 18, 2013. East Asia and Pacific Clean Stove Initiative Series (Washington, DC: World Bank, 2013).

[3] The World Bank's Africa Clean Cooking Energy Solutions (ACCES) initiative.

afternoon session comprises four panel discussions: lessons learned from pilot Results-Based Financing (RBF) programs, business models for private-sector development, performance measurement of stoves standards and testing, and identifying the next steps for scaling up solutions in each participating CSI country. These presentations and panel discussions are summarized as chapters 1–6 in the main body of this publication. Appendix A highlights feedback and follow-up from pre- and post-forum activities, while appendix B describes the launch of the CSI e-Forum. Also included are speaker biographies (appendix C), participants' contact information (appendix D), and the CSI Forum agenda (appendix E).[4]

Key Findings Summary

All forum participants endorsed the national-program approach with high-level support as the way to scale up clean cooking and heating. National programs may have specific pilots that target stove-market segments or areas that can help to adapt policies and practices to local conditions. Such programs not only need to involve stakeholders representing a broad spectrum of positions, roles, and levels (local, provincial, national, and international) from the public and private sectors, as well as civil society. Success also depends on high-level political, technical, and financial support from national leaders and agencies—a key ingredient that has sometimes been lacking in past scale-up efforts.

Public-private partnerships have emerged as a preferred implementation approach to developing sustainable clean stove markets. Government's comparative advantage is to provide the enabling environment for markets to function transparently and to supply stoves at specific standards that meet the public interest. Its role should include promotion and public awareness-raising, standards-setting, and monitoring and evaluation of progress. The private sector's comparative advantage is to make a business out of selling compliant stoves and meeting various consumer preferences at prices people are willing to pay. Its role should include stoves production, marketing, and dissemination. Where market failures exist, incentives can be provided by the government, but these should be understood as temporary.

Given market failures to deliver clean cooking and heating solutions, especially to low-income households, subsidies will be needed to achieve universal access to clean cooking and heating. Affordability remains a significant challenge. While opinions vary on the role and sustainability of subsidies, they are accepted as a necessary "evil" to enhance market penetration, acceptance, and scale-up and achievement of production-and-distribution economies of scale. To succeed, however, subsidies must be well-targeted, have low potential for leakage, and be calibrated in order to avoid destruction of commercial incentives and discipline. Thus, government policies are needed to (i) establish and maintain adequate levels of subsidies and (ii) design and implement effective subsidy allocation mechanisms to mobilize and sustain private-sector participation in scaling up access to clean stoves.

Results-Based Financing is a promising approach for using public resources to incentivize the market. RBF mechanisms link financial incentives to defined results and help to clarify the respective roles of government and the private sector in delivering them. The government plays a facilitating role, providing policy support and financial incentives to motivate market development, while the private sector responds to the incentives and delivers the results.[5] However, there are operational challenges of balancing verification costs with level of precision; pre-financing small cash-poor enterprises in a low-margin business environment; and existing government regulations on subsidies, procurement, and accounting, which are design issues for RBF applications. In countries with low-emission stove-switching programs supported by significant subsidies—whether producer or results-based, as in Mongolia—a comprehensive program is needed to adjust market expectations of low prices for cleaner stoves, which includes, but is not limited to, reducing subsidy levels. In countries with low private-sector capacity, technical assistance is needed to build such capacity.

Dissemination of clean stoves must be viewed as a social marketing problem. Consumer preferences must be extensively studied and evaluated. The challenge is no less than behavioral change, and the determinants of behavior are not necessarily a desire for improved fuel efficiency or health outcomes. Rather, they rest on deeply ingrained sociocultural factors involving convenience, comfort, status, and cooking style.

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[4] This publication was edited by Norma Adams, Writer/Editorial Consultant for the World Bank.

[5] Details on the RBF approach are provided in Y. Zhang and O. Knight, "Results Based Financing: Framework for Promoting Clean Stoves." EAP Clean Stove Initiative Knowledge Exchange Series (Washington, DC: World Bank, 2012).

Measurement of stoves performance is required to convince users to adopt and use the stoves and to motivate government decision-making to support cookstove programs. Without systematic measurement and reporting of stoves performance, claims cannot be substantiated on health, environmental protection, climate change co-benefits, or other public-goods objectives.

Setting stove standards and testing protocols should be developed within the local context where the stove is being used. The examples of four country programs indicate that, without such contextual consideration, performance metrics might not be meaningful (chapter 5). Measurement of cookstove performance should include the reality of the multiple fuels and cooking devices used, cooking practices, and user behavior. Given the broad and diverse cooking practices and climate conditions that characterize the countries, along with the observed disadvantages of the water-boiling test, it is suggested that ongoing ISO discussions need to be a participatory, transparent process.

The CSI platform for South-South collaboration, knowledge exchange, and learning is much appreciated by all forum participants and should be continued. China's experience in developing and disseminating clean biomass and coal cooking and heating chains is impressive overall and can provide valuable lessons. Likewise, smaller markets like those in Mongolia provide valuable lessons that could be studied for scale-up in larger markets. Participation in pre- and post-form activities—attending the 8th China Clean Stoves Expo and interacting with stove enterprises and a local manufacturer—generated more interest in South-South collaboration. Participants agreed that the next step of this knowledge exchange should include creating opportunities for Chinese engineers to interact with their counterparts in interested countries to design clean cookstoves that modify the combustion chamber, based on the technology developed for Chinese stoves, while retaining the stoves' traditional outer appearance. To extend the CSI platform for South-South collaboration, the CSI e-Forum was launched following the forum (appendix B).[6]

The EAP CSI Forum event has already generated immediate results and concrete follow-up activities. Several notable examples are highlighted, as follows:

- The Indonesia delegation identified a stove at the 8th China Clean Stoves Expo that is potentially applicable in Indonesia and invited the stove manufacturer to submit it for that country's RBF pilot program. The stove manufacturer submitted the application, sample stoves were delivered to the Indonesia stove-testing center, and the stoves are ready for eligibility testing.

- Following the post-forum activities, the Mongolia delegation invited Chinese enterprises to visit Mongolia to learn about its stoves market. In response, the CACS organized a visit by the Chinese delegation to Mongolia, partially supported by the CSI in Mongolia, for June 2014.

- After meeting with Chinese government officials on South-South collaboration opportunities, the Indonesia and Lao PDR delegations expressed great interest in the stove collaboration programs funded by China's Ministry of Science and Technology (MOST). Both countries have submitted applications for funding support.[7] If the applications are approved by MOST, more collaborative activities will be organized, such as exchanges on stove testing and standards and promotion of technology and business partnerships, as well as knowledge-sharing between government officials, research institutes, and nongovernmental organizations (NGOs).

Looking Ahead

The next phase of CSI implementation will prioritize the scaling up of best practices, strengthening collaboration, and promoting knowledge-sharing on clean cooking and heating solutions. Lessons and insights gleaned from implementing country-level pilot programs will be used to scale up future programs. The CSI Forum and e-Forum will serve as important platforms for facilitating both regional and global communication among practitioners and policy makers. Building on the accumulated experience of forum conversations, it is expected that many more participants from the clean cooking/heating community will benefit from the CSI effort.

[6] Details on the CSI e-Forum are available at https://collaboration.worldbank.org/groups/clean-cooking-and-heating-solutions.

[7] Indonesia's application included an official letter from the Directorate of Bioenergy, Ministry of Energy and Mineral Resources (MEMR).

1

Progress Updates from Country Programs

Moderator: Dejan Ostojic, The World Bank
Presenters: Jiuchen Wang, Ministry of Agriculture, China
Enkhbold, Ulaanbaatar Clean Air Project, Mongolia
Seumkham Thoummavongsa, Ministry of Energy and Mines, Lao People's Democratic Republic
Anna Rufaida, Ministry of Energy and Mineral Resources, Indonesia

Since its launch in January 2012, the East Asia and Pacific (EAP) Clean Stove Initiative (CSI) has progressed smoothly, and significant progress has been made toward scaling up access to clean cooking and heating solutions. National consultation workshops have been conducted in China, Indonesia, and Lao PDR, and intervention strategies have been developed. The first EAP CSI Regional Forum was held in March 2013 in Cambodia. By late 2013, all four country programs had completed Phase I activities and had started implementing Phase II. In Mongolia, the CSI is taking advantage of extensive World Bank–led consultative work and expanding the stove switch-out intervention opportunities from Ulaanbaatar to the entire country. The CSI has achieved significant buy-in from China and Indonesia counterparts, both of which have requested the World Bank's support in designing and preparing their national clean stove programs. Lao PDR has also witnessed rapid progress, thanks to strong government support and close collaboration with development partners. The following sections provide updates of the four country programs.

China

Phase II of the China CSI focuses on four major areas of activity: (i) improving stove standards, testing, and verification system; (ii) strengthening institutions and building capacity of key market players; (iii) supporting pilot programs; and (iv) supporting preparation of China's second national clean stoves program and the Hebei Rural Energy Project.

All four activities are progressing smoothly. To improve stove standards, testing, and the verification system, two workshops have been held for key stakeholders, and a paper has been drafted that reviews the current system, compares international practices, and proposes a roadmap for moving forward. In addition, an array of knowledge products have been generated, including a website, newsletter, and photobook. The China Alliance for Clean Stoves (CACS) has conducted exchange events to facilitate knowledge-sharing and capacity building of institutions and other key market players. The Results-Based Financing (RBF) pilot program has been completed. A short note on lessons learned is being prepared, which will provide valuable insights for further scale-up of clean stove dissemination. Approval of a US$100 million IBRD loan to fund technical-assistance support for design of the Hebei Rural Renewable Energy Development Demonstration Project is expected soon. There has also been keen discussion and communication with the Government of China on preparing a Global Environment Facility (GEF) project (possibly with IBRD lending) to scale up access to clean cooking and heating in China using the RBF approach.

RBF Pilot Results

Two RBF pilots to promote clean stoves were conducted in villages of Hubei and Liaoning provinces. Except for the final program summary, all pilot work has been completed—from planning and selection of the villages and stoves to stove delivery, verification, and subsidy payment. Outcomes have been evaluated for reduction of

household air pollution (HAP) and greenhouse gas (GHG) emissions. Based on households' feedback, the pilot program has achieved positive results, including improved indoor air quality, better stove quality and after-sales services, and reduced energy use and emissions. That said, some issues remain, including households' financial constraints in covering the high upfront cost, lack of awareness of the benefits of clean stoves, limited selection of stove models, and additional administrative costs (chapter 3).

Exploring Scale-Up Resources

Building on the momentum from village pilot results and stakeholder engagement, the China CSI has begun exploring the scale-up of the current program, including potential resources for implementing the provincial-level project (e.g., GEF funding) and national-level program (e.g., using government budget with World Bank lending). These initial ideas have been discussed with the government and are now being further developed by a World Bank team in close consultation and collaboration with the government.

Mongolia

The Ulaanbaatar Clean Air Project (UBCAP) and Mongolia CSI are helping Mongolia's transition to a sustainable market for cleaner heating and cooking stoves in the poor, peri-urban areas surrounding the capital city and potentially nationwide. Mongolia presents an alternative approach to traditional cookstove programs. Under past programs in the last 2.5 years, low-emission stoves achieved a high penetration rate. Over that period, nearly 160,000 low-emission stoves (within 220,000 households) were purchased by peri-urban households from donor and government efforts. The low-emission technologies were imported, owing to a lack of locally available models, and were heavily subsidized. The challenge for Ulaanbaatar is to adjust market expectations of low-priced, low-emission stoves to a level where minimal or no direct consumer subsidies are needed. The UBCAP and CSI are supporting this transition by financing continued reforms of the RBF model, adjusting regulations and other incentives, creating capacity for laboratory testing and stove development, and coordinating market and public relations in a comprehensive transition program. The UBCAP is also financing feasibility studies for district-heating efficiency and power-plant emission controls to develop bankable measures for air-pollution abatement.

Progress and Challenges

The UBCAP stove program has set a target of 45,000 low-emission stoves. From October 7, 2013, when the program formally started, through January 22, 2014, more than 29,710 orders were taken; of these, 25,193 households have made payment, and 21,206 clean stove installations have been made. Among the existing challenges are continued high consumer subsidy levels; leakage; unconstrained production and sale of inefficient, polluting stoves; and difficulties related to updating household eligibility lists due to household migration and movement within the city.

In addition, the Stove Emissions and Efficiency Testing (SEET) laboratory based at the Mongolian University of Science and Technology (MUST), which has been strengthened under the project, has conducted hundreds of tests, gradually gaining the confidence of suppliers and the government. The criteria for clean stoves eligible for RBF financing (consumer subsidies) were set by the Municipality of Ulaanbaatar based on inputs from experts and on local context. Under the UBCAP, selection criteria were published, which generated significant interest from private-sector stove developers. In the UBCAP's first year, some 12 stoves were tested, out of which 4 were ultimately found eligible. In 2014, the number of eligible stoves doubled. A workshop under preparation at the stove development center based at MUST is expected to start operation soon and will provide stove producers additionally needed technical support. The project's awareness-building campaign has been progressing well, with key messages delivered to households through various media.

Transitioning to a National Clean Stove Market

The project has reached out to high-level government officials and has received support for implementation. The National Committee for Air Pollution Reduction (NCAPR), overseen by Mongolia's Prime Minister, has been quite keen on implementing the UBCAP and requested the World Bank to develop a national strategy. The Mongolia CSI team,[8] in consultation with all key stakeholders, prepared a draft National Low-Emission Stove Strategy of Mongolia, which was presented to the Prime Minister and Minister of Environment and Green Development. The strategy, which proposes a plan for the country to transition to a sustainable clean stove market, is now under discussion within the NCAPR. Publication of the strategy is expected once it is finalized, including measures to consider for nationwide scale-up.

[8] The Mongolia CSI team also supervises the UBCAP.

Lao People's Democratic Republic

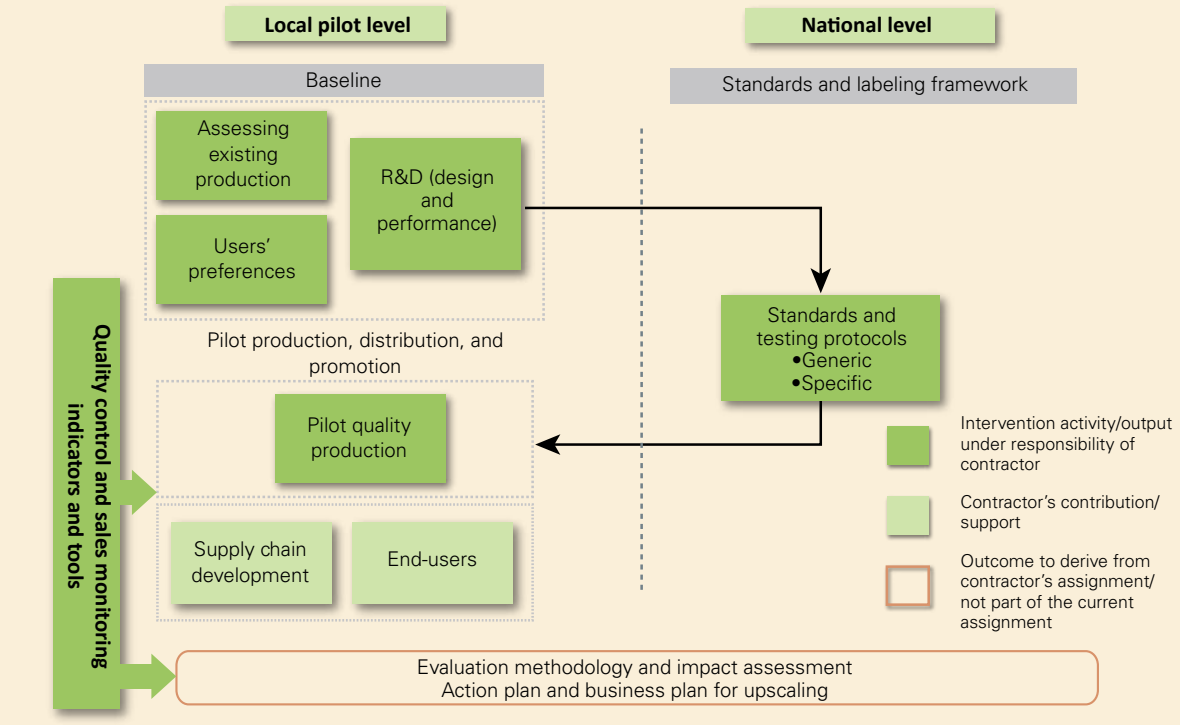
Phase II of the Lao PDR CSI is being implemented in close coordination and collaboration with current and emerging activities. These include (i) the current improved cookstove (ICS) program—led by the Netherlands Development Organization (SNV), Oxfam and other NGOs, and the Government of Lao PDR—which aims to deliver 100,000 stoves within four years; (ii) the Global Alliance for Clean Cookstoves (GACC) contract with the Renewable Energy, Environment, and Solidarity Group (GERES) for establishing regional testing centers; and (iii) the Asian Development Bank (ADB)–supported technical assistance, led by the SNV, for gender mainstreaming of improved cookstoves.

Filling the Gaps: Ongoing Activities

Key activities under Phase II build on existing ones and include the following: (i) an in-depth assessment of cookstove utilization, focused on clean stove performance, quality, and user acceptance; (ii) technical and policy backstopping support to the Inter-Ministerial CSI Task Force, particularly the Committee on Clean Cookstoves Standards in Lao PDR; and (iii) introducing new clean cookstoves, especially firewood clay cookstoves, in rural and/or urban and peri-urban areas in the northern provinces, where firewood still predominates as the main cooking fuel used by the vast majority of households.

A comprehensive household survey has been conducted to serve as a baseline for better understanding the country's stove and fuel markets, production and distribution networks, stove users' characteristics and preferences, and opportunities and challenges faced by local producers of improved cookstoves. Ongoing activities to promote clean stoves in the northern provinces and clean stove standards are progressing well. A pilot intervention was designed in May 2013. The CSI program is being implemented in partnership with the Institute of Renewable Energy Promotion (IREP), World Bank, GERES, and Lao Institute for Renewable Energy (LIRE) at local and national levels (figure 1.1). The Lao government–led ICS promotion activities include the building of provinces as strategic units, districts as comprehensively strengthened units, and villages as development units. The IREP has conducted multiple training sessions on ICS promotion in northern provinces. Institutional arrangements have been proposed for moving toward a national framework for clean cookstove standards and labeling (chapter 5).

FIGURE 1.1 CSI METHOD FOR SCALING UP CLEAN COOKSTOVES IN LAO PDR



Source: Lao PDR delegation.

Pioneering a Market for Health Benefits

If deemed feasible, the Lao PDR government may request including the innovative RBF pilot approach in its World Bank–supported Model Healthy Villages (MHV) program under the new Maternal and Child Health and Nutrition Improvement Project. Further information on the national program and RBF approach are found in chapters 2 and 3, respectively.

Indonesia

Phase II of the Indonesia CSI includes four main activities: (i) improving stove-testing performance standards and developing a national stove-testing laboratory and certification system, (ii) cultivating pilot programs by providing market players incentives through the RBF framework, (iii) strengthening institutions and building stakeholder capacity, and (iv) preparing scale-up to the national-level program. Activity implementation is supported through the coordinated pooling of donor and organizational resources (table 1.1). A complementary grant (€250,000), provided by the French Agency for Development (AFD) and implemented by GERES, supports technical assistance for the pilot program.

Two grants—one arranged between the World Bank and Government of Indonesia and the other between the World Bank and PT Bank Rakyat Indonesia Tbk (BRI)—are to support Phase II CSI implementation through December 2015. The grant to the Indonesian government will be utilized by the Directorate of Bioenergy to (i) establish a system for defining clean stoves as the foundation for market development and (ii) design and prepare a national clean biomass cookstoves program. The grant to BRI will provide incentives to partially finance the purchase of clean biomass cookstoves by consumers and end-users in the pilot-program areas of Central Java and Yogyakarta.

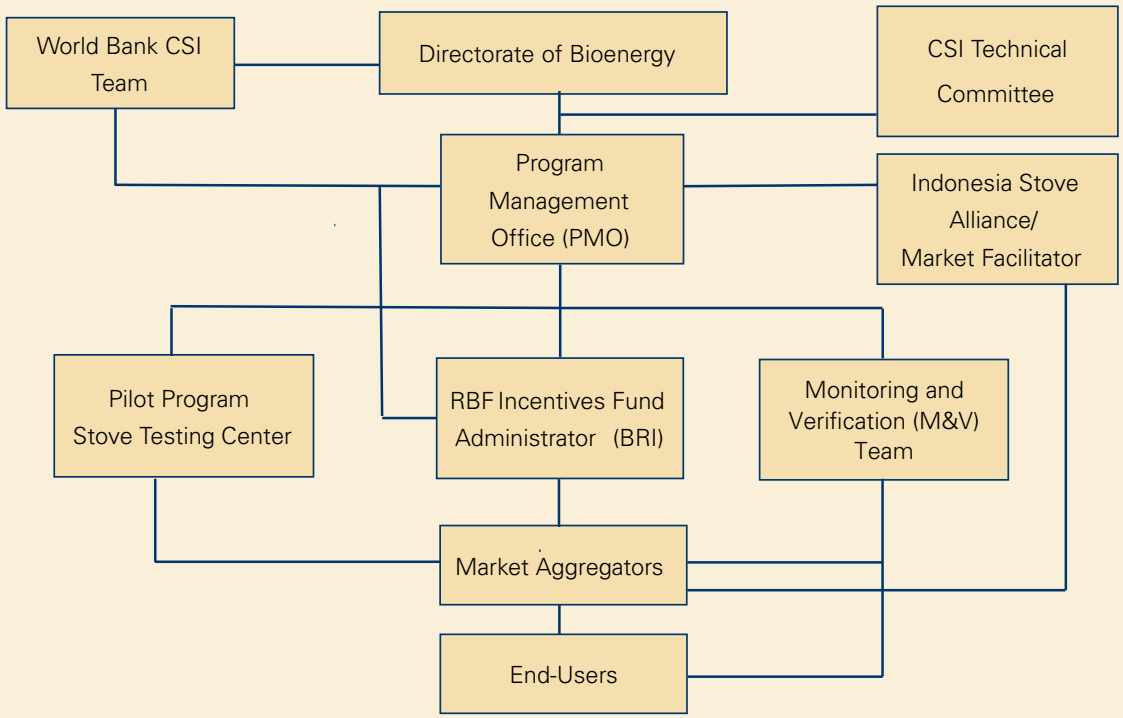
Under the pilot-program component, incentives will be channeled through market aggregators—legal entities that apply for the pilot-program incentives—who can sell eligible clean biomass cookstoves and demonstrate intended results, including actual stove usage and performance. The disbursement of incentives will be based on verified results to eligible market aggregators and will be expected to be passed on to final consumers through the market-based, stove-pricing mechanism (figure 1.2). Details on how the incentives are defined, applied, processed, and disbursed are included in the RBF program's operations manual.

TABLE 1.1 PHASE II IMPLEMENTATION ACTIVITIES OF INDONESIA CSI

Objective	Government-implemented activities	World Bank/partners–supported activities
Establish stove standards, testing, and certification system.	• Establish national stove standards and testing protocols and stove-testing and certification laboratory. • Designate stove-testing center for the pilot program.	• Provide international experience and technical advice on setting up stove standards, testing, and certification system. • Support establishment and operation of the stove-testing center for the pilot program.
Design and implement pilot program.	• Implement pilot RBF incentives program. • Oversee pilot-program implementation.	• Support pilot-program design. • Support monitoring and verification (M&V) of the pilot program. • Provide technical assistance to support key market players to implement the pilot program.
Strengthen institutions and build stakeholder capacity.	• Oversee overall CSI program management and consultation with key stakeholders.	• Support establishment of the Indonesia Alliance for Clean Stoves and conduct knowledge dissemination, public awareness-raising campaign, and training activities for key stakeholders. • Organize regional and international learning activities.
Move toward scaling up to the national-level program.	• Design and prepare the National Clean Biomass Cookstoves program.	• Provide international experiences and technical review.

Source: Indonesia delegation presentation.

FIGURE 1.2 ORGANIZATIONAL STRUCTURE OF CSI PILOT PROGRAM IN INDONESIA



Source: Forum presenters.

Responses to the first open call for stove technologies in February 2014 included some 15 companies with 20 stove technologies. Once the stove-testing results are made public, launching of an open call for market aggregators will soon follow. The government will then use the pilot-program results to scale up to the national program. Further details on the national program and stove standards are discussed in chapters 2 and 5, respectively.

2

Scaling Up Access through National Programs: Plans, Progress, and Challenges

Moderator: Charles Feinstein, The World Bank Group
Panelists: Anna Rufaida, Ministry of Energy and Mineral Resources, Indonesia
Erdenetsogt, National Committee for Air Pollution Reduction, Mongolia
Fang Fang, Ministry of Agriculture, China
Boualy Vongvisith, Ministry of Science and Technology, Lao People's Democratic Republic
Shekhar Sharma, Alternate Energy Promotion Center, Nepal

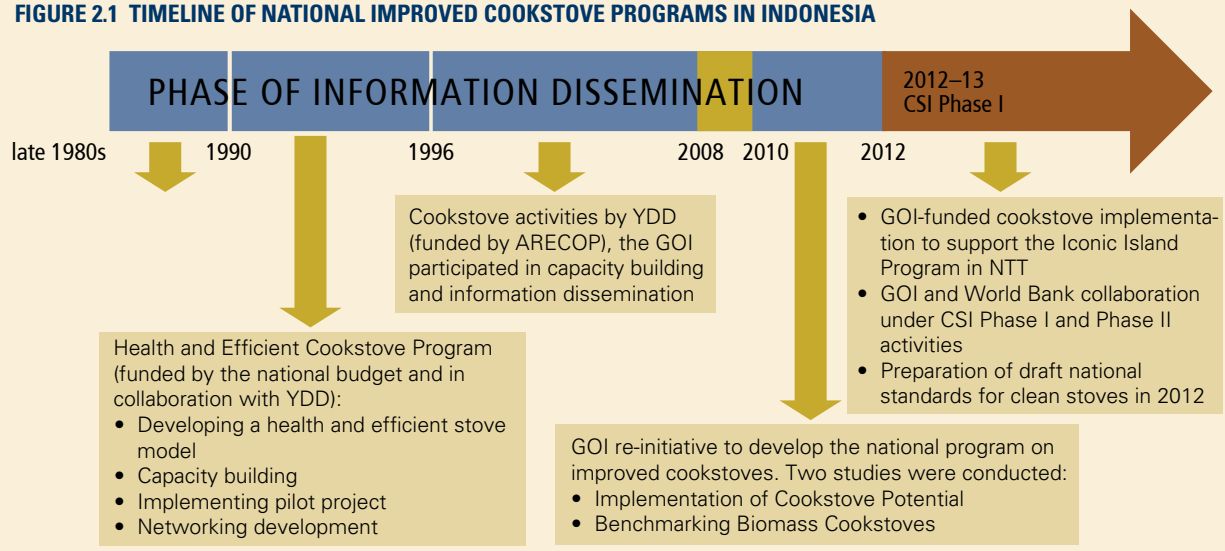
It is generally recognized that programs to scale up access to clean cooking and heating require stakeholder involvement across a broad spectrum of positions, roles, and levels (i.e., local, provincial, national, and international) from both the public and private sectors and civil society. Another key ingredient for success is high-level political, technical, and financial support from national leaders and agencies. All participants in this panel discussion agreed that there is no substitute for high-level national support and endorsed this approach as the most effective way to scale up clean cooking and heating. The following sections describe key lessons from past programs in the four EAP CSI countries, as well as Nepal, and summarize these countries' current planning of national programs, highlighting their progress and challenges.

Indonesia

Improved stove programs in Indonesia started in the late 1980s in collaboration with research institutes, universities, and local organizations. In 1990, the TSHE program (Tungku Sehat dan Hemat Energi) was implemented in collaboration with Yayasan Dian Desa (YDD). Funding from the national budget and by international donors was provided through the Asia Regional Cookstove Program (ARECOP) (figure 2.1).

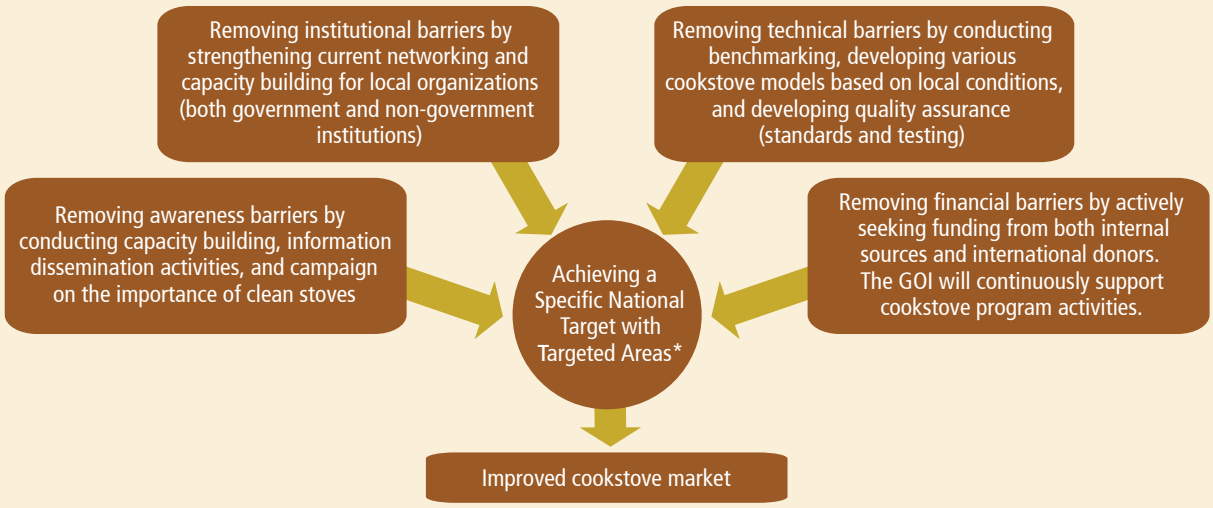
Early efforts were sporadic and lacked national targets. More recently, some research institutions have developed various designs for improved cookstoves, but such stoves have yet to penetrate the market. Contemporary

FIGURE 2.1 TIMELINE OF NATIONAL IMPROVED COOKSTOVE PROGRAMS IN INDONESIA



Source: Adapted from ASTAE (Asia Sustainable and Alternative Energy Program), *Clean Stove Initiative Forum Proceedings.* Phnom Penh, Cambodia, March 18, 2013. East Asia and Pacific Clean Stove Initiative Series (Washington, DC: World Bank, 2013).

FIGURE 2.2 EXPECTATION FOR THE INDONESIA CSI, PHASE II



Source: Adapted from ASTAE (Asia Sustainable and Alternative Energy Program), *Clean Stove Initiative Forum Proceedings*. Phnom Penh, Cambodia, March 18, 2013. East Asia and Pacific Clean Stove Initiative Series (Washington, DC: World Bank, 2013).

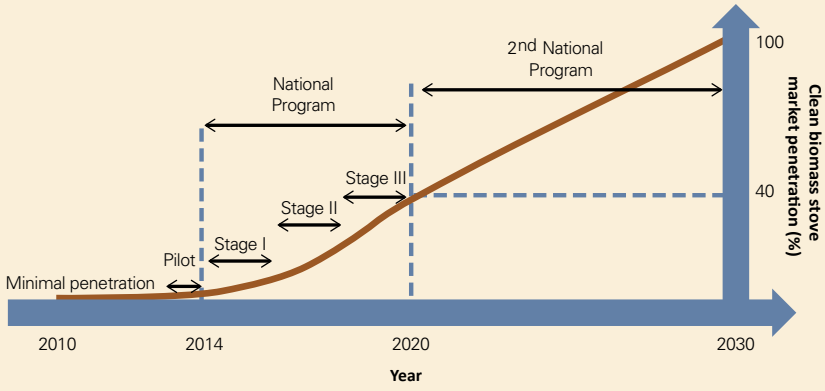
* It is expected that a specific target will be set after completion of the initial CSI stocktaking review.

improved clean-stove programs in Indonesia adopt either a non-commercial or semi-commercial approach. The non-commercial approach is being applied in a government-sponsored program implemented in poorer areas of the country where households have little capacity to pay for the stove units. The program covers West Java (1,000 units), Nusa Tenggara Barat (NTB) (1,000 units), Sumba (500 units), and Central Kalimantan (1,000 units). The semi-commercial approach is being applied by the Indonesia CSI, supported by the World Bank. This approach focuses on supporting market development using the Results-Based Financing (RBF) mechanism. The pilot program will start in DI Yogyakarta and Central Java, with the expectation of expanding it to Sumba Island to support the Sumba Iconic Island Program, in collaboration with the Asian Development Bank (ADB).

In sum, Phase II of the Indonesia CSI aims to achieve a specific national target within targeted geographical areas by developing a sustainable market of improved cookstoves through removing institutional, technical, awareness, and financing barriers (figure 2.2).

The Government will then use the pilot results to scale up the program across Indonesia through national programs. It was estimated that delivering 10 million clean biomass cookstoves by 2020 could result in a market penetration of up to 40 percent. This suggested that, by 2030, the Indonesia biomass cookstove market could be transformed, achieving universal access to clean cooking (figure 2.3). This achievement would significantly improve the health of rural people across Indonesia, particularly mothers and young children.

FIGURE 2.3 ROADMAP TO UNIVERSAL ACCESS TO CLEAN COOKING SOLUTIONS BY 2030



Source: ASTAE (Asia Sustainable and Alternative Energy Program), *Indonesia: Toward Universal Access to Clean Cooking*, East Asia and Pacific Clean Stove Initiative Series (Washington, DC: World Bank, 2013).

Mongolia

As a result of multiple donors' efforts, a total of 135,193 stoves had been purchased and 131,206 units installed by January 2014—an impressive penetration rate by any measure internationally. Also, a 20–50 percent reduction in measured fine particulate matter ($PM_{2.5}$) has been observed at various monitoring stations for some months. While these results are quite positive, the following challenges put the program's sustainability at risk:

- Re-sale of subsidized stoves threatens to reduce or reverse the air-quality benefits from the use of low-emission stoves in Ulaanbaatar, and there are difficulties with identifying eligible households due to migration.
- Large-scale, local production of qualified stove models that are affordable to households is lacking; without large subsidies, the list prices of imported models are unaffordable.
- There are regulatory and policy inconsistencies (e.g., benefits to imported stoves but not parts).
- Stove markets inside and outside Ulaanbaatar are linked; thus, if the subsidy were to end abruptly without a clear transition strategy, stove producers from outside the capital city could bring back traditional polluting models.

The Project Management Unit (PMU) indicates that the remaining unverified stoves have posed a great challenge to the project. Verification is a two-stage process—confirmation of installation at the household with GPS tracking and a second visit a few weeks later to check in on the household. Given the rapid penetration rates, this task is quite arduous because each of the thousands of households needs to be visited twice. Quality-assurance agents conducted verification for about half of the sold stoves; of these, 36,611 were verified. The remainder are still to be verified, and there is a lag. It could be that, when the verifiers visited, the house was vacant because household members were working, traveling, or had moved or some of the stoves were resold.

To address these issues, the Mongolia CSI team is working with the Mongolian government to develop a national strategy on transitioning to a sustainable, low-emission stove market. In this way, the air-pollution benefits from low-emission stoves can be increased and sustained in Ulaanbaatar and nationally. In a meeting with the World Bank, the Prime Minister confirmed that low-emission stoves are the Mongolian government's priority short-term measure to abate air pollution, with the policy objective of transitioning to a sustainable, low-emission stove market. The World Bank team was asked to lay out the challenges and propose measures that could help to achieve this objective. In response, the team prepared a national low-emission stove strategy and held consultations with key stakeholders, including government officials, stove suppliers, and donor representatives. The strategy includes recommendations for coordinating incentives, regulations, and standards to stimulate sustainable private-sector provision of low-emission stoves in Ulaanbaatar and possibly nationwide. It also includes a rollout plan for a national program, taking the country's challenges and opportunities into account. The National Committee for Air Pollution Reduction (NCAPR) is considering the proposed strategy for future programs, and details are under discussion.

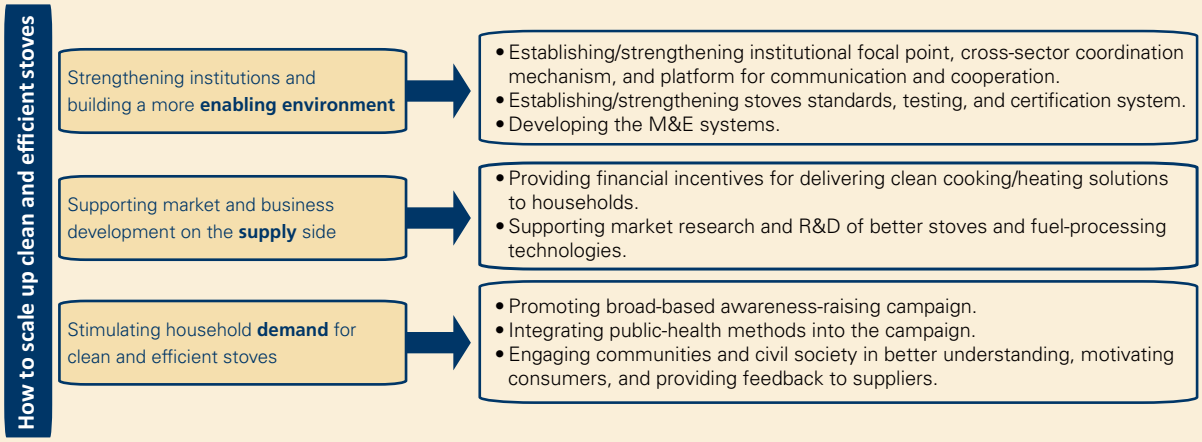
China

During the 1980s and 1990s, China's National Improved Stoves Program (NISP)—one of the world's most successful stoves programs—distributed some 180 million improved stoves. When the NISP ended in the late 1990s, the private sector assumed responsibility for stove commercialization. As of 2010, it was producing about 2.3 million clean heating coal stoves, 20 million honeycomb coal cooking stoves, and 600,000 clean biomass stoves. Yet stove development and production have not kept pace with the multidimensional challenge of promoting clean stoves.

The few provincial and local stoves programs implemented since completion of the NISP have confronted a number of issues. The main challenges are (i) low technology level of stoves; (ii) need to update obsolete stoves promoted in the past; (iii) the large number of rural households that still rely on traditional stoves; (iv) insufficient investment; and (v) lack of resources for stove maintenance, supply chain management, and quality assurance.

In consideration of past programs, the country's current situation, and future goal, the China CSI has proposed a new strategy, comprising three main components: (i) strengthening institutional capacity and creating an enabling policy and regulatory environment for scaling up access to advanced stoves, (ii) supporting supply-side market and business development, and (iii) stimulating household demand for clean and efficient stoves. A national program that implements the proposed strategy will help China to achieve the goal of universal access to modern-energy services by 2030, as set by the United Nations (figure 2.4).

FIGURE 2.4 OVERALL TRANSFORMATION STRATEGY TO SCALE UP CLEAN COOKING AND HEATING IN CHINA



Source: World Bank, *China: Accelerating Household Access to Clean Cooking and Heating*, East Asia and Pacific Clean Stove Initiative Series (Washington, DC: World Bank, 2013).

At the implementation level, the pilot-program experience and lessons learned will better inform the design and implementation of a national program. Potential resources and projects are being discussed with the government, with the aim of pilot scale-up. One possibility is to apply Global Environment Fund (GEF) resources to scale up the RBF pilot in selected provinces, supported by ongoing capacity strengthening of institutions and other key market players and building a more enabling environment. Building on previous village pilot projects, the RBF mechanism will be implemented in selected provinces to promote clean stoves. With the momentum gained during the provincial program, it is expected that a national program can be prepared concurrently.

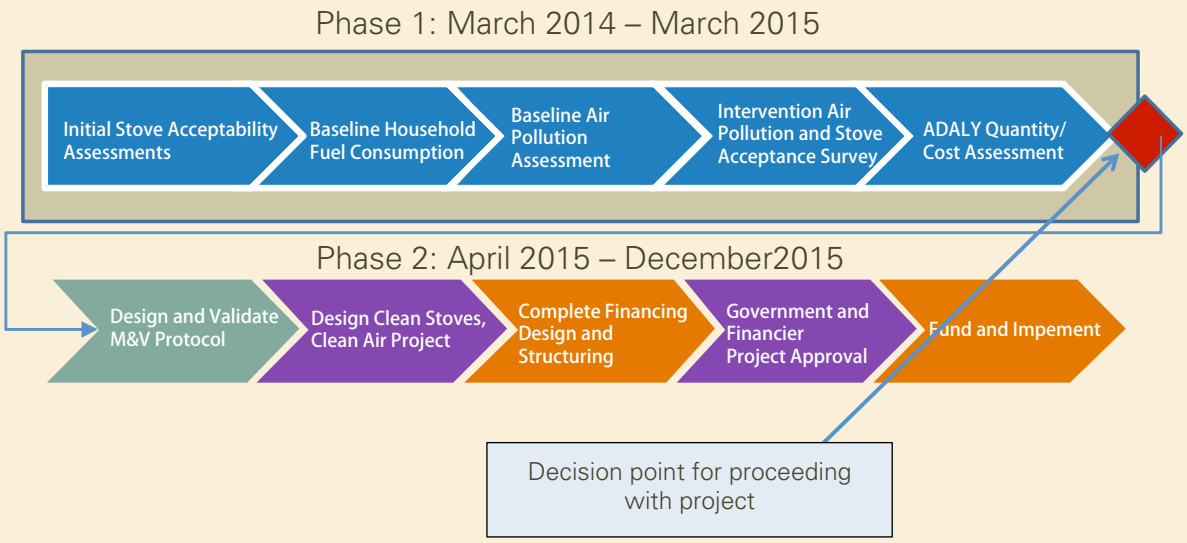
Lao PDR

There is great opportunity to scale up a clean stove market and roll out a national program. People's awareness of the health costs of inefficient biomass stoves is growing, as is their understanding of the exposure-response relationship between major diseases and biomass smoke inhalation. Also, the new super-clean woodstove technology is available and may be cost-effective in reducing the incidence of related diseases.

The CSI, together with the Lao PDR government, is taking a phased approach to preparing a clean air/clean stoves project, which is part of the World Bank's assistance to Lao PDR for improving maternal and child health. If the results of Phase 1 activities (March 2014–March 2015) are positive, Phase 2 activities can follow (April 2015–December 2015). They will center on project design, as well as design of the monitoring and verification (M&V) protocol and financing arrangements for public-private funding of stoves via payment on delivery for Averted Disability-Adjusted Life Years (ADALYs) (figure 2.5).

For the government to reach the decision to proceed with Phase 2, two key outputs from Phase 1 activities are required (figure 2.5). The first is attaining a satisfactory level of social acceptability of the clean cookstoves among poor rural households, as demonstrated by their use of the super clean cookstoves to meet most of their daily cooking needs and willingness to pay. The second is achieving cost-effectiveness in the health benefit (i.e., reduced morbidity and mortality among Lao women and children) from predictable stove use, using the World Health Organization (WHO) metric (i.e., cost per ADALY is less than or about equal to per capita GDP). If the Ministry of Health and the World Bank agree that clean air and clean coosktoves are a priority and can be incorporated with the proposed IDA support for maternal and child health care, they can then proceed with the clean air/clean stoves component of the FY16 Maternal and Child Health and Nutrition Improvement Project.

FIGURE 2.5 LAO PDR GOVERNMENT/WORLD BANK PARTNERSHIP TO DEVELOP A SALABLE HEALTH PRODUCT



Source: Forum panelists.

Nepal

The Alternative Energy Promotion Centre (AEPC) is the Government of Nepal's focal agency for the promotion and development of renewable energy technologies. Since its establishment in 1996, the AEPC has promoted various clean cooking solutions and technologies, including improved cookstoves (ICS), biogas, solar cookers, and low-wattage electric cookers (Bijuli Dekchi). In 2011, the government and development partners jointly agreed to support the formulation of the National Rural and Renewable Energy Program (NRREP), a five-year (2012–17) initiative, under which all future programs and projects for which the AEPC is the executing partner (including improved stove programs) are included.

In 2013, Nepal's Prime Minister announced an ambitious mission: "Clean cooking solutions for all by 2017, thereby ensuring an indoor-air-pollution free Nepal." The technology options for achieving the mission of Clean Cooking Solutions for All (CCS4ALL) include improved cookstoves, biogas, solar cookers, and more advanced technologies (e.g., briquettes, gasifiers, and electricity-based cooking). These four technology options are promoted under the NRREP, implemented by the AEPC, and supported by various development partners, including the World Bank. A second focus is institutional development, comprising institutional support, monitoring, and gender and social inclusion.

The implementation approaches adopted for the stoves program to achieve CCS4ALL include a joint multi-stakeholder coordination platform; a dedicated unit within the AEPC; targeted capacity building for service delivery; monitoring against a national baseline; and the active engagement of the private sector, financial institutions, local bodies, development partners, and stakeholders. Other features include a nationally coordinated local campaign, clustered approach, commitment of partners (from conceptualization through implementation), and multiple partnership modalities to cooperate in various support areas.

Key milestones toward achieving CCS4ALL have been reached under the NRREP stoves program. Numerous consultations and knowledge-exchange events were held in 2013. The Nepal Alliance for Clean Cookstoves (NACC) was launched in July 2013 to effectively coordinate key stakeholders in the program and generate synergy. In addition, the Nepal Bureau of Standards and Metrology (NBSM) requested national standards for cookstoves. In November–December 2013, a biomass cookstove design competition (including listing of metallic cookstoves) was announced. In support of the CCS4ALL objective, many development partners (e.g., SNV, International Union for Conservation of Nature, and Winrock International) have taken up improved cookstove dissemination, using the cluster approach.

3

Results-Based Financing: Does It Work?

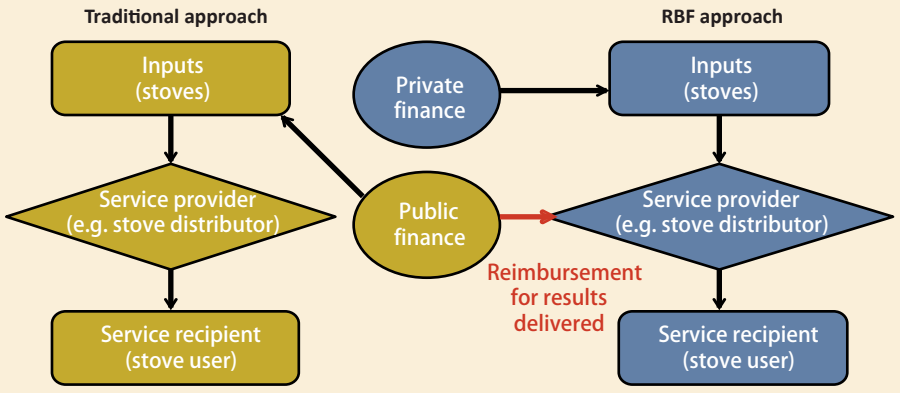
Moderator: Yabei Zhang, The World Bank
Panelists: Jingming Li, Ministry of Agriculture, China
Tomarbulang Lumbantobing, Ministry of Finance, Indonesia
Enkhbold, Ulaanbaatar Clean Air Project, Mongolia
Natsuko Toba, The World Bank
Julien Jacquot, GERES

RBF Overview

Results-Based Financing (RBF) is a concept comprising a range of public policy instruments, whereby incentives, rewards, or subsidies are linked to the verified delivery of pre-defined results. RBF is often used to enhance access to and delivery of basic infrastructure and social services, such as improved access to water and sanitation, energy, and health care. In most cases, the funding entity—typically a government, development agency, or other agent—deals directly with the service provider (e.g., private firm, public utility, civil society organization, or financial institution). Some of the better-known RBF approaches include output-based aid (OBA), conditional cash transfers, carbon finance, and advance market commitments.[9]

Unlike traditional public procurement, which uses public resources to purchase the inputs and contract service providers to deliver them to users, the RBF approach uses private-sector resources to finance the inputs and service delivery and public resources to reimburse the service provider upon delivery of the pre-defined results. This key difference gives RBF the potential to improve the efficiency and effectiveness of disbursing public resources and support of market-based interventions (figure 3.1).

FIGURE 3.1 DISTINGUISHING RBF FROM TRADITIONAL PUBLIC PROCUREMENT



Source: Adapted from Penelope J. Brook and Murray Petrie, "Output-Based Aid: Precedents, Promises, and Challenges." In *Contracting for Public Services: Output-Based Aid and Its Applications*, eds. Penelope J. Brook and Suzanne M. Smith, 3–11 (Washington, DC: World Bank, 2001).

[9] Details are provided in Y. Zhang and O. Knight, "Results Based Financing: Framework for Promoting Clean Stoves." EAP Clean Stove Initiative Knowledge Exchange Series (Washington, DC: World Bank, 2012).

The conceptual framework for using RBF in programs to promote clean stoves could include three key building blocks—(i) defined clean stoves, (ii) results-based incentives, and (iii) a monitoring and verification (M&V) system—supported by two pillars—(i) institutional strengthening and capacity building and (ii) awareness-raising campaigns (figure 3.2).

Pilot Program Implementation

The EAP CSI country programs are at various stages of implementing the RBF pilots. The sections that follow highlight the unique features of each of the four pilot programs, what is being learned, and the main design and implementation challenges.

China

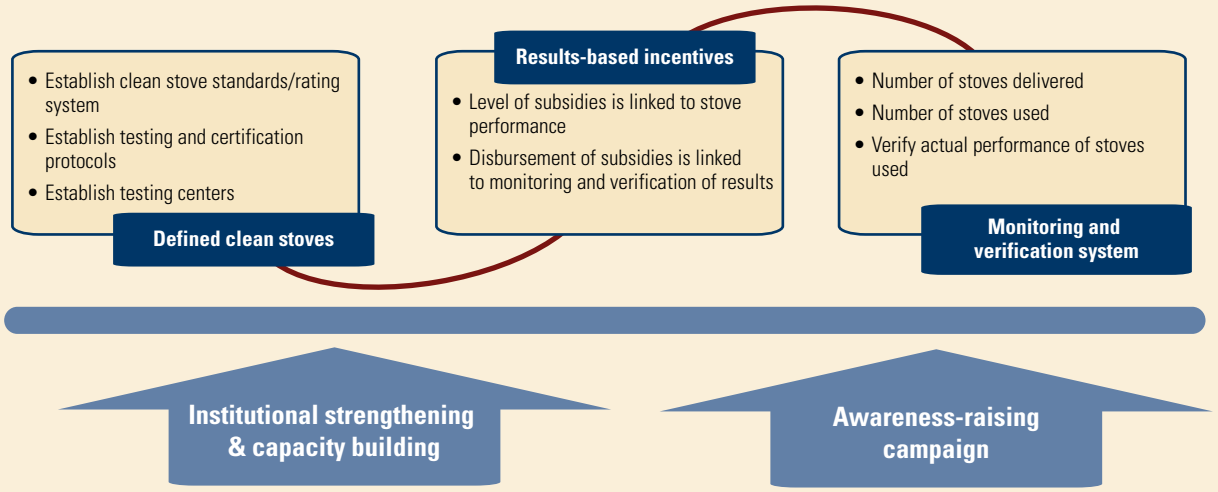
China has already completed its RBF pilot program, and is preparing a report that summarizes lessons and experience. The RBF pilot was carried out in two representative villages: one in the South and the other in the North. Both villages were selected against several criteria and in consultation with relevant stakeholders. Throughout the design and implementation of the two pilots, key elements of the RBF framework were followed, including the development of selection criteria for stove technologies and stove suppliers, the setup of results-based incentives level, and disbursement conditions and schedules, as well as a third-party monitoring and verification (M&V) system, accompanied by training and awareness-raising activities. China's RBF pilot program was jointly managed by its Ministry of Agriculture and the World Bank and implemented by China's Rural Energy and Environment Agency (REEA), with local government support.

By program completion, both pilot villages had attained a number of positive outcomes, especially in terms of indoor air quality, energy savings, fuel cost savings, and user satisfaction. These outcomes were generally supported by adoption of the RBF mechanism. Scaling up such pilots will require necessary adjustments of the detailed program design in accordance with local characteristics, particularly with regard to developing eligibility criteria for stoves and suppliers and RBF incentive levels.

Indonesia

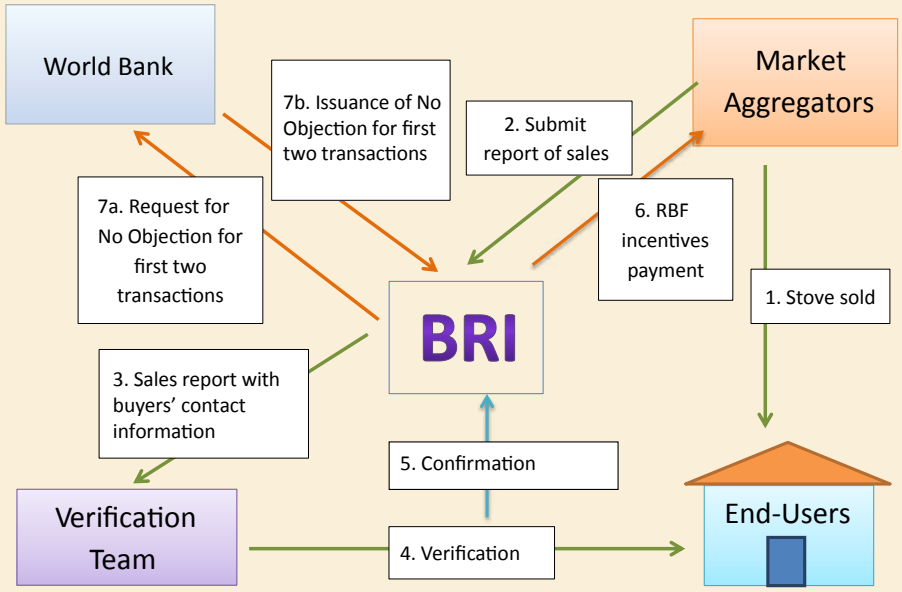
The RBF scheme in Indonesia provides key market players—known as market aggregators—incentives through the RBF framework, whereby incentives are linked to verified results. Disbursement depends on the results delivered, which must be verified by an independent, third-party team. Results under the RBF incentives are defined as qualified clean cookstoves sold to and used by the buyers. The participating market aggregators receive financial incentives only after the verification team has confirmed that the qualified clean cookstoves have been sold to and used by the purchasing households. Figure 3.3 illustrates the seven-step process.

FIGURE 3.2 RBF FRAMEWORK WITH THREE BUILDING BLOCKS AND TWO SUPPORTING PILLARS



Source: Y. Zhang and O. Knight, "Results Based Financing: Framework for Promoting Clean Stoves." EAP Clean Stove Initiative Knowledge Exchange Series (Washington, DC: World Bank, 2012).

FIGURE 3.3 DISBURSEMENT PROCESS FOR INDONESIA RBF PILOT PROGRAM



Source: Forum panelists.

To ensure that every qualified clean cookstove sold can be tracked, market aggregators are required to keep records of all stoves sold under the pilot program and submit these records to the PT Bank Rakyat Indonesia Tbk (BRI), which is responsible for managing and disbursing financial incentives to the market aggregators. The records contain sufficient information for the independent verification team to track qualified clean-stove buyers and verify that the clean stoves were bought by the end-users (first stage of verification) and used by them (second stage of verification).

The RBF pilot program announced a call for stove technology in February 2014. By late April, some 20 stove technologies from 15 companies had been received by the designated pilot stove-testing center. With expert international training and technical support, the center is now evaluating the applications and conducting stove testing. Once testing results are available, the program will launch a call for market aggregators.

Mongolia

The RBF approach in Mongolia, implemented under the Ulaanbaatar Clean Air Project (UBCAP), has been under way since 2013. Under this scheme, clean stove suppliers receive subsidies once stove installations are verified and the inefficient traditional stoves are removed. Verification of installation and stove-use training of household members is strengthened by having a third party visit the household at the time of installation and again a few months later. In this way, the third party ensures that the household is trained in the clean technology and continues to use the stove.

Stove-performance criteria are published,[10] and stove models are solicited for eligibility testing through an open competition. Those models that pass laboratory tests, used properly, can reduce $PM_{2.5}$ emissions by as much as 95 percent. Resources are also focused on building the capacity of a local laboratory to provide objective information on stoves' fuel-emissions performance.

[10] The main performance criteria are that stove power must be greater than 3 kW, $PM_{2.5}$ emissions cannot exceed 70 mg per net MJ, carbon-monoxide emissions cannot exceed 7 g per net MJ, and thermal efficiency must be greater than 70 percent.

Lao PDR

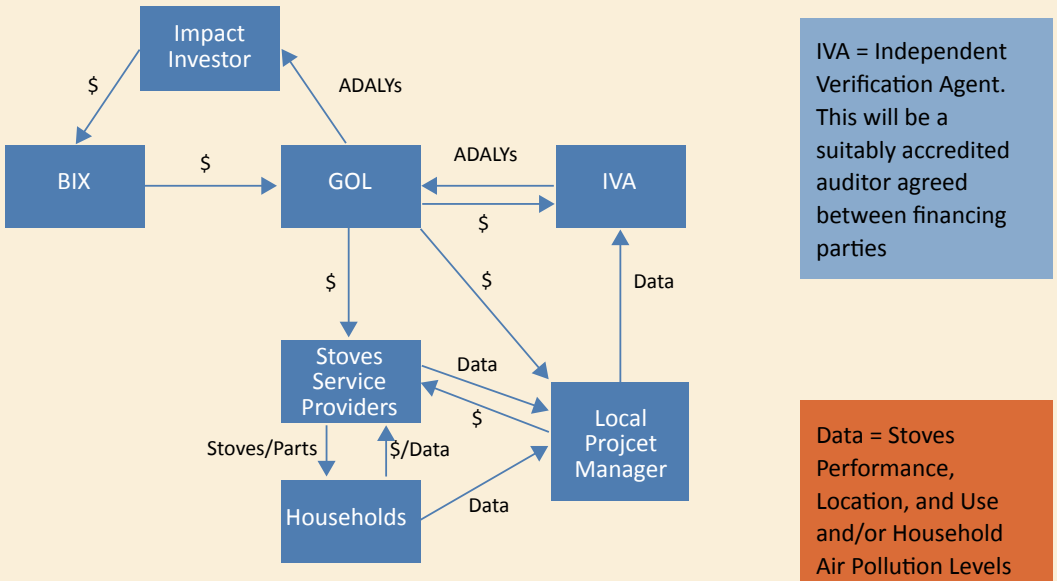
The Lao PDR program has tested cookstoves, developed improved models, and trained local producers. Draft stove standards were submitted to the Inter-Ministerial CSI Task Force's Committee on Clean Cookstoves Standards for final review. Under this scheme, the RBF mechanism is linked with Averted Disability-Adjusted Life Years (ADALYs) as a unit of financing (i.e., years of women's and children's lives saved because of reduced household air pollution [HAP] from using a clean cookstove).

Exploring application of the RBF approach to clean stoves has attracted much attention and support from within and outside the World Bank. Criticism received can also serve to improve the development of this innovative approach. A multidisciplinary World Bank team (i.e., health, energy, water and sanitation, social inclusion, gender and development, and environment), together with leading global research institutions, is undertaking in-depth HAP assessments in poor rural households to determine reduction in illnesses and premature deaths resulting from the use of clean cookstove technology. This cross-cutting, multi-sector partnership also blends public- and private-sector financing.

If the innovative health-impact RBF is included in the World Bank's FY16 Maternal and Child Health and Nutrition Improvement Project, it is envisaged that clean stoves/clean air will be an integral health component. The stoves will be funded under the menu of interventions of Model Healthy Villages (MHV), a Lao government supported, community-based health-promotion program, with certain criteria and targets. Poor households will purchase the clean stoves based on their willingness to pay, while retail shops will sell at full price. Both social and commercial marketing will be pursued. ADALYs will be monitored, verified, marketed, and sold, with World Bank assistance provided to donors and foundations for payment on delivery. ADALYs sales revenue will support the MHV budget.

A social impact investor (i.e., private foundation, bilateral donor, or World Bank trust fund) can also finance against a forward contract for purchase of ADALYs by a creditworthy buyer. The impact investor enters into a fixed-price, forward purchase contract to buy ADALYs on a pay-on-delivery model (i.e., ADALYS purchase agreement [ADPA]). A new private-sector, Base-of-the-Pyramid Impact Exchange Fund (BIX Fund) has already issued a letter of intent to the World Bank Group (World Bank and International Finance Corporation) to finance the clean stoves/health project in Lao PDR with a buyer who will pay for the ADALYs on delivery, year on year over the expected five-year project life. BIX lends against the impact-investor ADPA to fund the project (figure 3.4). In this case, the price for ADALYs is negotiated between BIX and the impact investor, and BIX takes project performance and service-agent delivery risk.

FIGURE 3.4 POSSIBLE PROJECT FINANCING STRUCTURE FOR THE LAO PDR CLEAN STOVES HEALTH PRODUCT



Source: Forum panelists.

4

Private-Sector Development: What Are the Business Models?

Moderator: Gailius Draugelis, The World Bank
Panelists: Simon Bell, The Apex Consulting Group, Indonesia
Feng Wen, Xunda Import and Export Company, China
Ken Newcombe, C-Quest Capital, Washington, DC
Jan Friedrich Kappen, The World Bank

While globalization trends offer opportunities to development programs that focus on clean cooking and heating stoves, new stove models are needed, and import barriers to qualified models should be addressed. For example, China's vast commercial manufacturing capacity can offer low-cost, high-quality stoves that could be imported almost anywhere in the world. Similarly, U.S.-made stoves are being sold in Africa, while Mongolia imports stoves from Turkey. Some Asian countries, including Indonesia, are relative newcomers to the international stove trade, while others, like China, have had long experience, even without much international support. Africa's multi-decade history has produced limited results. This panel discussion suggests how to reduce barriers to private-sector participation in the stove-market sector and describes promising business models and delivery mechanisms.

Mobilizing Private-Sector Participation

Market-development programs need to consider that the private sector requires economies of scale to deliver high-quality stoves at affordable prices. Markets may be too small to justify some program activities more characteristic of larger stove markets. That said, the design of program activities depends on the particular country context; thus, each program should be designed to address local characteristics.

Transforming the current stove market toward a cleaner, more efficient one requires financial incentives that attract more suppliers of clean cooking and heating solutions for households and working with potential private-sector investors interested in this business. This suggests that government programs, acting in a transparent manner, could also assume the role of bridge builder, connecting markets to the private sector.

Government policies are needed to (i) establish and maintain adequate subsidy levels and (ii) design and implement effective subsidy-allocation mechanisms to mobilize and sustain private-sector participation in scaling up access to clean stoves. Transparent "rules of the game" provide the predictability that the private sector needs in order to develop viable business plans. This means that there is a high premium on program coordination to ensure coherent policies and support measures.

Need for Innovative Subsidy Schemes

Considering that stove end-users are often widely scattered, the more cost-effective way of channeling financial incentives is through stove suppliers. The traditional subsidy approach uses a public-procurement procedure to purchase clean stoves and disseminate them to households for free or at a low price. This approach can quickly aggregate demand and deliver stoves; however, problems are likely to result. For example, users may not like the stoves and decide not to use them. Or they may not cherish the free stoves and fail to properly maintain them. Households who did not receive free stoves may expect to receive them in the future and thus decide to stop purchasing stoves. International experience has shown that more innovative subsidy schemes are required to develop a sustainable market and thus make government funding support more effective and efficient.

Results-Based Financing (RBF) is a useful, "smart-subsidy" mechanism to monetize a wide range of benefits. In the context of clean cooking and heating, the program objective—reducing outdoor or household air pollution (HAP)—is a key factor in design of the subsidy scheme. In addition, calculated economic benefits might justify the subsidy. However, people's willingness to pay for switching to clean stoves is key to developing the level of subsidy.

5

Stove Standards and Testing: How to Measure Performance

Moderator: Koffi Ekouevi, The World Bank
Panelists: Xiaofu Chen, China Alliance for Clean Stoves, Beijing
Crispin Pemberton-Pigott, The World Bank
Richard Grinnell, HELPS International, Guatemala
Michael Blunck, German Agency for International Cooperation (GIZ), India
Robert J. van der Plas, MARGE, the Netherlands

Establishing a system to define clean stoves is the foundation for developing a clean stoves market. Such a system includes (i) stove standards and associated testing protocols, which set testing methods and performance indicators and define stove-testing and measurement procedures; (ii) a testing laboratory that follows protocols and procedures for performing stove tests and reporting their results; and (iii) a stove-certification laboratory authorized to issue clean stove certificates based on stove-testing results.

Clean stove standards, testing protocols, and certification systems form the cornerstone for developing a clean stoves market. They define what a clean cookstove is and provide direction for improving stove design. If stove standards and testing protocols do not reasonably reflect on-the-ground use, an optimally designed, laboratory stove model may fail to deliver the intended efficiency and emissions-reduction results in the field or may not be adopted by end-user households. Another vital component in promoting the adoption of certified clean stoves is linking the stove-testing and certification system to an incentives-based mechanism. In addition, the process of setting stove standards and testing protocols needs to take the local context into account; otherwise, performance metrics might not be meaningful.

This panel discussion highlights the progress of the four participating EAP CSI countries in setting stove standards, including updates on the ISO (International Organization for Standardization) process. The summaries suggest that, given the broad and diverse cooking practices and climate conditions that characterize the countries, along with the observed disadvantages of the water-boiling test, ongoing ISO discussions need to be a participatory, transparent process.

Mongolia

Currently, Mongolia has criteria for (i) legal stove standards and (ii) subsidy eligibility for consumers who switch to better stoves under the Municipality's program supported by the Ulaanbaatar Clean Air Project (UBCAP) and the Mongolian Clean Air Foundation. Some differences need to be resolved gradually. Currently, none of the traditional stoves meet the current legal stove standards, while all of the stoves eligible for consumer subsidy support exceed them. The legal standards are based on European ones, but do not take into account local experiences with the low-emission stoves sold. Traditional stoves that fail to meet former or current standards are still allowed to be sold in the market. Thus, it is proposed that the eligibility criteria be maintained, especially the emissions-performance criteria used by Ulaanbaatar city for subsidies under the UBCAP. A concurrent review of current stoves-emission standards is also proposed. This review would compare the current standards with stove-switching eligibility criteria and field experience. Local characteristics and experience should be considered to ensure that the desired emissions performance can be achieved in the local market.

Small water-heating boilers (SWHBs) are one the fastest growing market segments for heating systems. These boilers include imported, locally produced, and do-it-yourself systems. To date, Mongolia has not set standards for the SWHBs. The UBCAP is supporting local consultants to develop a testing protocol that will be used to inform policy makers on the potential benefits of an improved SWHB program.

An emerging consensus among policy makers is the need to base decisions on scientifically determined, laboratory testing of stove-fuel emissions performance. Because emissions performance differs by particular stove-fuel combinations, reliable laboratory testing is essential to determine their potential contributions to reducing air pollution.

Mongolia benefits from having the Stove Emissions and Efficiency Testing (SEET) Laboratory, a local laboratory owned by the Mongolian University of Science and Technology (MUST). The SEET conducts performance tests locally, but these are under laboratory conditions, following a user's manual. Field tests could also be conducted to help understand the differences. The SEET Laboratory is encouraged to provide such caveats in its reporting, based on its judgment of the new technology's ease of use.

China

China has issued standards for stove-testing methods and technical specifications for cooking stoves, heating stoves, cooking and water-heating stoves, and cooking and radiant-heating stoves (table 5.1).[11] These standards apply not only to testing stove performance and specifications for product quality and safety concerns. According to Chinese law, any enterprise must manufacture qualified products that meet standard requirements. Before entering the market, any product must meet these requirements and pass the tests conducted by certified organizations.

At the same time, China's standards system has several shortcomings. Notably, standards methods and coverage are not systematic. Also, standards lag in relation to technology improvements and the emergence of new products. In addition, some standards are not implemented or enforced strictly enough to prevent inferior stoves from entering the market.

TABLE 5.1 CHINA'S HOUSEHOLD STOVE STANDARDS

Standard number	Standard name	Type
GB6412-2009	Testing protocol for domestic coal use and household stoves	National
GB16154-2005	General technical specifications for household water-heating coal stoves	National
GB/T16155-2005	Testing protocol for heating performance of household heating coal stoves	National
NY/T1001-2006	Technical specifications for household improved stoves and Kangs	Industry
NY/T8-2006	Testing protocol for thermal performance of firewood stoves	Industry
NY/T1703-2009	Specifications for installation and acceptance of water-heating stoves of heating system	Industry
NB/T34006-2011	General specifications for household densified biofuel heating stoves	Industry
NB/T34005-2011	Testing protocol for household densified biofuel heating stoves	Industry
NB/T34007-2012	General specifications for biomass cooking and heating stoves	Industry
NB/T34008-2012	Testing protocol for biomass cooking and heating stoves	Industry
NB/T34009-2012	General specifications for biomass cooking and radiant-heating stoves	Industry
NB/T34010-2012	Testing protocol for biomass cooking and radiant-heating stoves	Industry
To be approved	General technical specifications for household biofuel cookstoves	Industry
To be approved	Testing protocol for household biomass cookstoves	Industry
DB11/T540-2008	General technical specifications for household biomass stoves	Regional (Beijing)

Source: China Alliance for Clean Stoves (CACS), Background report prepared for the China CSI (Beijing: World Bank, 2012).
Note: GB = national standards, NY = agricultural industry standards, NB = energy industry standards, DB = regional standards.

[11] The Standardization Administration of China functions as the nation's standardization management organization. Relevant administrations under the State Council, together with the industry association that it authorizes, are responsible for standardization management in the corresponding departments and industries.

To improve the current system for stove standards, testing, and certification, a technical report has been prepared that evaluates the system's current status. Drawing on international best practices, it proposes a roadmap, including a recommended methodology and institutional arrangements, for moving toward a strengthened system over the short and long term. Stakeholders are actively engaged in standards-system discussions through workshops and consultations. Currently, a team of experts is drafting a national standard for clean biomass cookstoves. In addition, international collaborations are being carried out, and China is considering the compatibility of its national standards with those of the International Workshop Agreement (IWA) framework.

Results to date suggest that separate testing protocols should be developed for each of the various stove types. Also, real-time emissions monitoring for the national standard on cookstove testing needs improving. Furthermore, standards should take the local context into consideration. Finally, current standards need to be compared across countries so that necessary improvements can be made to achieve internationally accepted standards.

Indonesia

The Research and Development Agency for Electricity, New, Renewable Energy, and Energy Conservation, under Indonesia's Ministry of Energy and Mineral Resources (MEMR), serves as the national laboratory for stove testing and certification. Its main function is to issue government-authorized certificates for clean biomass cookstoves under the future national clean biomass cookstove program. The certificates are issued based on the results of stove testing, following standards and testing protocols accepted by the National Stove Standards Committee.

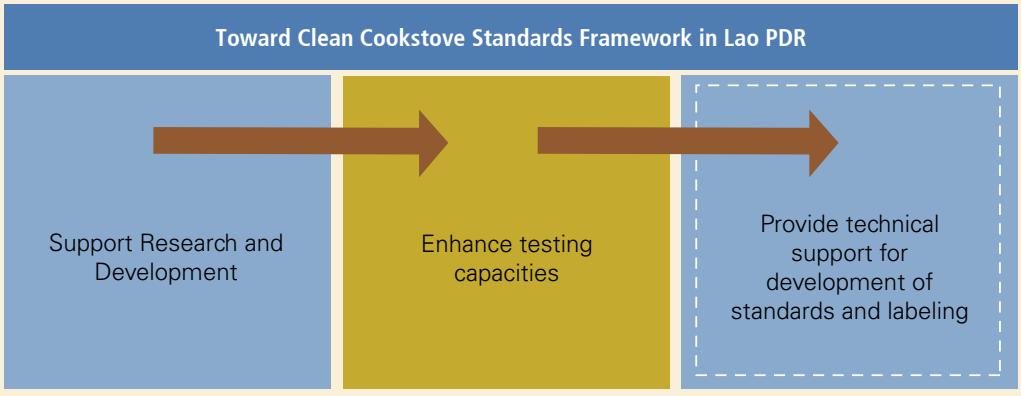
In early 2013, the Government of Indonesia established the Indonesia National Standard (SNI) on Biomass Stove Performance (Standar kinerja tungku dan kompor biomassa), registered as SNI3 7926:2013. The SNI defines the minimum requirements for biomass stove performance, covering combustion and thermal efficiency, cabon monoxide and particulate emissions, stove safety, and stove-testing procedures. This is the first step in selecting the method for the RBF pilot program. It is expected that the SNI will be improved, based on pilot implementation results (chapter 3).

Lao PDR

With support from GERES and LIRE, a new laboratory for testing stove performance was established under the Lao PDR CSI, and testing specialists were trained. The laboratory, part of the Regional Testing and Knowledge Center (RTKC) for Southeast Asia, ensures the quality and consistency of results through unified metrics, reference protocols, and a common rating system. It also functions as a center for research and development (R&D) on improved cookstoves and a training center for specialists testing new and existing cookstoves in national and local markets.

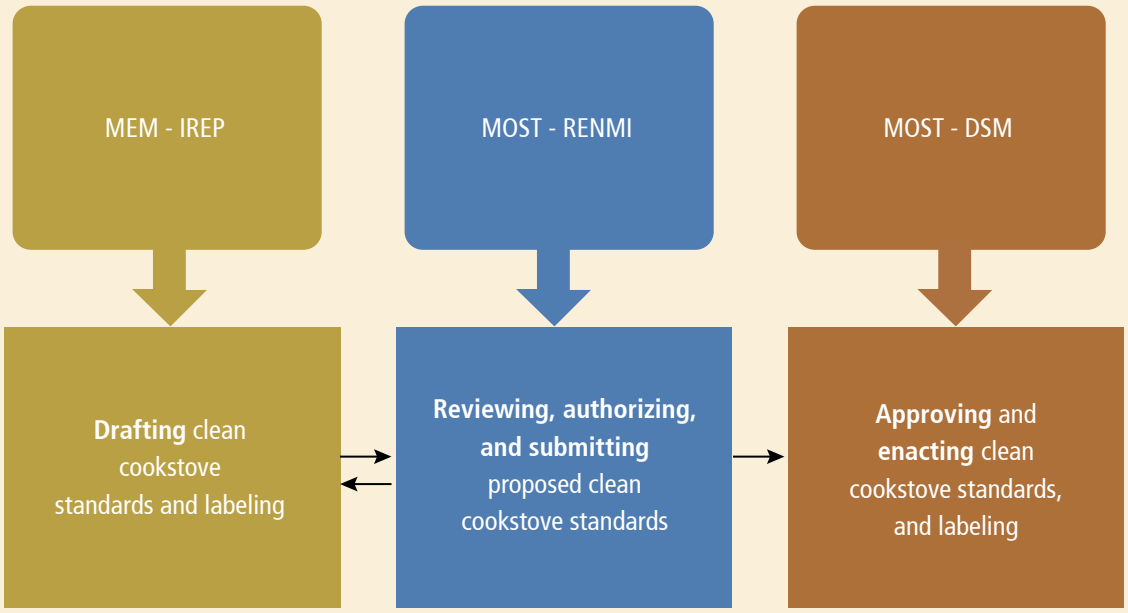
Draft cookstove standards have been submitted to the Inter-Ministerial CSI Task Force for final review. The major steps toward establishing national stove standards and labeling involve support for research and development, enhancing stove-testing capacities, and providing technical support (figure 5.1).

FIGURE 5.1 DEVELOPING NATIONAL COOKSTOVE STANDARDS AND LABELING IN LAO PDR



Source: Ministry of Science and Technology, Lao PDR.

FIGURE 5.2 INSTITUTIONAL ARRANGEMENTS FOR STANDARDS DEVELOPMENT IN LAO PDR



Source: Ministry of Science and Technology, Lao PDR.

The Ministry of Energy and Mines (MEM) and Ministry of Science and Technology (MOST) have shared responsibility for implementing the development of national standards and labeling (figure 5.2). The MEM's Institute of Renewable Energy Promotion (IREP) is in charge of drafting the clean cookstove standards and labeling. Under MOST, the Renewable Energy and New Materials Institute (RENMI) reviews, authorizes, and submits the proposed standards, while the Department of Standardization and Methodology (DSM) approves and enacts the standards and labeling.

6

Next Steps

Moderator: Yabei Zhang, The World Bank
Panelists: Fang Fang, Ministry of Agriculture, China
Anna Rufaida, Ministry of Energy and Mineral Resources, Indonesia
Erdenetsogt, National Committee for Air Pollution Reduction, Mongolia
Tayphasavanh Fengthong, Ministry of Health, Lao PDR

Significant progress toward scaling up access to clean cooking and heating solutions has been achieved under the EAP CSI Phase II activities. Clean stove standards, testing, and verification systems are being established and strengthened in the participating countries to create a more enabling environment for building a sustainable clean stove market. This panel discussion reviews the key components required for national program scale-up, highlights progress in ongoing cross-country learning, and summarizes priorities for moving forward.

Toward National Program Scale-Up

The knowledge-sharing, platform-building, technical-assistance, training, and awareness-raising activities currently under way are strengthening institutions and building the capacity of key market players. Strong and sustained political commitment to the clean cooking agenda, along with accountable institutions with adequate implementation capacity, are vital to national program scale-up; otherwise, the cooking needs of poor vulnerable households in remote rural areas will continue to be neglected. CSI pilot activities are the best way to test the effectiveness of the innovative RBF approach before national scale-up. Lessons learned from testing these pilots will be applied to national program design. Preparation of the national programs has begun and is gaining traction in the participant countries.

Cross-Country Exchanges

The platform for cross-country knowledge-sharing and learning established under the EAP CSI has spurred a wave of collaboration between countries. For example, while attending the 8th China Clean Stove Expo, the Indonesia delegation identified a potentially applicable stove for its local context and invited the Chinese manufacturer to submit that stove to the Indonesia RBF pilot program. Also, the Mongolia delegation invited Chinese enterprises and research institutes to visit Mongolia to learn first-hand about that country's cookstove market. Both Indonesia and Lao PDR have submitted applications for clean-stove collaboration programs with China.[12] Furthermore, it is expected that Honduras and China will collaborate on stove testing through their respective testing centers at the University of Zamorano and China Agricultural University (appendix A).

What Are the Next Steps?

Building on the foundation established, the EAP CSI country programs will continue strengthening institutional frameworks for national program scale-up and engaging key stakeholders. The "learning-by-doing" approach to pilot programs is helping to build countries' confidence in project management and operations. The lessons and insights gained from these experiences

[12] Indonesia's application included an official letter from the Directorate of Bioenergy, Ministry of Energy and Mineral Resources (MEMR).

will inform the design of national programs, and agreements will continue being made in preparation for them. Concurrent with national program preparation, the CSI will continue to systematically encourage cross-country learning and knowledge exchange by linking markets at various operational and policy-development stages and applying a similar structure in each country.

Moving forward, priority will be given to scaling up best practices, strengthening collaboration, and promoting knowledge-sharing on clean cooking and heating solutions. Follow-up is expected on the activities proposed at this forum. The CSI e-Forum platform (appendix B), together with the CSI Forum, will work to facilitate regional and global communication among practitioners and policy makers. Based on the accumulated experiences reflected in conversations at this forum, it is anticipated that many more participants from the clean cooking/heating community will benefit from the EAP CSI initiative.

APPENDIX A

Forum Feedback and Follow-Up Activities

The four-day, CSI Regional Forum event (April 26–29, 2014) generated immediate feedback and concrete, follow-up activities. Participants were impressed by the scale of the 8th China Clean Stove Expo and the level of stove-sector industrialization, and discussions and knowledge-sharing among the country delegations were dynamic. Clearly, China has much to offer in terms of its clean stove experience, technologies, and sector development. At the same time, it can learn much from other country programs. Post-forum feedback from participants has been quite positive. They much appreciate the World Bank for having provided such a useful platform and hope that it will continue to do so in the future. This appendix highlights notable feedback and follow-up activities.

8th China Clean Stove Expo (April 26–27)

Some delegations were able to identify stove products potentially applicable to their countries' local contexts. For example, the Indonesia delegation identified such a stove and invited its manufacturer to submit the stove for inclusion in the Indonesia RBF pilot program. The stove manufacturer submitted the application; subsequently, sample stoves were delivered to Indonesia's stove-testing center and are ready for eligibility testing.

The Mongolia delegation invited Chinese enterprises to visit Mongolia to learn first-hand about that country's cookstove market. In response, the China Alliance for Clean Stoves (CAAS) planned to organize a Chinese delegation to visit Mongolia two months later.

Post-Forum Activities (April 29)

Attendees were given the option of participating in one of three concurrent post-forum activities: meeting with officials of the Ministry of Agriculture and Ministry of Science and Technology on South-South collaboration, touring the China Agricultural University's regional stove-testing and knowledge center, and visiting local stove manufacturers in Gaobeidian, Hebei province. Results from these post-forum activities are described below.

Ministry Meetings

Forum participants met with government officials on China's rural energy situation and opportunities for South-South collaboration. The Ministry of Agriculture's Rural Energy and Environment Agency (REEA) and Department of Science, Technology, and Education, as well as the Ministry of Science and Technology's Department of International Cooperation were represented. Following these meetings, the Indonesia and Lao PDR delegations expressed great interest in the stove collaboration programs funded by the Ministry of Science and Technology. Both countries have submitted program applications. If the applications are approved for funding support, more collaborative activities will be organized (e.g., exchanges on stove testing and standards and promotion of technology and business partnerships, as well as knowledge-sharing between government officials, research institutes, and nongovernmental organizations [NGOs]).

Tour of Stove-Testing Center at China Agricultural University

Follow-up collaboration on stove testing is expected between China and Honduras through these countries' respective stove-testing centers at China Agricultural University in Beijing and the University of Zamorano in Tegucigalpa. Ongoing discussions are being held on staff and student-exchange opportunities. The Central America Clean Cooking Initiative (CACCI) is considering inviting one or two top Chinese cookstove designers to Honduras to work with researchers at the University of Zamorano on improving the combustion chamber of the Plancha cookstove.

Visits with Local Stove Manufacturers

Forum participants were impressed by the scale of stove-enterprise operations, the range of products manufactured (e.g., a variety of cookstove models, water heaters, and boilers), and the enterprise discipline embedded in Chinese culture. Participants had the opportunity to witness first-hand some 1,000 workers sharing motivational words as they lined up for lunch. The stove enterprises allocate time for classes on Chinese culture and have programs that enable workers to help the community's elderly.

Participants observed these enterprises' high-level of technical capacity to produce many types of household appliances and were convinced they could produce stove appliances if provided design drawings. It was agreed that the next step of this South-South exchange should be creating opportunities for Chinese engineers to interact with their counterparts in interested countries to design clean cookstoves that have modified combustion chambers, based on the technology developed for Chinese cookstoves, while retaining the stoves' traditional outer appearances.

APPENDIX B

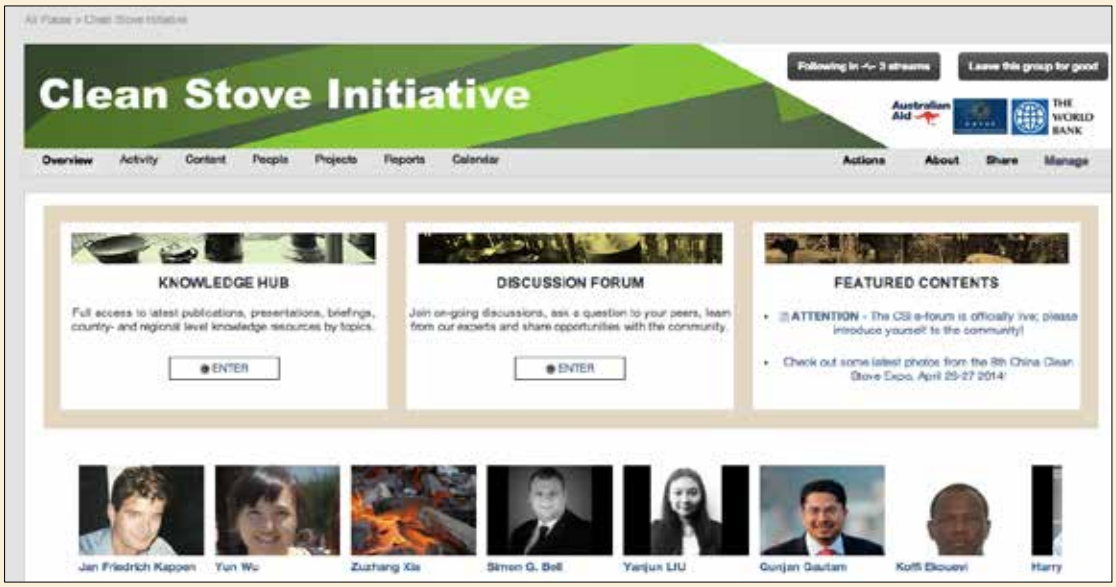
Launch of CSI e-Forum

The Clean Stove Initiative (CSI) e-Forum aims to promote collaboration, learning, and knowledge-sharing on access to clean cooking and heating solutions around the globe. Launched on April 28, 2014, the CSI e-Forum is an extension of the World Bank's East Asia and Pacific (EAP) Regional CSI, which aims to achieve universal access to modern cooking and heating solutions, particularly for poor households in remote rural areas, who are likely to continue using solid fuels to meet their cooking and heating needs beyond 2030.

The site serves as an archive for designated CSI-related information, as well as a collaborative platform for people seeking answers to CSI-related questions and getting to know their peers. The CSI e-Forum aims to extend its network reach beyond the EAP region to the global community, in the process bringing the World Bank's expertise and experience to external stakeholders to facilitate mutual learning. Knowing-sharing is encouraged among World Bank experts and practitioners from around the world. Through stimulating conversations, participants will benefit not only from solid knowledge products, but also from the networking, publicity, and collaboration that the e-Forum facilitates.

The CSI e-Forum's Knowledge Hub provides the latest updated information on clean cooking and heating solutions, while its Discussion Forum promotes conversations among practitioners, policy makers, and technicians and gives the general public easy access to key experts in the field (figure B.1). The Knowledge Hub includes briefings, reports, presentations, and other documents that help to advance an understanding of best practices in clean cooking and heating solutions from around the world. Participants are encouraged to upload files, helping to create a collaborative effort to store the information and materials, while keeping track of updates on various topics. The Discussion Forum enables people to post questions and answers, meet peers virtually, and develop shared learning through collaboration.

FIGURE B.1 SCREENSHOT OF CSI E-FORUM SITE SECTIONS



Source: https://collaboration.worldbank.org/groups/clean-cooking-and-heating-solutions.

APPENDIX C

Speaker Biographies

Bell, Simon

Simon Bell is President and Managing Director of The Apex Consulting Group, a business advisory firm that delivers real-world results through a culture of business excellence and a passion for peak performance. Currently based in Jakarta, Indonesia, Simon is Apex team leader and market facilitator for the World Bank's Indonesia Clean Stove Initiative (CSI). He has led numerous business-critical projects for a wide range of clients across sectors in Australasia, Europe, and North America. He has worked with hundreds of organizations supporting the development of improved management and business processes to deliver better bottom-line results and commercial sustainability. His expertise includes capability and capacity building, performance enhancement, inter-firm cooperation, value-chain improvement, procurement localization, and private-sector engagement. Over the past 14 years, he has advised national governments, non-profit organizations, and the private sector on economic development and environmental projects in the region. He holds a Bachelor's Degree in Music Technology from Griffith University in Brisbane, Australia and a Bachelor's Degree in International Business from Queensland University of Technology in Brisbane.

Blunck, Michael

Michael Blunck is Project Manager for the German Agency for International Cooperation (GIZ), and has worked on energy access programs under German bilateral cooperation for the past seven years. For the past three years, Michael has headed the energy access component of the Indo-German Energy Programme in New Delhi, India, working with the Indian Ministry of New and Renewable Energy on improving the policy framework for rural energy enterprises in the areas of improved cooking, solar pumping, solar mini grids, and pico hydropower. As of May 2014, Michael began supporting the Asian Development Bank's Energy for All Initiative, coordinating its working group on biomass cookstoves. Previously, he worked for the GIZ energy access programs in Bangladesh and the global Poverty-Oriented Basic Energy Services Programme (HERA). As a participant in the Development Cooperation Trainee Programme of the German Federal Ministry for Economic Cooperation and Development (BMZ), he has worked with the BMZ, GIZ, World Bank, and REN21 network. Michael holds a Master's Degree in Social and Economic Geography from the University of Mainz, Germany.

Chen, Xiaofu

Xiaofu Chen is Executive Director of the China Alliance for Clean Stoves (CACS). In this capacity, he leads the CACS in the large-scale promotion of clean stoves in China and conducts international cooperation projects. He also serves as Secretary General of the Technical Committee on Rural Energy Standardization of China. Xiaofu has 30 years of experience in the fields of solar energy, energy efficiency, and other renewable energy. He has held senior management roles at the Chinese Academy of Agriculture Engineering and the China Association of Rural Energy Industry (CAREI), affiliated with the Ministry of Agriculture.

Draugelis, Gailius

Gailius Draugelis is Lead Energy Specialist for the East Asia and the Pacific Region and Energy Sector Coordinator for China and Mongolia at the World Bank. In his more than 18-year career at the World Bank, Gailius has worked in the Baltics, South East Europe, Central Asia, Mongolia, and China, managing investments and providing advisory services in urban infrastructure and energy efficiency. Based in Beijing, he coordinates the World Bank's energy investment and advisory services portfolio in China and Mongolia. He has worked with industry, government, and real-estate development and utilities in developing business models, financing mechanisms, policies, incentives, and regulations to accelerate investments in energy efficiency and access to clean energy. He is co-lead author of the green urbanization chapter in a 2014 joint report with the State Council's Development Research Center on China's urbanization. Since mid-2007, Gailius has led the World Bank's policy dialogue on investments for air-quality improvement in Ulaanbaatar, Mongolia. In this role, he has led a team to develop policies, raise donor awareness, and make investments to promote access to clean technologies for heating and cooking in poor, peri-urban households. He is Project Manager for the IDA-financed Ulaanbaatar Clean Air Project, which includes a large stove-switching component, and the Australian government–supported Mongolia Clean Stoves Initiative, which is developing a national clean stove strategy.

Ekouevi, Koffi

Koffi Ekouevi is Senior Economist for the World Bank's Latin America Region and Caribbean Sustainable Energy Group. Over the past 16 years, Koffi has led energy policy dialogue and lending activities in many countries. He has worked on several energy projects covering energy-sector reform, energy access, and regional power trade. His main areas of concentration include off-grid rural electrification and household energy access. He is currently leading the Central America Clean Cooking Initiative. In addition, he is involved in the design and supervision of energy-access operations in Kenya, Haiti, and Bangladesh.

Enkhbold, Mr.

Mr. Enkhbold is Director of the Ulaanbaatar Clean Air Project (UBCAP), Project Management Unit (PMU). As executive and member of the Project Steering Committee, he is responsible for overall project implementation activities; coordinating efforts across the World Bank and Mongolian government agencies; and generating effective decision-making for the Municipality of Ulaanbaatar, government-funded agencies, and the World Bank. His career began in 2000 as Project Coordinator for the United Overseas Textile Corporation Barrage in the United States. He was later appointed Executive Director, responsible for quality monitoring of export products in various markets. As Director of the UBCAP PMU, he is responsible for overall unit planning and development, as well as implementation, coordination, and supervision of activities. He has played a key leadership role in UBCAP implementation, including the stove-switching program; quality-assurance monitoring using a participatory approach; results-based management, including facilitation of contributions from diverse stakeholder groups; and constructive engagement between decision-makers, donor organizations, and counterpart projects in Ulaanbaatar. Over the years, he has earned both the Best Annual Exporter and Perfect Quality (Ulemjiin Chanar) awards. He received his professional economics training from Santa Monica College in the U.S.

Erdenetsogt, Mr.

Mr. Erdenetsogt is Secretary of the National Committee for Air Pollution Reduction (NCAPR) in Mongolia.

Fang, Fang

Fang Fang is Counselor in the Department of Science, Technology, and Education's Division of Energy and Ecology within China's Ministry of Agriculture. Fang Fang is mainly responsible for the management of biogas and straw energy utilization, development of rural renewable energy, dissemination of firewood and coal-saving stoves, rural energy savings and emissions reduction, and various ecological agriculture projects and other technical guidance activities in China.

Feinstein, Charles

Charles (Chas) Feinstein is Director of the Energy and Extractives Global Practice, World Bank Group. Prior to his promotion in July 2014, Chas served as Sector Manager for Water and Energy, East Asia and the Pacific Sustainable Development Department. In this role, he provided guidance to the Department's management team and staff on energy and water-sector strategy development, innovation, quality assurance, knowledge management, and portfolio development. Previously, he was Sustainable Development Leader for Timor-Leste, Papua New Guinea, and the Pacific Islands based in Sydney, Australia, responsible for a diverse sustainable-development portfolio in 12 client countries. Prior to assuming that

position, he was Sector Manager for Energy Operations in the Europe and Central Asia (ECA) Region. His more recent work at the World Bank builds on his earlier service as a recognized energy expert and role as co-author of *Fuel for Thought*, the World Bank's landmark environmental strategy for the energy sector. Throughout the 1990s, Chas worked as Team Leader for Climate Change in the World Bank's Environment Department. Before joining the World Bank, he was a U.S. Peace Corps Volunteer and Peace Corps Associate Country Director in the Pacific Islands. An alumnus of the East-West Center in Honolulu, Chas is trained in electrical engineering and resource economics.

Fengthong, Tayphasavanh

Tayphasavanh Fengthong is Director of the Environmental and Occupational Health and Safety Division, Department of Hygiene and Health Promotion within Lao PDR's Ministry of Health. Concurrently, he serves as Head of the Health Impact Assessment Team and graduate-level Lecturer on Environmental Health at the University of Health Sciences. In 2011–12, Tayphasavanh authored a study on the impacts of climate change on health in Lao PDR. He has co-authored various case studies on the links between household air pollution, housing characteristics, and the respiratory health of women and children in Lao PDR.

Grinnell, Richard

Richard Grinnell is Vice President of HELPS International in Guatemala. Richard has worked with HELPS International since 2001, where he has been directly involved in the manufacture, sale, distribution, and implementation of the ONIL stove. The ONIL Stove Program initiated in Guatemala, and now under Richard's management, has expanded to El Salvador, Honduras, Mexico, and Nicaragua. From 2009 to 2013, Richard was a Board Member of HELPS International Incorporated and Co-chair of the Global Alliance for Clean Cookstoves (GACC) working group, Reaching Consumers. Currently, he serves as Board Member of ETHOS (Engineers in Technical and Humanitarian Opportunities of Service). He is also a Founding Member and current President of the Improved Cookstove and Clean Energy Cluster in Guatemala.

Jacquot, Julien

Julien Jacquot is Program Manager for StovePlus, the improved-cookstove, knowledge-transfer program of GERES (Renewable Energy, Environment, and Solidarity Group), and is based in Cambodia. Since joining GERES in 2006, Julien has worked on renewable-energy and energy-efficiency projects in Afghanistan and Indonesia, before being assigned to the global outreach program. His main areas of focus have been household energy and energy efficiency of buildings in development settings. He has also worked on energy conservation for small agricultural holdings. Julien holds a Master's Degree in International Political Economy from Pierre Mendes-France University, University of Grenoble.

Kappen, Jan Friedrich

Jan Friedrich Kappen is Senior Energy Specialist with the Africa Energy Practice at the World Bank. Jan oversees the World Bank's Clean Cooking Initiative in Sub-Saharan Africa and works on various renewable energy, rural electrification, and sector-reform projects throughout the region. Prior to joining the World Bank, Jan worked in corporate finance at General Electric, as assistant to the CEO of a major German energy group, and in energy and climate finance with the United Nations Environment Programme (UNEP). As Senior Energy Economist with the German Development Bank (KfW), Jan managed power distribution and energy access projects in the Asia region, and advised the German government as Trust Fund Committee Member of the Climate Investment Funds. Jan holds a Master's Degree in International Finance and Economic Policy from Columbia University, a Master's Degree in Business Administration (MBA) from ESCP Europe Business School, and a Master's Degree in Industrial Engineering from the Berlin Institute of Technology.

Li, Jingming

Jingming Li is Director of the Rural Energy and Environment Agency's Division of Renewable Energy within China's Ministry of Agriculture. Concurrently, Jingming serves as Secretary General of the China Biogas Society, Deputy Secretary General of the China Energy Institute, and Expert Committee Member of China's Energy Grid Research Center. He has substantial experience in technical and standardization management, as well as technology promotion and training in the fields of biomass stoves, biogas, solar, and other renewable energy.

Lumbantobing, Tomarbulang

Tomarbulang Lumbantobing (Tor Tobing) is Deputy Director of Loans and Grants in the Directorate of Loan and Grant Management within Indonesia's Ministry of Finance. In this capacity, he is in charge of policy and strategy development and implementation of loans and grants from the World Bank and other multilateral institutions.

Newcombe, Ken

Ken Newcombe, CEO of C-Quest Capital, has a long and varied career in development finance, with extensive experience in the energy and environment sectors and emerging markets and as an entrepreneur and pioneer of markets for global public environmental goods. He was a member of the small team that designed the multi-billion dollar Global Environment Facility (GEF). He developed the business concepts around public-private partnerships for generating and trading greenhouse gas (GHG) emissions reductions, and designed and managed the Prototype Carbon Fund, the first global carbon fund. Under the Forest Market Transformation Initiative, which he established and led, Ken spurred global partnerships with industry and nongovernmental organizations (NGOs) for forest conservation and sustainable use. This initiative gave rise to Forest Trends, the organization of which he serves as Director Emeritus. In the 1980s, he prepared the World Bank's first cookstove project. Ken has successfully built or turned around a diverse group of businesses and business units, and is an acknowledged leader, team builder, and manager. In 2004, he won the World Bank's Manager of the Year Award.

Ostojic, Dejan

Dejan Ostojic is Lead Specialist at the World Bank and previously Energy Sector Leader for the World Bank's East Asia and the Pacific Region. Dejan has extensive energy-sector experience, including institutional, regulatory, and technical aspects of electric power industry, gas industry, and municipal utilities. His diverse experience in sustainable energy and infrastructure development—Europe and Central Asia, East Asia, Middle East, Latin America, and the United States—includes 15 years at the World Bank (5 based in country offices), 6 years as manager and consultant for a leading U.S. energy and water-resources consulting company, and 8 years in academia in Europe and the U.S. His responsibilities included high-level policy dialogue and complex sector reform; business development for public- and private-sector projects; design, preparation, and implementation of multi-billion dollar investment projects; coordination of infrastructure operations across organizational boundaries; and task-team management in IDA and IBRD countries.

Pemberton-Pigott, Crispin

Crispin Pemberton-Pigott is an industrial designer and owner of New Dawn Engineering, Swaziland. A co-founder of the Eastern Cape Appropriate Technology Unit, the Renewable Energy Association of Swaziland, and the Industrial Designers Association of South Africa, he designs clean stove projects and testing laboratories around the world. Attached to the SeTAR Centre, University of Johannesburg, Crispin serves on the South African Bureau of Standards Technical Committee TC1054 co-writing national stove standards and testing protocols. He received the Design Institute of South Africa's Chairman's Award 2004 for the Vesto biomass stove and an innovation award from the Southern Africa Stainless Steel Development Association (SASSDA).

Rufaida, Anna

Anna Rufaida is Head of the Subdirectorate of Investment and Cooperation in the Directorate of Bioenergy within Indonesia's Ministry of Energy and Mineral Resources (MEMR). In this capacity, she is in charge of policy and strategy development on investment and cooperation in the bioenergy sector.

Sharma, Shekhar

Shekhar Sharma is Program Officer at the Alternate Energy Promotion Center (AEPC) in Nepal. In this capacity, he is responsible for central and regional planning, capacity building of partner organizations, quality-assurance support, social marketing and behavioral change communication, streamlining of gender equity and social inclusion in component activities, private-sector development, and coordination with external stakeholders. He has more than seven years of experience in project planning, implementation, and monitoring related to biomass energy technologies for various NGOs and development programs in Nepal. Shekhar holds an Agricultural Engineering Degree from Tribhuvan University's Institute of Engineering and an Executive Master's of Administration Degree from Kathmandu University School of Management.

Thoummavongsa, Seumkham

Seumkham Thoummavongsa is Director of the Energy Efficiency and Conservation Division of the Institute of Renewable Energy Promotion (IREP) within Lao PDR's Ministry of Energy and Mines (MEM). In this capacity, he is in charge of policy and strategy development on energy efficiency and conservation. In addition, Seumkham serves as IREP's Coordinator for the East Asia and Pacific (EAP) Clean Stove Initiative (CSI) in Lao PDR.

Toba, Natsuko

Natsuko Toba is Senior Economist at the World Bank, where she specializes in infrastructure, especially links

between energy and poverty, environment (including climate change), social and economic development, regulation, governance, and political economy. Natsuko has extensive experience as team leader and has worked independently on operational and analytical projects with the Asian Development Bank, World Bank/International Finance Corporation, and other international organizations in some 30 countries across Central, East, and South Asia; the Pacific Islands; Africa; and Latin America. Her work has focused on carbon finance and innovative project design and financial, policy, and strategy instruments, such as introducing Global Environment Facility (GEF) financing to land degradation at a time when it was not under the GEF focal areas. She is a formal reviewer of *Energy Policy* journal and is Coordinator for the Asia Sustainable and Alterative Energy Program (ASTAE). Natsuko has a PhD in Economics from the University of Cambridge and is an Honorary Cambridge Overseas Trust Scholar and Fellow.

van der Plas, Robert

Robert van der Plas is Director of the Netherlands office of MARGE (Energy, Environment, and Sustainable Development), a European consulting firm specializing in the nexus of energy and environment, whose activities are focused mainly in developing countries. Previously, Robert worked at the World Bank for more than 16 years, where his last position held was Senior Energy Planner. As part of the Energy Sector Management Assistance Program (ESMAP) team, he was instrumental in adding rural energy to the development assistance agenda. He has extensive experience in household, rural, and renewable energy issues in Africa and Asia, with two areas of focus: (i) biomass energy management, use, and conversion and (ii) decentralized rural electrification. His recent work includes developing a biomass energy strategy for Mozambique, a national stove program from Nigeria, and a national rural electrification program for Haiti; assisting private firms and the Government of Rwanda to develop micro hydro plants in that country; and acting as Team Leader for the Asian Development Bank's Energy for All Partnership. Robert holds Master's Degrees in Applied Physics and Development Studies from the University of Twente in the Netherlands.

Vongvisith, Boulay

Boulay Vongvisith is Deputy Head of the Bio Gas Division of the Institute of Energy and New Construction Materials within Lao PDR's Ministry of Science and Technology (MOST). In this capacity, he is responsible for research activities that involve the development of improved cookstoves, biodiesel production, domestic biogas technology, and organic fertilizer production. In 2007, Boulay earned his Master's Degree in the Science of Food Engineering and Bio-processing Technology from the Asian Institute of Technology (AIT) in Thailand. He also holds a Bachelor's Degree in Science from the National University of Lao PDR (NUOL).

Wang, Jiuchen

Jiuchen Wang is Deputy Director-General of the Rural Energy and Environment Agency (REEA) within China's Ministry of Agriculture. In this capacity, he has overall responsibility for the day-to-day management of the REEA. Jiuchen has extensive experience in the development of rural renewable energy, as well as the dissemination of firewood and coal-saving stoves in China.

Wang, Yanliang

Yanliang Wang is Deputy Director-General of the Department of Science, Technology, and Education in China's Ministry of Agriculture. Yanliang has a long career working on rural policy research issues in China. He has actively promoted international cooperation of the Ministry of Agriculture, and has also been in charge of the REEA since its establishment in 2012. Yanliang's work has focused mainly on agricultural and environmental protection and rural energy development.

Wen, Feng

Feng Wen is General Manager of Xunda Import and Export Company and Visiting Professor of the Hunan Institute of Engineering. She established the Xunda international sales team, which transformed Xunda from a simple overseas export market company into an international company with its own brand export, overseas factories, and international marketing network. Today, Xunda products are being sold to more than 80 countries and regions around the world, and export sales of its cookers are rated first in the country. Feng holds a Master's Degree in Business Administration (MBA).

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Yun Wu is an Energy Economist in the World Bank's Water and Energy Unit, East Asia and the Pacific Region. She has worked on energy, environment, and climate change issues with a focus on energy efficiency, renewable energy, and household energy. Prior to joining the Bank, Yun worked as Research Associate at the United States Department of Energy's Oak Ridge National

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Yabei Zhang is Senior Energy Economist in the World Bank's Water and Energy Unit, East Asia and the Pacific Region. She joined the World Bank as a Young Professional in 2008 and has worked on energy, urban, and climate-change issues, with a focus on energy efficiency, urban energy, and household energy. She leads the regional Clean Stove Initiative (CSI) flagship program and manages the China and Indonesia CSI country programs. Prior to joining the World Bank, Yabei worked at the Joint Global Change Research Institute (a joint program of the Pacific Northwest National Lab and the University of Maryland). She holds a PhD in Economics from the University of Maryland, College Park and a Master's Degree in City Planning from the Massachusetts Institute of Technology (MIT).

APPENDIX D

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APPENDIX E

EAP CSI Forum Agenda

Saturday, April 26 **4月26日星期六**	
Time	**Activity**
7:30 am	Assemble at hotel lobby and depart by bus for 8th China Clean Stoves Expo. Address: Youyi Road, Economic and Technological Development Zone, Langfang, Hebei 于大厅集合后乘坐巴士到廊坊参加炉博会。 地址：河北省廊坊经济技术开发区友谊路中段国际会展中心B馆
8:40 am	Arrive at Expo venue 到达炉博会现场
9:00–9:30 am	Attend opening ceremony 参加开幕式
9:30–12:00 pm	Visit Expo 参观炉博会展览
12:30–1:30 pm	Buffet lunch. Address: Al Cartier International Hotel 自助午餐，阿尔卡迪亚国际酒店
2:00–3:00 pm	Free communication and private meeting between foreigner delegation and Chinese stove manufacturers 外国参会代表与中国炉具企业的自由交流和私人会议
3:20 pm	Return by bus to Mercure Downtown Hotel, Beijing 乘坐巴士回北京
4:50 pm	Arrive at hotel 到达宾馆
Sunday, April 27 **4月27日星期日**	
8:00 am	Assemble at hotel lobby and depart by bus for 8th China Clean Stoves Expo. Address: Youyi Road, Economic and Technological Development Zone, Langfang, Hebei 于大厅集合后乘坐巴士到廊坊参加炉博会。 地址：河北省廊坊经济技术开发区友谊路中段国际会展中心B馆

9:30 am	Arrive at Expo venue 到达炉博会现场	
9:30 am–12:00 pm	Visit Expo 参观炉博会展览	
12:30 pm–1:30 pm	Buffet lunch. Address: Al Cartier International Hotel 自助午餐，阿尔卡迪亚国际酒店	
2:00 pm	Return by bus to Mercure Down Hotel, Beijing 乘坐巴士回北京	
3:30 pm	Arrive at hotel 到达宾馆	
Monday, April 28 **4月28日星期一**		
8:30–9:00 am	Registration 报到	
Welcome and Introduction (Coordinator: Yabei Zhang) **介绍并致辞（主持：张亚蓓）**		
9:00–9:15 am	Opening remarks by senior officials 高级官员致开幕辞	Charles Feinstein Yanliang Wang
Progress Updates from Country Programs (Moderator: Dejan Ostojic) **国家项目进展介绍（主持: Dejan Ostojic）**		
9:15–9:30 am	Indonesia 印尼	Anna Rufaida
9:30–9:45 am	Lao PDR 老挝	Seumkham Thoummavongsa
9:45–10:00 am	China 中国	Jiuchen Wang
10:00–10:15 am	Mongolia 蒙古	Mr. Enkhbold
10:15–10:30 am	Q&A 提问与回答	
10:30–10:45 am	Coffee break (video show: Clean Stove, Better Life) 茶歇（播放视频：清洁炉灶，美好生活）	
Scaling up Access to Clean Cooking/Heating through National Programs: Plans, Progress and Challenges (Moderator: Charles Feinstein) **清洁炉灶升级换代国家项目: 计划、进度与存在的挑战（主持: Charles Feinstein）**		
10:45–11:45 am	• Is implementing a national program an effective way to scale up clean cooking/heating? 执行国家项目是否是炊事取暖清洁炉灶升级换代的有效途径? • What are the lessons learned from past programs? 从过去的项目中能得到什么经验教训? • Any plans or progress for implementing a national program? 执行国家项目的计划与进展? • What are the key challenges? 关键挑战与问题是什么?	Panelists讨论组成员： Fang Fang Anna Rufaida Mr. Erdenetsogt Boualy Vongvisith Shekhar Sharma
11:45 am–12:00pm	Q&A 提问与回答	
12:00–12:15 pm	Group Photo 合影	
12:15–1:30 pm	Lunch at La Via, B1, Main Building 于主楼地下西餐厅午餐	
Results-Based Financing: Does It Work? (Moderator: Yabei Zhang) **基于效果的融资补偿是否有效？（主持: 张亚蓓）**		

1:30–2:15 pm	• What are the lessons learned from the Results-Based Financing pilot? 基于效果的融资补偿项目试点有哪些经验教训? • What are the design and implementation challenges? 项目计划与执行的问题与挑战?	Panelists讨论组成员： Jingming Li Tomarbulang Lumbantobing Natsuko Toba Mr. Enkhbold Julien Jacquot
2:15–2:30 pm	Q&A 提问与回答	
Private Sector Development: What Are the Business Models? (Moderator: Gailius Draugelis) **私营企业发展的商业模式？（主持：Gailius Draugelis）**		
2:30–3:15 pm	• What are the opportunities and challenges for stove-sector entry? 炉灶市场准入的机遇与挑战有哪些? • What are the promising business models/delivery mechanisms? 什么是承诺商业模式与输配机制?	Panelists讨论组成员： Simon Bell Feng Wen Ken Newcombe Jan Friedrich Kappen
3:15–3:30 pm	Q&A 提问与回答	
3:30–3:45 pm	Coffee break (Launch and Demo of CSI e-Forum: Yun Wu) 茶歇（CSI网络论坛启动及演示：吴芸）	
Stove Standards and Testing: How to Measure Performance? (Moderator: Koffi Ekouevi) **炉灶标准与测试：如何进行炉灶性能测试？（主持: Koffi Ekouevi）**		
3:45–4:30 pm	• What progress has been made? 炉灶标准与测试的进展如何? • What are the recent updates on the ISO process? 清洁炉灶的国际标准化最近的更新情况有哪些?	Panelists讨论组成员： Xiaofu Chen Crispin Pemberton-Pigott Richard Grinnell Michael Blunck Robert J. van der Plas
4:30–4:45 pm	Q&A 提问与回答	
Next Steps (Moderator: Yabei Zhang) **下一阶段工作（主持：张亚蓓）**		
4:45–5:30 pm	• What are the plans for the next step to scale up clean cooking/heating stove solutions in each CSI country? 各清洁炉灶倡议国下一阶段炊事取暖用清洁炉灶升级换代工作计划与打算? • How to continue and strengthen cross-country learning and exchanges? 如何继续加强多边学习与交流?	Panelists讨论组成员： Fang Fang Anna Rufaida Mr. Erdenetsogt, Mongolia Tayphasavanh Fengthong
5:30–5:45 pm	Q&A 提问与回答	
5:45–6:00 pm	Closing remarks 致闭幕辞	Dejan Ostojic Jiuchen Wang
6:30 pm	Dinner at Huatengxuan Chinese Restaurant, 1st floor, Building 3 于3号楼一层华腾轩中餐厅晚餐	
Tuesday, April 29 **4月29日星期二**		
Option 1: Ministry of Agriculture Meeting 选项一：农业部会议		
8:30 am	Assemble at hotel lobby and depart by bus for REEA 于大厅集合后乘坐巴士去农业部生态与资源保护总站开会。 地址：北京市朝阳区农展北路2号院，中央农业广播电视学校大厦518室。	

9:00–9:15 am	Welcome and round-table introduction 欢迎与介绍 Leader remarks 领导致辞	Moderators 主持: Jiuchen Wang Charles Feinstein
Overview of China Rural Energy and South-South Cooperation Situation (Moderator: Jiuchen Wang) 中国农村能源与南南合作情况介绍（主持: 王久臣副站长）		
9:15–9:30 am	General presentation of REEA, Ministry of Agriculture 农业部农业生态与资源保护总站总体情况介绍	Jiuchen Wang
9:30–9:50 am	Development status of China rural energy 中国农村能源发展现状	Jingming Li
9:50–10:10 am	South-South cooperation process in China and discussion on next steps 中国南南合作进展与下一步合作探讨	Fang Fang
10:10–10:30 am	South-South cooperation program and plans, Ministry of Science and Technology 科技部南南合作项目与计划	Xiao Wei
10:30–10:45 am	Coffee Break 休息	
Discussion (Moderator: Jiuchen Wang) 合作意向交流（主持：王久臣副站长）		
10:45 am–12:30pm	Cooperation intentions, opportunities, and mechanisms 关于清洁炉灶合作机制与意向探讨	
12:30–2:00 pm	Lunch 午餐	
Option 2: Tour of China Agricultural University 选项二：参观中国农业大学		
9:00 am	Assemble at hotel lobby and depart by bus for China Agricultural University (CAU) 于大厅集合后乘坐巴士参观中国农业大学	
10:30 am	Arrive at CAU stove laboratory of 到达中国农业大学炉灶区域测试与知识中心	
10:30 am–12:00pm	Visit regional testing and knowledge center at CAU 参观中国农业大学区域测试与知识中心	
12:00–2:00 pm	Lunch 午餐	
2:30 pm	Depart by bus for hotel 乘坐巴士回宾馆	
4:00 pm	Arrive at hotel 到达宾馆	
Option 3: Visits with Stove Manufacturers 选项三：参观炉灶企业		
7:30 am	Assemble at hotel lobby and depart by bus for stove manufacturers in Gaobeidian 于大厅集合后乘坐巴士到高碑店参观炉灶企业	
9:00 am	Arrive at the first stove manufacturer 到达炉灶企业	
9:00 am–12:00 pm	Visit with the two stove manufacturers 参观两家炉灶企业	
12:00–1:30 pm	Lunch 午餐	
1:30 pm	Depart by bus for hotel 乘坐巴士回宾馆	
3:00 pm	Arrive at hotel 到达宾馆	

EAP CSI Forum participants gather outside the Mercure Downtown Hotel conference center in Beijing, China (photo credit: CACS).

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