



USAID | **HAITI**
FROM THE AMERICAN PEOPLE

IMPROVED COOKING TECHNOLOGY PROGRAM (RECHO PAW)

BUILDING THE FOUNDATIONS FOR CHARCOAL CONSUMPTION REDUCTION IN HAITI



FINAL REPORT

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IMPROVED COOKING TECHNOLOGY PROGRAM (RECHO PAW)

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REDUCTION IN HAITI**

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CONTENTS

ACRONYMS i

EXECUTIVE SUMMARY 1

SECTION I. Awareness and Marketing of Improved Biomass and LPG Stoves Increased.....7

SECTION II. Local Market for Improved Household Biomass Stoves Expanded. 10

SECTION III. Charcoal Consumption by Large Users Reduced..... 16

SECTION IV. Carbon Finance Program for Cooking Technologies Scaled-Up.....21

SECTION V. Lessons Learned and the Way Forward.....25

ANNEX A. Performance Monitoring Plan — Final Performance Table29

ANNEX B. Final Environmental Monitoring And Evaluation Tracking Table35

FRONT COVER: Passing the Baton — ICTP Closing Ceremony

ACRONYMS

BME	Bureau des Mines et de l'Energie
BMPs	best management practices
CCT	controlled cooking test
CDM	Clean Development Mechanism
CPA	component project activity
EdM	Entrepreneurs du Monde
ESF	environmental screening form
FDS	Faculté des Sciences
GHG	greenhouse gas
HTG	Haitian gourde
ICS	improved biomass cooking stove
ICTP	Improved Cooking Technology Program (also known as Recho Paw)
ILF	International Lifeline Fund
LPG	liquefied petroleum gas (known as propane in Haiti)
MCI	Ministry of Commerce and Industry
MFIs	microfinance institutions
MT	metric tons
POA	program of activities
PPP	public-private partnership
SONAPI	Société Nationale des Parcs Industriels
UEH	Université d'Etat d'Haïti
WBT	water boiling test
WCK	World Central Kitchen

EXECUTIVE SUMMARY

The objective of the Improved Cooking Technology Program (ICTP), also known as Recho Paw, was to help set Haiti on a path toward sustainable cooking solutions and to achieve a significant reduction in charcoal consumption by large-scale users and households in the Port-au-Prince metropolitan area.¹ ICTP's team members and partners worked together to educate consumers with a view to generating demand and expanding the market for improved biomass and liquefied petroleum gas (LPG) cookstoves, develop clean-energy businesses, and address regulatory constraints to LPG expansion in Haiti.

The \$8.7-million program began in February 2012 in response to Haiti's excessive charcoal production and consumption, and the resultant environmental impact, such as extensive deforestation, watershed destruction, and increased vulnerability to flooding, mudslides, and soil erosion. Each year, Haitians use an estimated 4 million metric tons (MT) of wood, of which about one-third is transformed into charcoal to meet the cooking fuel needs of urban consumers. This includes an estimated 561,942 families in the program's target area who consume about 80 percent of the charcoal produced in Haiti. Apart from the negative environmental impact, cooking with firewood and charcoal exposes women and young children to smoke and indoor air pollution. The World Health Organization estimates that exposure to indoor air pollution leads to nearly 3,000 premature deaths in Haiti each year, representing about 3 percent of Haiti's national burden of disease.

ICTP worked to address these challenges through the following three principles:

1. *Haitian leadership and ownership.* Haitians stakeholders drove the process and were extensively involved in all program activities to ensure sustainability.
2. *Coordination, collaboration, and communication.* ICTP supported relevant Haitian government strategies and plans; created synergies among key stakeholder groups; and used targeted awareness and marketing campaigns to ensure the success of its long-term, market-driven approach for improved cookstoves.

¹ This includes the communes of Port-au-Prince, Delmas, Petion-ville, Kenscoff, Tabarre, Carrefour, and Croix des Bouquets.

ICTP Results in Numbers

117,805 new beneficiaries with improved cooking technology

120,458 MT of charcoal consumption reduced

246 new sale points of improved cookstoves created

136 business women and community leaders trained on commercialization techniques

96 technicians trained on LPG stove installation and repair

36,488 improved biomass cookstoves (ICS) purchased

78,769 domestic LPG cookstoves purchased

3,313 commercial LPG cookstoves purchased

More than \$16 million saved in charcoal expenditures reduction

More than 823,930 MT of CO₂ greenhouse gas (GHG) reduced

3. *Proven, practical approaches to build sustainable markets.* ICTP used global best practices and interventions, adjusting them as needed, in response to local realities and annual consumer survey results.

With an original budget of \$7.2 million, ICTP aimed at four intermediate results. During the second year, a fifth intermediate result was added, with a concomitant increase in the budget. The five intermediate results are:

1. Local market for improved household biomass cookstoves expanded.
2. Charcoal consumption by large users reduced.
3. Legal and regulatory framework for LPG strengthened.
4. Carbon finance program for improved cooking technologies scaled-up.
5. Management systems of enterprises along the cookstoves supply chain strengthened.

Final survey data indicate that ICTP met or significantly exceeded 20 out of its 26 performance targets — laying the foundation for a viable improved biomass and LPG cookstove market in Haiti. The program served to enhance the private sector’s role and engagement in Haiti’s market for improved biomass and LPG cookstoves, and encouraged new private sector investments in LPG distribution. It also helped to raise public awareness of the negative health effects caused by improper and excessive use of charcoal. The project assisted local stove manufacturers to improve and standardize their stove production, and helped to increase the availability and affordability of improved biomass and LPG cookstoves. Finally, the program established a biomass cookstove testing and certification mechanism, obtained an exoneration of customs and duty taxes for LPG cylinders from the Ministry of Economy and Finance, and created a hotline to support consumers to make informed decisions about efficient cookstoves, well-rated manufacturers, distributors, and repair specialists.

Health Consequences of Cooking with Charcoal

Cooking with charcoal can have devastating health consequences — as demonstrated by Mme. Berman’s story on page 18.

That is why ICTP partnered with the Haitian private sector and government bodies to create charcoal-free zones in certain areas, such as the Société Nationale des Parcs Industriels (SONAPI) industrial park and the Harry Clesca gas station in Portail Leogane.

One of ICTP’s most important achievements was creating a charcoal-free food zone at SONAPI, where 52 food vendors, including 49 women, serve more than 10,000 workers each day. Through a public-private partnership (PPP) agreement with the Ministry of Commerce and Industry, the Bureau du Ministre Délégué à la Sécurité Énergétique, the general directorate of SONAPI, and LPG importer and distributor SODIGAZ, in March 2013 ICTP facilitated the food vendors’ conversion from charcoal use to LPG use. This reduced charcoal use in the industrial park by 800 MT, saving 5,000 MT of wood, and reducing CO₂ GHG emissions by more than 5,000 MT in 80 weeks. In the same period, those 52 food vendors saved the equivalent of \$170,000 in cooking energy expenditures.

During its three-year life, ICTP facilitated 117,805 conversions to improved biomass and LPG cookstoves, including 2,270 street-food vendors, 239 schools canteens, and 39 orphanages. This

reduced charcoal use by more than 120,000 MT, saving at least 549,455 MT of wood and more than \$16 million in cooking energy costs. It also contributed to reducing CO₂ GHG emissions by more than 823,930 MT and fostered a 130 percent increase in LPG imports, from 10,847 MT in 2011 to 25,088 MT in 2014, for a total import of 68,240 MT at the end of 2014. The program also worked with key LPG importers and developed and submitted to the Ministry of Commerce and Industry (MCI) a draft legislation to guide LPG sector development and promote investments for improved management and safe expansion of the LPG distribution system.

Overall, the program converted about 36,000 households to ICS and more than 78,000 others to LPG stoves. But at the end of the program in February 2015, about 461,000 households in the Port-au-Prince metropolitan area are still using about 66 kilograms of charcoal per month for their traditional stoves, amounting to more than 365,000 MT of charcoal per year. This figure includes households only and does not account for street-food vendors, schools, orphanages, and bakeries not yet converted to LPG. Currently, Haiti can sustainably produce about 474,000 MT of wood each year; with the current level of production efficiency, that amount of wood would only produce 71,000 MT of charcoal. This leaves an annual deficit of about 300,000 MT of charcoal per year to respond to Port-au-Prince's cooking energy needs. ICTP's efforts must continue to balance Haiti's charcoal consumption with its sustainable production capacity.

The ICTP geographic scope was limited to the Port-au-Prince metropolitan area. During its last 10 months, the program was extended to cover a larger geographic area, but the expansion occurred too late to garner meaningful impact. However, the program's awareness, education, and marketing campaigns and "word of mouth" messages have successfully spread beyond the program's target area. For example, an LPG commercial stove manufacturer in Gonaives requested and obtained ICTP's technical assistance. Future programs in Haiti should draw from ICTP's experiences, successes, and lessons learned to reduce charcoal consumption and attain an equilibrium between charcoal production and consumption in the rest of the country. These programs should

- Create additional charcoal-free food zones, especially in collaboration with municipalities, to facilitate the conversion of street-food vendors
- Enact the proposed LPG legislation to promote and accompany needed investments to safely manage and expand the LPG distribution system
- Create energy woodlots for charcoal production
- Introduce modern kilns for efficient charcoal production
- Continue to train and provide funding and technical assistance to local stove manufacturers (ICS and LPG) to increase improved cookstoves production, and boost their business management and marketing skills
- Continue to train and provide technical assistance to improved stove manufacturers and distributors (ICS and LPG) to ensure quality control and consumer satisfaction
- Facilitate creation of briquette production units for alternate cooking energy sources
- Create a household LPG stoves production plant

SECTION I.

AWARENESS AND MARKETING OF IMPROVED BIOMASS AND LPG STOVES INCREASED

ICPT's early assessments and surveys identified key barriers to adopting new cooking technologies, including users' preferences, fears, and lack of understanding of the negative effects of charcoal consumption and of the benefits of improved cookstoves. Because socio-cultural barriers to behavior change are among the most difficult to overcome, the program's awareness and marketing efforts were closely associated with education.

EXPANDING MARKETING AND OUTREACH FOR INCREASED ICS SALES

To support its marketing and commercialization efforts, ICTP worked with a marketing firm, The Edge Worldwide, to assess how to motivate consumers to convert to improved cookstoves and to design, develop, and implement a targeted awareness and marketing campaign to

- Promote the use of improved cookstoves
- Educate consumers on the characteristics and benefits of improved cookstoves
- Introduce consumers to the concept of quality standards and parts warranty
- Educate consumers and retailers on the importance of good customer service

Understanding that the targeted consumers are motivated by the perceived benefits and values of the stoves, their prices, and easy access to sales points, ICTP's commercialization and marketing approach followed a targeted strategy and model (see Exhibit 1, next page). Together with The Edge Worldwide, ICTP and its partners organized demonstration activities in public spaces, churches, and schools. The demonstrations highlighted the benefits of using LPG stoves as compared to charcoal, stressing cheaper prices, faster cooking times (which is especially important for women juggling multiple household duties), and health benefits for cooks and

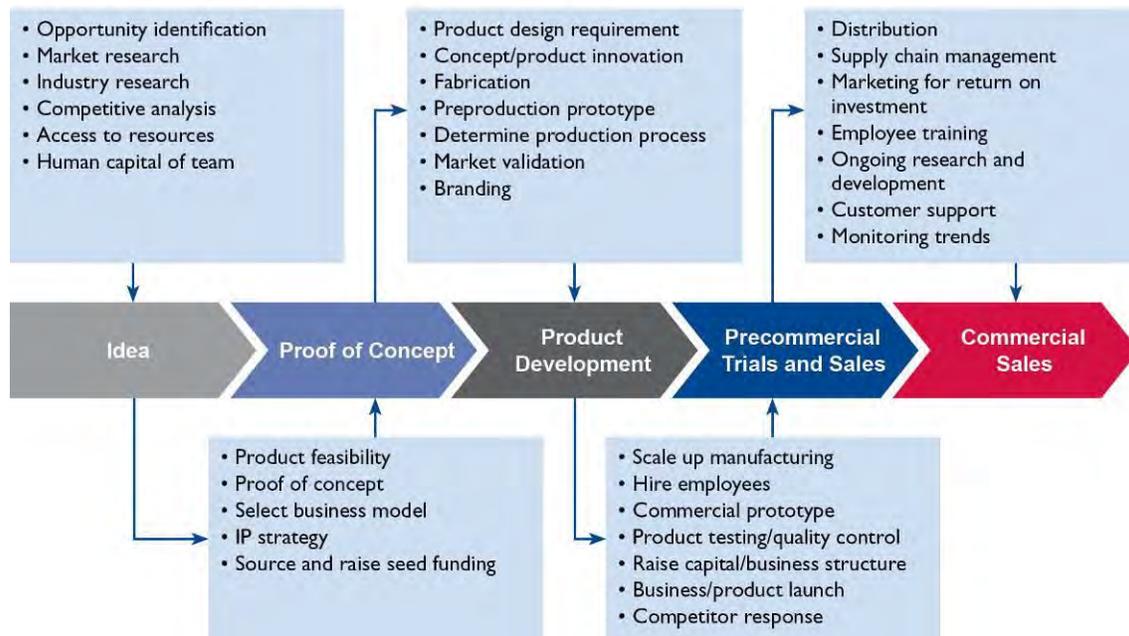
young children. The demonstrations also showed people how to use the stoves to cook traditional Haitian dishes, emphasizing that there was no change in taste or appearance. ICTP also used newspaper, radio, television, flyers, pamphlets, sound trucks, and billboards to broadcast behavior-change messages to reduce the overconsumption and misuse of charcoal.



ICPT's "happy pot" logo.

The "happy pot" or "bouch rosé" logo (see photo, left) became popular through ICTP's marketing materials and advertisements. These advertisements taught

EXHIBIT 1. COMMERCIALIZATION PROCESS FOR IMPROVED BIOMASS COOKSTOVES



consumers how to use biomass cookstoves correctly to reduce charcoal consumption and how to care for the stoves to extend their lifespan. The advertisements also identified ICS sale points. The “happy pot” logo and its LPG companion were prominently featured in World Cup outreach materials (see photo below) and a USAID documentary, “Solèy la Cho, Pye Bwa Se Tèt Frèt,” to raise awareness of the production, transportation, distribution, and use of charcoal in Haiti and to encourage people to convert to improved biomass and LPG cookstoves. USAID is now distributing this documentary to television stations across Haiti.



ICTP’s “happy pot” logo joined by its LPG companion in World Cup outreach materials.

Operating on a market-driven basis, where consumers buy stoves at full price, ICTP guided its partners to negotiate and sign an agreement on manufacturers’ ICS retail prices and agreed on a set of profit margins. This will enable continuous sale of ICS at reasonable prices beyond the life of the program.

The program also developed and produced educational radio and television shows about improved cooking technology and trained church and community leaders to serve as “word-of-mouth” outreach agents. It also featured television spots on Télé Caraïbes, Télé Superstar, Télé Guinen, and Télé Lumière; sponsored a series on Regards Croisés, a popular television show airing on Télévision Nationale d’Haïti on Saturday evenings; and produced the “Environment Plus”

program aired on Radio Caraïbes and Radio Lumière. Telephone calls to ICTP’s hotline after the shows aired were extremely positive. ICTP technical staff also participated in outreach programs like “Haiti Plus” on Radio Lumière, “Ann Pale” on TV Chaine 32, and “Focus Energie” on

Radio TV Métropole to dispel fears of new cooking technologies and to explain the economic, environmental, and sanitary benefits of converting to improved cookstoves.

ICTP's 2013 annual survey showed that many people did not fully understand the economic benefits of ICS. This limited their conversion from traditional to improved biomass cookstoves. To address this issue, ICTP designed a cost-savings booklet to help retailers explain the comparative benefits of buying and using ICS. The booklet detailed the savings process with clear graphic representations to help consumers envision potential savings. Using this information, ICTP also developed an animated PowerPoint presentation, which was shown in selected retail stores and office waiting rooms. In collaboration with first-year partners Mercy Corps and Earth Matters, ICTP developed a point-of-sale toolkit for retailers and manufacturers and conducted training-of-trainer sessions for wider outreach. The training materials (written in Creole and French) covered the basic principles of cost calculation, customer service, marketing, and logistics management. Using these materials, ICTP trained 136 businesswomen and community leaders to serve as improved cookstoves extension agents and retailers.



“Environment Plus” recording with the minister of energy security, ICTP’s communications officer, and ICTP’s director.

As part of ICTP’s outreach program, it established a pilot telephone hotline with Entrepreneurs du Monde (EdM) to

- Help interested clients find information on improved cookstoves and locate ICS sales points
- Provide information to individuals interested in becoming retailers and stove sales agents
- Assess the results of the program’s outreach and marketing campaigns and identify the most appropriate media outlets to reach clients and potential sales agents

The success of the pilot enabled a longer-term ICTP-hosted hotline that covered biomass and LPG stoves. Despite the users paying for the phone calls, the line received 9,069 calls in its first seven months, demonstrating public interest in new cooking technologies as a result of ICTP’s outreach efforts. A series of preregistered messages provided callers with names, addresses, and phone numbers for the nearest improved cookstoves sales points; nearest technicians for propane stove installation and repair; nearest propane distributors; and nearest commercial propane stove manufacturers. The menu also helped consumers to choose the most appropriate improved cooking technology for their needs. Callers could interact with a live phone operator if they had questions that were not featured on the menu. They could also leave a message for the operator if they called outside of office hours.

By using popular occasions such as Mother’s Day and the World Cup as an emotive catalyst, ICTP sent SMS messages to 150,000 people to encourage them to convert to improved cookstoves. This also prompted several hundred information-seeking phone calls to the hotline.

SECTION II.

LOCAL MARKET FOR IMPROVED HOUSEHOLD BIOMASS STOVES EXPANDED

ICTP facilitated production and marketing for six improved biomass cookstove (ICS) models: Eco Recho, Men Recho, Plop Plop, Prakti Wouj, and Rena. Toward the end of the program, Prakti Design, the manufacturer of Prakti Wouj, decided to no longer partner with ICTP, stating that the approach to market all of the supported ICS together does not highlight the Prakti Wouj, which is a more expensive stove. ICTP also supported marketing efforts for the artisanal Recho Mirak, designed by the Bureau des Mines et de l’Energie (BME).

EXHIBIT 2. IMPROVED BIOMASS COOKSTOVE MODELS



The first five stoves were identified based on four rounds of controlled cooking tests (CCTs) and water boiling tests (WBTs) with 12 models to identify the most efficient biomass cookstoves. ICTP also conducted a year-long longitudinal study to test the durability of eight models in 120 households across the metropolitan area of Port-au-Prince. For the CCTs, the program assessed stove design and production in addition to human and cultural issues, such as cooks’ biases and priorities, traditional cooking processes, types of food cooked, cooking environment, and other factors influencing stove purchases.

All of the stove models in Exhibit 2 have

- An efficiency of at least 20 percent compared to traditional stoves’ charcoal consumption
- A repayment period less than or equal to 90 days of charcoal expenditures savings
- A shorter cooking time than traditional charcoal stoves

Results of the longitudinal study showed that these models were durable and adaptable to local demand. Manufacturers used these study results to further improve their stove design to fit the local market better. The study also pointed to the stoves’ higher efficiency, leading to significant savings for users (see Myrlene Delphonse’s story, next page).

Entrepreneur Snapshot



ICTP piggy bank, designed like an improved biomass cookstove.

MYRLENE DELPHONSE

One of 15 women who participated in a “piggy-bank competition” during the longitudinal study, Myrlene Delphonse enjoys saving money. As part of the competition, ICTP provided a piggy bank, called a “secret box,” to a target group of 15 women to put aside money saved from charcoal expenditures reduction with the use of improved cookstoves. Myrlene saved 3,760 HTG (Haitian gourdes), equivalent to about \$80, using her Men Recho over the course of a year, and won the competition. With the money saved, she was able to purchase books for her children to go to school this year.

Myrlene’s traditional stove used 75 HTG worth of charcoal each day to cook meals for her family. With her improved cookstove, she uses between 30 and 35 HTG each day and saves the rest of her money in her piggy bank. Myrlene also runs a small business that sells AK-100, a Haitian corn-based breakfast drink, and reduced her business’ spending on charcoal by 90 HTG a day using the improved cookstove. This represents a 60 percent fuel-cost saving!

“The improved stove helps me a lot,” said Myrlene. “I used to use three cans of charcoal and now I only use one — I like the new stove very much.” Now that she knows how much she can save with her improved cookstove and piggy bank, she feels a sense of pride and is already thinking about other expenses that she can cover with her savings next year. Her biggest concern? Accessing another improved cookstove once her current one needs replacing!

PROMOTING AND COMMERCIALIZING EFFICIENT IMPROVED BIOMASS COOKSTOVES

All of the cookstove models in Exhibit 2, except for the Prakti Wouj, are produced in Haiti by Haitian manufacturers. Plop Plop and Eco Recho are produced by D&E Green Enterprises, Men Recho and Rena by Haiti Metal, and Recho Mirak by small local artisans. ICTP provided technical assistance to these manufacturers to improve their stove design, build their business management structure and capacity, increase their access to capital to improve their production line, create stoves that meet efficiency standards, and expand their market. The program’s technical assistance was based on the results of various assessments, studies, surveys, and consultations, especially those conducted during the first year and a half of operation. These surveys and assessments showed that consumers wanted fast stoves that were clean, easy to use, safe, efficient, visually appealing, and competitively priced as compared to traditional stoves. Apart from driving technical assistance, this data was used to design marketing campaigns.



Manual production of Echo Recho and Plop Plop prior to ICTP support.

In April 2013, ICTP awarded in-kind support (manufacturing equipment, training, and technical assistance) to produce the Plop Plop and Eco Recho, transforming these models’ production line from manual to semi-industrial. The program also worked with the manufacturers to ensure quality control and improve stove efficiency. For example, it trained manufacturers to conduct



Semi-industrial production of Echo Recho and Plop Plop with ICTP in-kind, grant, and technical support.

CCTs and WBTs to evaluate their stoves, thus strengthening their capacity to ensure the stoves meet international quality and efficiency standards. As a result, D&E Green Enterprises changed the clay composition for the Eco Recho's combustion chambers, and their new welding system provided improved joints for the stove's metal sheets, resulting in reduced heat loss. Haiti Metal and Ticadaie also improved their stoves' combustion chambers and ash compartment plates. As a result of ICTP support, D&E Green Enterprises and Haiti Metal can now produce about 2,000 stoves per month, which is above the current demand for ICS.

INCREASING ICS SALES POINTS

ICTP entered into agreements with NGO Palmis Enèji of EdM and private sector partners TOTAL Haiti SA, Micama, and Ticadaie, using their distribution networks to support ICS sales. During the first year of the agreements, more than 69 new retail outlets, including mobile and fixed sales points, sold improved cookstoves in Port-au-Prince, boosting ICS sales to 12,777 units in fiscal year 2013 and surpassing the year's sales target by 27.8 percent. By program end, the number of ICTP-associated improved cookstoves retail outlets grew to 246, and the number of ICS sold reached 36,488². ICTP aimed to distribute these sales points throughout the target area whenever possible.

The program also enabled the Ticadaie Group to promote Ticadaie briquettes as an alternate cooking energy source. Manufactured in Haiti using organic matter and discarded charcoal dust, these briquettes are used in both traditional and improved biomass cookstoves and are cheaper than charcoal. They also produce no smoke. As a result, low-income families were eager to use them. However, the briquettes' wider use is currently hampered by Ticadaie's limited production capacity.

USING FINANCING MECHANISMS TO PURCHASE IMPROVED COOKSTOVES

ICTP survey results and supply chain actors' feedback showed that many consumers wanted to purchase improved biomass and LPG cookstoves, but could not afford to do so in a single payment. Because client referrals to traditional microfinance institutions (MFIs) did not yield the expected results due to lengthy, paperwork-heavy processes, ICTP worked with two MFIs — ID-Microfinance of EdM and ACME SA — to pilot special consumer microfinance products, including

² This number reflects only the sale of Eco Recho, Men Recho, Plop Plop, and Rena, based on sales receipts and survey results. It does not include the tens of thousands of Recho Mirak sold, as its manufacturers and distributors do not maintain records and valid proof of sale. Furthermore, as a result of ICTP's education and awareness campaigns on the negative effects of poor use of charcoal, many consumers converted directly from traditional cookstoves to LPG (propane) stoves. (Source: ICTP October 2014 consumers' survey).

- Krédi Enèji with ID-Microfinance, a loan of up to 2,000 HTG (about \$42), accessible from any of the seven ID-MFI agencies in and around Port-au-Prince to purchase energy-efficient products like solar lighting and improved stoves.
- Krédi Enèji Vèt with ACME SA, a loan for green products distributed by Micama Soley and Palmis Enèji. Unfortunately, the minimum loan amount of 1,000 HTG was higher than the price of one improved biomass cookstove, and despite all the negotiations, the loan procedures remained too complicated to attract clients.

In a similar manner, ICTP worked with EdM and ID-Microfinance to develop an inventory finance loan scheme, in which Palmis Enèji-affiliated retailers had access to improved stoves inventory valued at up to 100,000 HTG (about \$2,100), to be repaid within three months. Retailers received products at wholesale prices, giving them fair benefit margins to provide credit to their clients, resell the stoves at reasonable prices, and repay their loan. By the end of the program, 2,098 consumers had accessed consumer loan products to purchase improved cookstoves, and more than 43 retailers had financed loans through MFIs or distributors.

ICTP’s experience shows that consumers gaining credit directly from manufacturers and distributors — without a credit agency and with minimal paperwork — is effective for biomass and LPG stoves. Unfortunately, during the life of the program, manufacturers and distributors could only respond to a limited number of loan requests; therefore, many food vendors who were interested in purchasing LPG stoves had to be waitlisted until the manufacturer or distributor could recover enough cash to provide new credits and deliver the stoves.

CERTIFYING IMPROVED BIOMASS COOKSTOVES

To foster consumers’ confidence in improved stoves, ICTP worked with the BME and key stakeholders to develop a stove certification program based on efficiency test results. Through an in-kind grant for materials and equipment, ICTP helped establish a national stove testing laboratory at the BME and worked with the international stove center, Aprovecho Research Center, to install, test, and calibrate the equipment; train BME’s engineers and technicians to operate and manage the equipment; and provide remote technical backstop. Using their newly acquired skills, BME’s engineers and technicians conducted WBTs to support ICTP’s awareness and outreach activities. In mid-2013, ICTP and the BME agreed that the laboratory should also be used for research and training, and decided to transfer it to the Faculté des Sciences (FDS) at the Université d’Etat d’Haiti (UEH). Through a tri-partite agreement with the Ministry of Public Works, UEH, and



Training at the improved cookstove testing laboratory at UEH.

ICTP, the laboratory was transferred to the FDS. ICTP then worked with the Aprovecho Research Center to re-install and calibrate the equipment, train the FDS team, and provide remote technical backstop. Seven FDS professors and students, two BME employees, and two ICTP-selected participants participated in the six-day training program.

Although these testing facilities were transferred to the FDS, stove certification remained the prerogative of the BME, which will continue to issue the quality and efficiency seal once testing is complete and the results are deemed satisfactory. Improved stove certification is important for stove marketing and awareness efforts because it enables customers to recognize legitimate improved cookstoves as opposed to pirated un-regulated ones.

The fully operational laboratory has so far completed efficiency tests and WBTs on two stove models (Eco-Zoom and Jikokoa) for a carbon credit program (POA) under the Clean Development Mechanism (CDM) of the U.N. Framework Convention for Climate Change.

STRENGTHENING ICS SUPPLY CHAIN ENTERPRISES' CAPACITY TO SCALE-UP PRODUCTION AND SALE

In May 2013, ICTP began working on micro-level activities to improve ICS supply chain actor operations, such as piloting innovative marketing and commercial strategies, strengthening relationships and synergies between ICS supply chain actors, and passing the baton to nine enterprises and government agencies involved in ICS: BME, the FCS of the UEH, D&E Green Enterprises, International Lifeline Fund (ILF), Micama, Palmis Enèji SA, Ticadaie SA, and Haiti Metal SA. Passing the baton was a core element of the program's exit strategy to ensure continuation of activities beyond the life of the program. ICTP organized several training workshops and seminars on topics like carbon finance and ICS value chain; improved cookstoves and climate change resilience; microfinance products; and production, distribution, and marketing of ICS.

As a result of ICTP's assistance to partners to improve their respective business strategies:

- Ticadaie SA, developed a new marketing initiative in collaboration with the UniTransfer remittance program, in which Ticadaie briquettes, Rena and others ICS were placed in UniTransfer's sales points.
- D&E Green Enterprise and ILF entered into a partnership agreement to produce and distribute ICS, taking advantage of D&E's new semi-industrial production line with ICTP-provided industrial equipment and materials. The line is adapted to the Eco Recho from D&E Green Enterprise and the Plop Plop from ILF. This merger has proven to be a huge success, building on the long-term vision and business plans developed by these two ICS partners.
- Palmis Enèji completed all requirements for its conversion to a private Haitian enterprise.
- ICS partners, D&E Green and EDM's Palmis Enèji, applied for \$1,975,000 in funding with Compete Caribbean, USAID's Leveraging Effective Application of Direct Investment for Haiti program, the Pilot Innovation Fund, and Yunus Social Business. A total of \$1.2 million was approved.

SUCCESS STORY

Independent salesman gains reliable source of income through ICS

“Selling stoves has allowed me to make a living, have a place to sleep, and feed my family.”



After becoming an independent mobile distributor with D&E Green Enterprises, an ICTP partner, Wilder Felix can now afford to pay for rent, food, and basic necessities for his family.

CHALLENGE. Wilder Felix recently got married and had an unexpected baby. He did not have a job and needed to find a way to provide for his family.

INTERVENTION. In November 2014, Wilder became an independent mobile distributor with D&E Green Enterprises, an ICTP partner. Through a grant for innovative marketing strategies, D&E Green Enterprises recruited distributors to test an independent sales program to grow their ICS distribution, create jobs, and reduce poverty.

RESULTS. Wilder can now pay for rent, food, and basic necessities for his small family. “Selling stoves has allowed me to make a living, have a place to sleep, and feed my family,” he said. When he heard of the opportunity to become a salesman, he convinced his brother to lend him 4,950 HTG (approximately \$106) to buy the first stock of stoves. He repaid his brother in 22 days and had enough money left over to cover his basic needs. Sales were especially strong during the holidays; he sold an average of eight stoves a day. Using promotional materials provided by D&E Green Enterprises and supported by ICTP, Wilder works in busy street markets and shows people how these stoves can save them money by using less cooking fuel.

Considering that the minimum wage in Haiti is 250 HTG (approximately \$5) per day, Wilder makes a hefty profit on the stoves, too. He can make between 100 HTG (\$2) and 240 HTG (\$5) on each stove depending on the final price, taking up to 1,000 HTG (\$21.50) home in one day. He also uses an ICS at home; his wife only spends 15 HTG (32 cents) on fuel each day for charcoal instead of 30 HTG (65 cents). Wilder is working hard to grow his business by finding access to a motorcycle with a small trailer, which would allow him to carry a larger stock of stoves to sell each day.

SECTION III.

CHARCOAL CONSUMPTION BY LARGE USERS REDUCED

ICTP targeted large-scale charcoal consumers in the Port-au-Prince metropolitan area, focusing on street-food vendors, schools, orphanages, and households that could afford to convert to LPG cookstoves. In Port-au-Prince alone, there are 4,939 street-food vendors, 1,311 schools with canteens, and 254 orphanages³ serving food to a large number of people — in addition to an estimated 561,942 families — who are heavy users of cooking energy. Thus guiding and facilitating their access to LPG stoves is critical to reducing charcoal consumption. Before ICTP, LPG stoves were expensive and considered a luxury. ICTP's work with the MCI, Bureau du Ministre Délégué à la Sécurité Énergétique, LPG importers, and LPG stove parts importers and manufacturers, as well as its marketing and outreach efforts, have contributed significantly to dispelling the perception that an LPG stove is a luxury. Prices of many LPG stoves and parts are now less than 50 percent of their pre-program prices; as a result, sales have increased sharply. ICTP also helped parts importers diversify their suppliers, showed them the benefits of reducing their profit margin, obtained exoneration of customs and duty taxes for LPG cylinders from the Ministry of Economy and Finance, and assisted local LPG commercial manufacturers in increasing and improving their production. Through PPPs and direct contribution, LPG importers also contributed to the LPG stove market expansion effort.

INCREASING PRODUCTION AND AVAILABILITY OF LPG COOKSTOVES

During program commencement, ICTP worked with seven manufacturers to develop standards for LPG commercial stoves, calculate their production costs, and suggest manufacturers' retail prices. Six of the manufacturers adopted the new standards immediately, and two agreed to reduce their profit margin and adopt the new price structures. Subsequent consultations and negotiations brought the others on board with the new price structures a few month later. In response to a competitive solicitation process, ICTP provided grants to the six manufacturers that adopted the technical norms and standards for commercial LPG stoves: Filière Congelée, Jean Baptiste Enterprise, Omnigaz, Pipe, LUTESA, and Frank Machine Shop. These in-kind grants provided tools and equipment for manufacturers to improve and increase their production in addition to increasing employment. ICTP's support also included technical assistance, access to burners at reduced prices, and marketing assistance. As a result, five of these manufacturers experienced a production increase from an average of 21 to 117 stoves per month, and their employment numbers rose from an average of 16 to 26 workers.⁴ In July 2014, ICTP expanded its training and technical assistance to three additional LPG stove manufacturers: Atlas Heema Engineering, Atlas, and Epsilon Construction (manufacturer of the Ayiti Cherie LPG stove).

³ Data from the ICTP database.

⁴ The five LPG stove manufacturers were Jean Baptiste Enterprise, Frank Machine Shop, Lutesa, and Omnigaz. Filière Congelée was not available to be surveyed.



Jean Baptiste Enterprise manufacturing cookstoves at an orphanage.



The finished product at the orphanage.

One of the major constraints to producing LPG commercial stoves was parts availability, especially for high-quality LPG burners. The program worked with Valerio Canez's and C&K Hardware's senior management to import LPG stove parts on a regular basis and helped them identify new importation sources. It also negotiated with them to reduce their burners' retail prices, thereby allowing local LPG stove manufacturers to reduce their prices by half. Later the program made similar agreements with Matelec and Flamingo.

In October 2012, as a direct result of ICTP's interventions, the Ministry of Economy and Finance waived import duty and taxes on LPG, gas cylinders, pressure regulators, valves, and associated tubing importation, which reduced the cost of LPG commercial stoves manufactured in Haiti and the cost of the LPG itself.

During ICTP's final survey, the team discovered an artisan, Fednold Joseph (see below), who makes and sells biomass cookstoves that look like the promoted ICS — even making burners for LPG stoves in his backyard. Although innovative and opportune, this presents significant risks, especially in regards to LPG burners. Future programs should work with Fednold and artisans like him to guide, train, and help them improve their

production quality. Given the importance of the informal sector and micro-businesses in Haiti, this is one way that improved cookstoves could reach more Haitian households and become the norm as opposed to traditional cookstoves.

Entrepreneur Snapshot

FEDNOLD JOSEPH

Fednold is a versatile metal worker who owns a shop selling handmade metal works, such as animal cages. He also specializes in repairing stoves and manufacturing improved stoves and propane gas stoves. He even manufactures burners, which are general imported by other manufacturers. To make ends meet, he designed and built a cookstove model that uses less charcoal due to its shape and closed combustion chamber and sold it to nearby street vendors to use in their homes. He is skilled at copying any model of stove on the market and has used many ICTP-supported stoves as models to improve his own design and diversify his offerings to clients. Fednold now sells improved stoves and LPG burners to many people in his neighborhood and doesn't keep stoves in stock for long due to the high demand for his products. Fednold's clients often do not have enough funds to pay up front for their purchases, and he provides credit to a few of them when he can afford it. Although a success, Fednold is not a specialist. He said, "With training and funds to improve the quality of these products, I could revolutionize the stove market in Haiti!"



Following a call for expressions of interest, ICTP awarded a grant to SWITCH S.A., a Haitian commercial enterprise, for the conversion of 900 street-food vendors to LPG stoves. Later, a similar grant was awarded to Palmis Enèji. The majority of these street-food vendors are women cooking on large or household traditional charcoal stoves. They serve the most food-insecure urban households, for whom it is less expensive to buy small meals on the street than to purchase groceries and fuel for home cooking. Therefore, most of the street-food vendors run their stoves long hours each day, consuming on average 175 kilograms of charcoal per month⁵.

STRENGTHENING LEGAL AND REGULATORY FRAMEWORK FOR LPG

The legal framework that regulates and controls LPG supply and distribution in Haiti is weak and nearly non-existent. Despite the obvious dangers of working with inflammable gas under high pressure, micro-filling stations are unregulated and many do not have occupational health and safety procedures in place. Several stations have no liability insurance in the case of a fire or explosion. Given these risks, Haiti's major LPG suppliers (SODIGAZ and TOTAL) think that if they are to substantially invest in new LPG infrastructure, equipment, and materials, it would be important to develop, promulgate, and enforce laws that regulate the LPG sector.

In mid-2012, ICTP re-established an LPG working group in coordination with the Ministère du Commerce et de l'Industrie and the Secrétaire d'Etat de l'Energie to develop a legal framework for LPG management. As a result, the ministry created a sub-committee charged with defining

- LPG characteristics and importation norms
- Standards for stocking LPG
- Standards for filling LPG cylinders and bottles
- Standards for transporting LPG
- Standards for LPG security in general

Working with key stakeholders (first with the working group, and second with key LPG importers representing more than 80 percent of the market), ICTP developed draft LPG legislation, which was submitted to the ministry for discussion with the Cabinet and onward submission to the Parliament. Unfortunately, the Parliament has not been in session since the draft legislation was submitted. In the meantime, SODIGAZ, TOTAL, and their affiliated distributors continue to use established international standards (SODIGAZ uses U.S. guidelines, while TOTAL uses French guidelines). The main issue is the increasing number of independent LPG retailers and distributors who see the increase in LPG use as an opportunity to establish microfilling centers by any means necessary. Without relevant legislation, regulations, and guidelines, these centers could represent a significant threat to the nascent LPG sub-sector. Any accident could undermine the foundation that ICTP has created over the last three years.

In 2013, ICTP began negotiating with the World LPG Association to organize a training workshop for Haitian government managers and decision-makers in the LPG sector on international standards, norms, and safety procedures. Unfortunately, this training could not take place as planned because the World LPG Association insisted on presenting its position on cross-

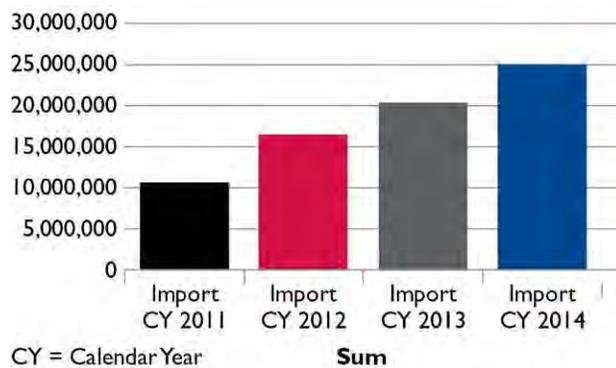
⁵ ICTP Market Analysis, September 2012

filling LPG tanks, which conflicted with the Haitian government’s position. The training took place one year later using LPG safety and installation experts from SODIGAZ and TOTAL. Participants included Ministry of Commerce and Industry and Bureau des Mines et de l’Energie staff and LPG distributors.

KEY SUCCESSES AND ACCOMPLISHMENTS

As a result of increased LPG stove use in Haiti, LPG imports have also increased significantly, reaching 25,088 MT in 2014 compared to 10,847 MT in 2011 — an increase of 131 percent over three years. See Exhibit 3, below, for details. Total LPG imports during ICTP’s lifespan reached 68,240 MT; and two new importers, UNIC and Propane Solution, have also entered the market, importing from the Dominican Republic.

EXHIBIT 3. LPG IMPORTS IN HAITI (IN METRIC TONS)



A major constraint to the conversion to LPG stoves was a lack of qualified technicians to repair these stoves. To address this issue, ICTP conducted a series of five-day training programs during a two-year period on LPG stove installation and repair. Along with a certificate of participation, the 96 trained technicians received a toolkit to help them with future repairs. Many of these technicians were recommended by LPG stove manufacturers and distributors and are kept very busy providing their services.



Training program for LPG stove installation and repair technicians.

Expanding the LPG market required collaboration with the major LPG suppliers to facilitate consumers’ access. Transporting the 25-, 50-, and 100-pound gas cylinders was not convenient for most of the households targeted for conversion (in some cases, it was impossible). To address this issue, ICTP negotiated with SODIGAZ and TOTAL to import 12-pound gas cylinders that are easier to carry or transport. In addition, consumers do not necessarily have to fill up the small cylinders; they can purchase a smaller quantity of LPG as they would for charcoal.

Together with the importation of small one-, two-, three-, and four-burner household LPG stoves marketed with metallic frames made by local manufacturers, the importation of smaller 12-pound cylinders helped convert more than 78,000 households to LPG.

Another major ICTP success was PPP with MCI, the Bureau du Ministre Délégué à la Sécurité Énergétique, the general directorate of SONAPI, and SODIGAZ to transform SONAPI's food court in Port-au-Prince into a charcoal-free place. As part of the public-private partnership agreement, the Haitian government refurbished the canteen area, where 10,000 workers buy their daily cooked lunches from 52 food vendors, including 49 women, while SODIGAZ provided the LPG installation and two 100-pound LPG cylinders to



SONAPI prior to converting to LPG stoves.



SONAPI after converting to LPG stoves.

each food vendor. SODIGAZ also sold the gas at wholesale price, and assured its regular supply. Cooking with charcoal on very inefficient traditional stoves, the food vendors consumed about 10 MT of charcoal per week. After ICPT demonstrated the economic, environmental, and health benefits of switching to LPG to SONAPI's management and food vendors, SONAPI responded by banning charcoal cooking in the park altogether. ICTP guided the vendors throughout their conversion from charcoal use

to LPG. The food court has been charcoal-free since March 2013, saving about 800 MT of charcoal (i.e., 5,000 MT of wood) and reducing CO₂ GHG emissions by more than 5,000 MT. During that 80-week period, the 52 food vendors also saved the equivalent of \$170,000 in cooking energy expenditures.



SONAPI after converting to LPG stoves.

Potential buyers of LPG commercial stoves often require credit to purchase their stoves. ICPT worked with traditional MFIs like SOGESOL, ACME S.A., and Fonds Haïtien d'Aide à la Femme to develop pilot microloan products to facilitate food vendors' conversion to LPG stoves. Unfortunately, despite discussions and meetings, the credit application processes remained too long and cumbersome for potential clients, significantly impeding their conversion.

For example, these MFIs require food vendors to fill out complex paperwork and make several trips to their offices. The process can take nearly two months, and in most cases, it is too difficult for food vendors to leave their businesses to go to the MFI offices. In the end, the stove distributors resolved to provide direct credit to some of their customers based on their available cash flow. This system was successful but only for few credit sales at a time. Toward the end of the program, ICTP provided SWITCH, one of the LPG stove distributors, with a revolving inventory stock of 300 LPG commercial stoves to support the direct credit program. This approach worked well and will help to sustain food vendors' conversion beyond the life of ICTP. Please see Exhibit 4 below for a summary of ICTP's results in improving access to and increasing production of LPG cookstoves.

Entrepreneur Snapshot

MME. BERMAN AND ANNETTE FORTUNE



Mme. Berman cooked and sold fried foods in Mariani for more than 40 years. She cooked with charcoal, complaining constantly about the heat and ashes it produced, which made her feel sick. As part of ICTP's awareness campaign, the program installed a commercial LPG stove for her to test out. After a couple of weeks, she was convinced that the stove was a great fit, but did not have enough money to purchase one right away. She asked the ICTP team to return in one month with a stove vendor. However, when the team returned, she had already died from respiratory complications.

Annette Fortune, her niece who took over the business said "I am using charcoal now, as I do not have enough money to convert to propane, nor a secure place to store the LPG stove and tank". Most of the street-food vendors in the Mariani area cannot convert to LPG even when they are able to buy an LPG stove kit. This is one reason why ICTP partnered with the private sector and government offices to create charcoal-free street-food zones in certain areas, such as the SONAPI industrial park, and the Harry Clesca gas station in Portail Leogane to provide a safe place for street-food vendors to store their LPG materials. Without continued investments in this area, a large number of street-food vendors will continue to use charcoal for cooking.

EXHIBIT 4. IMPROVED ACCESS TO AND INCREASED PRODUCTION OF LPG COOKSTOVES

Improved Access to LPG Cookstoves

- Resources leveraged from three LPG suppliers: Valerio Canez, TOTAL, and DINASA.
- 2,270 street-food vendors converted to LPG as a result of ICTP efforts; 3,707 street-food vendors now use propane in Port-au-Prince.
- A charcoal-free street-food zone made operational at SONAPI with 52 food vendors, including 49 women.
- 239 schools converted to LPG. Of 1,311 schools with canteens in Port-au-Prince, 498 now use propane.
- 39 orphanages converted to LPG due to ICPT assistance. Of 254 orphanages in Port-au-Prince, 188 now use propane.
- 78,769 households in Port-au-Prince bought new LPG household stoves.
- Ten bakeries converted to LPG (10-shelf LPG ovens manufactured by Jean Baptiste Enterprise).

Increased LPG Cookstove Production

- Six LPG stove manufacturers with increased and improved production via in-kind grants and technical assistance.
- Production and sale of at least 3,313 LPG commercial stoves officially recorded.
- Five LPG stove manufacturers and retailers advertising their own product line.
- Four hardware companies regularly importing LPG burners and stove parts (Valerio Canez, C&K Hardware, Matelec, and Flamingo), with about 7,000 burners imported in 2013.
- 96 technicians trained in LPG stove installation and repair, including 15 women.

SUCCESS STORY

Flourishing business produces high-quality, affordable commercial LPG stoves

“During the past 18 months, I have experienced significant growth in my production capacity and a major increase in customer demand.”



Serge Jean Baptiste, owner of Jean Baptiste Enterprise, which received a \$10,000 in-kind grant to increase LPG commercial stove production.

CHALLENGE. Serge Jean Baptiste, a civil engineering student and mechanical technician, established his metal works business, Jean Baptiste Enterprise, in 2003 to create iron gates and roof frames for houses. He later began manufacturing kerosene and LPG stoves, but with very limited capacity.

INTERVENTION. In 2012, ICTP awarded Jean Baptiste Enterprise a \$10,000 in-kind grant of materials, tools, and equipment, as well as training and technical assistance, to improve its organizational capacity and increase its LPG commercial stove production.

RESULTS. Now, Serge’s business is booming. It has grown from six to 10 employees and produces an average of 103 stoves per month compared to 35 per month in 2012. Thanks to ICTP’s support, as well as the promotional fairs and cooking demonstrations, which highlighted Jean Baptiste Enterprise among other businesses, Jean Baptiste Enterprise has become a popular, flourishing business.

“Today, I see myself as a leader and manager who can effectively organize his work and create a better vision for the future of my business,” said Serge with a smile.

Apart from strengthening his business, Serge recognizes that LPG stoves have several benefits for Haiti: they require less energy, pose fewer health risks, and are less expensive to use than traditional stoves. He is proud that he can contribute to protecting his country’s natural resources and improving the lives of his countrymen.

SUCCESS STORY

Earthquake victim uses LPG stove to cook for her family again

“My problems have vanished. I can move around the stove and cook freely...This stove is really great!”



Emania Charles, a victim of the 2010 earthquake, can now cook for her family again thanks to her new LPG stove, which is higher off the ground and easier to manage with her rolling walker.

CHALLENGE. A victim of the 2010 earthquake, Emania Charles cannot walk without the assistance of a rolling walker. After about two years of therapy, she finally regained the ability to move around the house, but was unable to cook for her family because she could not bend down to put charcoal in her cookstove or maneuver the cookstove’s appliances. As a result, she had to wait for her husband to come home and cook for the family every day.

INTERVENTION. When her husband, Ludes Charles, joined the ICTP team as a cleaner, he became intrigued by the LPG stoves promoted by the project. With the help of project staff, he was able to bring a domestic LPG stove home to his wife.

RESULTS. With her new LPG stove, Emania has rediscovered the joys of cooking for her family. The stove is higher off the ground, so she can easily manage preparing meals. It also cooks much faster. “My problems have vanished,” said Emania. “I can move around the stove and cook freely...This stove is really good! There are other people who have disabilities like me and I would like for them to have access to this stove, too.” In addition, Emania’s kitchen is cleaner and she can use the extra cash from her charcoal budget for transportation and school fees for her children.

“The way I see it, people who are using charcoal only are losing money,” said Emania. “I used to spend 3,000 HTG a month to purchase charcoal, and now I save approximately 800 HTG, depending on the way I cook for the month.” Transitioning to cooking with LPG has not only changed Emania’s life, but her whole family is happy to see their mother smile again. They cannot imagine their lives without their LPG stove!

SECTION IV.

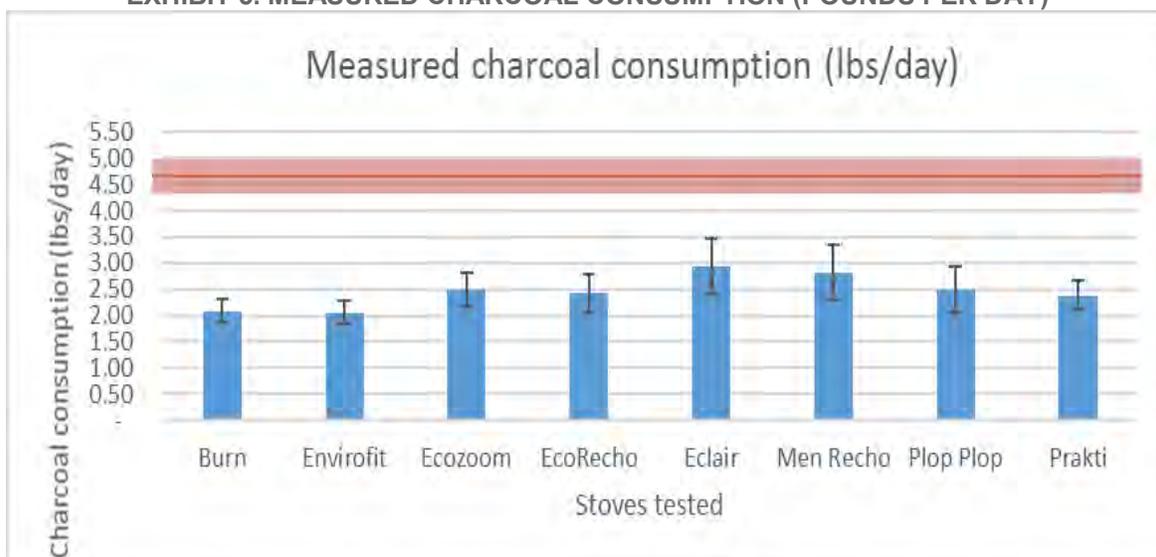
CARBON FINANCE PROGRAM FOR COOKING TECHNOLOGIES SCALED-UP

ICTP successfully submitted a POA under the U.N.'s Clean Development Mechanism. Known as “Improved Cookstoves for Haiti,” the POA is registered with the [U.N. Framework Convention for Climate Change](#) with project partner C-Quest-Capital as the POA’s coordinating managing entity. In support of this submission, ICTP conducted a longitudinal study and national baseline studies on household, street-food vendor, and school charcoal consumption. These baseline studies complied with CDM and Gold Standard methodologies, allowing independent Haitian stove manufacturers to apply for carbon credits under the Gold Standard scheme in the future. The longitudinal study gathered important information, such as users’ cooking preferences and stove fuel consumption and durability under normal usage conditions. The first of its kind, this study can help design future improved cookstove interventions in Haiti.

ASSESSING ICS USERS’ PREFERENCES

During its final two years, ICTP designed, implemented, and completed the first longitudinal performance assessment of improved cookstoves in Haiti, with a view to better understanding consumer preferences and generating data on the durability of improved cookstoves in Haiti. Please see Exhibit 5 for details on the comparative charcoal consumption of eight improved cookstoves.

EXHIBIT 5. MEASURED CHARCOAL CONSUMPTION (POUNDS PER DAY)



Through this longitudinal study of eight improved cookstoves in the Port-au-Prince area, ICTP collected feedback on consumer preferences after their year-long exposure to selected stoves. Four of the participating stoves were locally produced or assembled: Eco-Recho, Men Recho, Plop-Plop, and Prakti Wouj. The other



“With my improved cookstove, I use less charcoal! Now, with only one can of charcoal, I can cook my rice, beans, and meat sauce, and I have charcoal left over at the end. With my traditional stove, one large can of charcoal was not enough to cook that daily meal.”

— *Analia Monguoin, 41 years old, who cooks for a family of 10 in La Plaine. Photo taken June 12, 2014.*

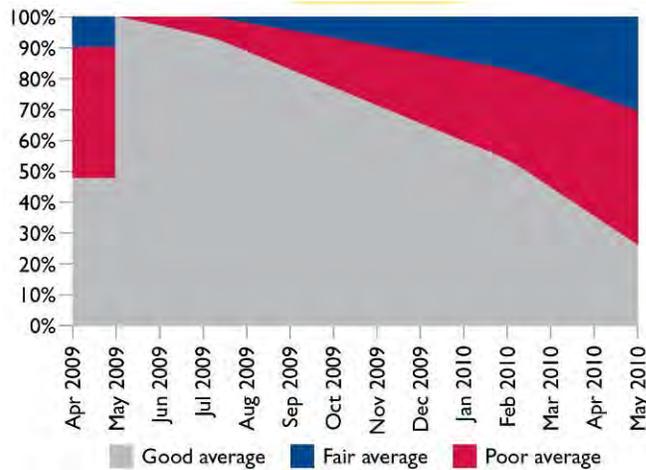
four stoves were imported from manufacturers interested in penetrating the Haitian market: Eco-Zoom prototype, Burn, Éclair, and Envirofit CH-5200. The study showed that households’ top stove criteria were its appearance, cooking time, and fuel savings. Results also showed that households used about half the amount of charcoal to cook their meals with improved cookstoves as compared to traditional cookstoves. This means that households can save up to 50 percent of the money they usually spend on charcoal to purchase food or other necessities. In fact, the 15 women in the study who participated in a secret box piggy bank challenge (see Myrlene Delphonse’s story, page 11) reported savings ranging from 535 HTG (about \$12) to 3,000 HTG (about \$75) over a period of three to six months, depending on how much they cooked and how they purchase their charcoal.

The study found that the majority of stoves had at least a one-year lifespan as compared to the traditional round stove’s four-month lifespan, yet deteriorated faster than expected, especially due to the saline atmosphere in Port-au-Prince, which corrodes metallic objects quickly. Thirty percent of the stoves were in good condition at the end of the study’s one-year period, and 40 percent were in fair condition (keeping in mind that households continue to use their stoves in fair condition until they become completely unusable).⁶ Please see Exhibit 6 on the next page for details. The study highlighted that women valued their ICS stoves and took better care of them than their traditional stoves; more than 60 percent of women reported storing their ICS stoves in the kitchen or living room as compared to outside. Furthermore, the locally manufactured stoves were consistently estimated to be worth more than their current market price.

The program shared preliminary data with stove manufacturers at the halfway point of the study, allowing them to improve their stove models. The final survey results were presented to them and improved cookstove stakeholders at ICTP’s final workshop in October 2014. The program also shared the survey’s raw data with the respective manufacturers so that they could analyze them further and make continued improvements to their stoves.

⁶ Final report, longitudinal study of eight improved cookstoves in Haiti. Drafted by Olivier Lefebvre, a monitoring and evaluation consultant for the Improved Cooking Technology Program in October 2014 (p.19, 24-25.)

EXHIBIT 6. PERCENTAGE OF COOKSTOVES WITH GOOD, FAIR, AND POOR AVERAGES



On a global level, few longitudinal studies have been implemented, documented, and released to the public or to stove manufacturers, making this data particularly valuable in Haiti and around the world. This study is essential to calculate the precise number of carbon credits that improved charcoal stoves can generate in a typical Haitian household. In addition, data on charcoal reduction, coupled with information on consumer preferences and behaviors, is already shaping ICS marketing in Haiti. Local manufacturers are more confident in their pricing, and their new campaign messages focus on savings and testimonials from ICS users.

DEVELOPING THE CARBON CREDIT PROGRAM

The POA, “Improved Cookstoves for Haiti,” presents a possibility to introduce multiple projects during the POA’s 28-year lifetime, with the following important characteristics:

- It can generate carbon credits from urban households using ICS with a rated thermal efficiency of at least 20 percent.
- C-Quest Capital, the POA’s coordinating and managing entity, manages the incorporation of all component project activities (CPAs) under this POA. This includes verifying the information provided by CPA implementers and auditing their records to ensure emissions reductions are accurately accounted for.
- The first CPA under this POA incorporates the Eco-Zoom Jet stove from Kenya.



Eco-Zoom stove model.

Due to the high-quality POA documentation submitted, all the documents, including baseline studies, were quickly approved by the auditor with no comments. For the first time, the carbon credit program characterized charcoal consumption in Haiti with statistically reliable methods (960 kilograms of charcoal per household per year).

Several challenges arose when developing the carbon finance credit program, including:

- *Lack of available auditors once the POA was ready for validation.* Because the European Union Emissions Trading System (the main market where CDM carbon credits are purchased) would not accept carbon credits from CDM projects registered after 2012, auditors were busy validating other carbon credit programs and could not begin working on this POA. The validation process was thus delayed until 2013.
- *Drop in carbon credit prices.* The average prices of CDM carbon credits dropped significantly in 2012 and are still low. C-Quest Capital is working to promote the POA among buyers who are willing to offer premium for carbon credits generated via technologies that have important social benefits, such as improved cookstoves.
- *Low stove durability.* Improved cookstoves under a carbon credit program have to be monitored for continuous usage every time carbon credits are issued. However, the process of carbon credit verification can be long and expensive. In the period between stove monitoring and auditors' confirmation of monitoring results, some stoves may reach the end of their usable lifespan. CDM strict performance standards require minimal discrepancies between the monitoring results and the auditors' field observations. Therefore, short lifespan stoves imply high verification risk.

SECTION V.

LESSONS LEARNED AND THE WAY FORWARD

Final survey data indicate that ICTP met or exceeded 20 out of its 26 performance targets, laid the foundation for a viable improved biomass and LPG cookstove market, and reduced charcoal use in the Port-au-Prince metropolitan area by more than 120,000 metric tons, saving at least 549,455 MT of wood and reducing Haiti's CO₂ greenhouse gas emissions by more than 823,930 tons. With 117,805 new beneficiaries using improved biomass or LPG cookstoves, the program saved Haitian consumers more than \$16 million in cooking energy costs. But despite the 36,000 households converted to ICS, and more than 78,000 others converted to LPG stoves, by the end of the program about 461,000 households in the Port-au-Prince metropolitan area will still be using each approximately 66 kilograms of charcoal per month with traditional stoves, totaling more than 365,000 MT of charcoal per year. This figure is just for households and does not account for street-food vendors, schools, orphanages, and bakeries not yet converted to LPG.

At present, Haiti can sustainably produce about 474,000 tons of wood per year. With this amount of wood, and the current level of production efficiency, Haiti would only produce 71,000 tons of charcoal, leaving an annual deficit of more than 300,000 MT of charcoal per year to meet Port-au-Prince's needs. Although lower than Port-au-Prince, charcoal consumption in other urban areas is still important, equaling about 100,000 MT per year. This deficit must be addressed to balance charcoal consumption with Haiti's sustainable production capacity.

ICTP's education and marketing campaigns and "word of mouth" messaging reached beyond the target metropolitan area of Port-au-Prince. For example, ICTP received and responded to requests for technical assistance from an LPG commercial stove manufacturer in Gonaïves, and partner stove manufacturers and distributors had many sales outside of the target area. The ICTP team expects that many project activities will be sustained by the private sector and Haitian government after closeout. For example, World Central Kitchen (WCK) plans to expand the ICTP-facilitated partnership between WCK and SWITCH for schools' conversion to LPG. The Presidential Advisory Council for Economic Growth and Investment (PACEGI) has taken over managing the hotline for the next six months after signing a memorandum of understanding with ICTP. Evidence from ICTP's performance management plan suggests that as a result of its awareness and marketing campaigns, demand for improved cookstoves has increased and is expected to continually rise in the near term. The efforts initiated by ICTP must continue and expand.

The upcoming period of accelerated demand represents a critical phase for the nascent improved cookstoves market in Haiti, especially for the relatively untested supply chain, which connects manufacturers with new distributors. As part of its passing-the-baton effort, or exit strategy, ICTP supported six key actors (D&E Green Enterprise, ILF, Ticadaie SA, Palmis Enèji SA,

Faculty of Sciences, and The World Bank) to create a biomass cookstoves task force to continue the marketing and awareness campaign.

As a result of ICTP's successful awareness and marketing campaign, there is increasing interest and demand for improved cooking technologies. ICTP is proud to report that it passed the baton for several of its activities to its Haitian government and private sector partners; however, there is a risk that some important program gains could be lost. For example:

- Although the number of improved cookstoves has significantly increased, with the creation of 246 new sales points, many more will need to be created and included in other major urban areas to accommodate consumers who wish to purchase new stoves. Otherwise, they are likely to lose motivation to convert to improved cookstoves.
- Sales of LPG stoves have significantly increased, with an increasing number of street-food vendors' conversion. ICTP-supported manufacturers and distributors sold and installed more than 3,000 LPG commercial stoves, including 2,000 during the past 15 months. In many cases, during the monitoring and inspection of these installations, ICTP staff and drivers (all ICTP drivers are trained LPG installation and repair technicians) discovered installation issues and safety concerns that they addressed or referred to the manufacturers or distributors. Poor installation could thus set the market back and undermine program gains. Although manufacturers and distributors understand these risks, after-sale services are not yet a standard business practice. The 96 LPG stove installation and repair technicians trained by ICTP can help develop a network of professional LPG after-sale services agents to support clients, manufacturers, and distributors; this could not be achieved during the short life of ICTP.
- The two main LPG importers that represent more than 80 percent of the market (SODIGAZ and TOTAL) and their affiliated distributors use established international standards for LPG management and distribution. However, as a result of the significant increase in LPG use, an increasing number of independent LPG retailers and distributors have entered the market, establishing microfilling centers with the goal of making fast money. Without relevant legislation, regulations, and guidelines, these centers represent a significant threat to the nascent LPG sub-sector. Any accident could undermine the foundation that ICTP has created over the last three years.
- ICTP survey results and feedback from supply chain actors show that many consumers who would like to purchase improved cookstoves cannot afford to do so with a single payment. Initially, increased access to credit appeared to be as simple as creating a special product with traditional MFIs and coordinating the contacts to facilitate the transactions. However, clients are not able to secure credit with traditional MFIs, because the process takes too long and requires too much paperwork. ICTP's experience with manufacturers and distributors providing credit directly to consumers without a credit agency intermediary and with minimal paperwork during the last months, has proven successful for both biomass and LPG stoves. Unfortunately, manufacturers and distributors can only respond to a limited number of loan requests, and many food vendors interested in purchasing LPG stoves are put on a

waiting list until the manufacturer or distributor can recover enough cash to provide new credits and deliver the stoves. The results of this experience will need to be further assessed for possible refinement and expansion.

Other programs in Haiti should draw from ICTP's successes and lessons learned to reach the rest of the country and effectively reduce charcoal consumption to create an equilibrium between charcoal production and consumption. These new programs should:

- Create additional charcoal-free food zones, especially in collaboration with municipalities, to facilitate the conversion of street-food vendors
- Enact the proposed LPG legislation to promote and accompany needed investments to safely manage and expand the LPG distribution system
- Create energy woodlots for charcoal production
- Introduce modern kilns for efficient charcoal production
- Continue to train and provide funding and technical assistance to local stove manufacturers (ICS and LPG) to increase improved cookstoves production and boost their business management and marketing skills
- Continue to train and provide technical assistance to improved stove manufacturers and distributors (ICS and LPG) to ensure quality control and consumer satisfaction
- Facilitate creation of briquette production units for alternate cooking energy sources
- Create a household LPG stoves production plant

SUCCESS STORY

Creating partnerships for healthier schools

Through ICTP's partnership with WCK and SWITCH S.A., 27 schools have already converted to propane, with more planned for 2015.



A trainee practices proper hand-washing techniques during a "sink-to-stove" training.



Trainers with cooks after a "sink-to-stove" training.

CHALLENGE. Using charcoal stoves inside school kitchens has major hygienic and health consequences; when black soot from the burning charcoal mixes with steam from the food, it coats the walls, cabinets, and kitchen utensils with a black substance that is difficult to remove.

INTERVENTION. In May 2014, ICTP partnered with the WCK to convert schools from using charcoal to using LPG as their cooking fuel. WCK is a non-profit organization launched by world-renowned chef and culinary ambassador of the Global Alliance for Clean Cookstoves, Jose Andres. ICTP leveraged a \$5,000 contribution from WCK to help some schools in the Port-au-Prince metropolitan area convert to LPG, and brokered a partnership agreement between WCK and ICTP's partner, SWITCH S.A. for its management.

RESULTS. 27 schools converted to propane with WCK 1:1 matching assistance for the down payment. This serves as an incentive for schools to make the largest possible deposit to purchase their LPG stove kit. While SWITCH S.A. provides training on using LPG stoves, WCK brings in foreign chefs to conduct food safety and sanitation training. The first "sink-to-stove" training took place in July 2014, with six cooks from the first five converted schools. The cooks learned proper hand-washing, sanitizing, and food preparation techniques to avoid cross-contamination, and reported that they felt empowered to transfer this knowledge to other cooks. A second training session took place in October 2014.

This partnership is expected to continue to grow beyond the life of ICTP. WCK is building awareness and raising funds via a social media campaign called "Haiti Breathes" to convert more schools and refurbish already-converted schools kitchens in 2015, with the help of SWITCH S.A. Chef Jose Andres will also visit converted schools to bring the world's attention to the issues of cooking with charcoal as well as the innovative solutions implemented in partnership with ICTP.

ANNEX A.

PERFORMANCE MONITORING PLAN: FINAL PERFORMANCE INDICATORS TABLE

Last updated January, 21, 2015.

Indicator Code	Performance Indicator	Unit of Measure	Baseline Dec 2011	FY 2012 Jul-Sep 2012 Results	FY 2013 Oct 2012-Sep 2013 Results	FY 2014 Oct 2013-Sep 2014 Results	FY 2015 Oct-Dec 2014 Results	Life-of-Project Results	Life-of-Project Targets	Percent of Target Reached	Notes
Program Objective: Market for sustainable improved cooking technologies expanded											
1	Number of beneficiaries with improved energy services due to U.S. government assistance (FACTS 4.4.1-31)	Number	0	6,266	52,672	51,836	7,031	117,805	81,939	144%	This is a cumulative of survey results for indicators 3, 12, and 22 (See method of calculation sheet).
2	Amount of charcoal consumption reduced as a result of increased use of improved cooking technologies due to project assistance	MT	0	2,660	46,033	61,343	10,422	120,458	101,648	119%	This is calculated from indicators 3, 14, and 22. It is cumulative (See method of calculation sheet).
Intermediated Result (IR) 1. Local market for improved biomass cookstoves expanded											
3	Number of certified improved biomass stoves sold in metropolitan Port-au-Prince	Number	4,401	6,200	13,760	13,509	3,019	36,488	35,000	104%	Stoves are Plop-plop, Eco-recho, Men Recho, Rena, and Prakti Wouj. This does not include the thousands of Recho Mirak sold, because its manufacturers and distributors do not maintain records and valid proof of sale.
4	Number of manufacturers that meet proposed requirements for certification of improved biomass cookstoves	Number	0	1	2	2	-	5	3	167%	Manufacturers are D&E, ILF, Prakti, Haiti Metal, and Ticadaie.

Indicator Code	Performance Indicator	Unit of Measure	Baseline Dec 2011	FY 2012 Jul-Sep 2012 Results	FY 2013 Oct 2012-Sep 2013 Results	FY 2014 Oct 2013-Sep 2014 Results	FY 2015 Oct-Dec 2014 Results	Life-of-Project Results	Life-of-Project Targets	Percent of Target Reached	Notes
Sub-IR 1.1. Leading efficient improved biomass cookstoves promoted and commercialized											
5	Number of new sales points for improved cookstoves in Port-au-Prince	Number	15	3	54	187	2	246	20	1,230%	Creation of mobile and fixed sales points to improve access.
6	Number of manufacturers and retailers receiving training in commercialization	Number	0	0	24	112	-	136	30	453%	88 training events during Q1 to Q3 of FY 2014 were not reported by the partners.
Sub-IR 1.2. Marketing and outreach cookstove campaigns expanded											
7	Number of media campaigns conducted in and covering target area	Number	0	0	4	9	-	13	8	163%	
Sub-IR 1.3. Financing mechanisms for manufacturers, retailers, and consumers to purchase improved cookstoves established											
8	Percentage of target population that recognizes the national eco-label and logo	Percent	0	0	-	80%	-	80%	20%	400%	There is no national eco-label, but final household survey results show that 80% of the target population can identify an ICS, specifically those promoted by the program.
9	Number of manufacturers and retailers that have accessed financing to improve the affordability of improved cookstoves with project assistance	Number	0	0	-	43	-	43	15	287%	
Sub-IR 1.4. Haitian government working groups on certification of cookstoves strengthened											
10	Number of protocols proposed for improved cookstoves developed by Haitian government working groups	Number	0	0	1	-	1	2	1	200%	Stove testing standards and protocols have been established with the BME. Certification protocol was developed with BME and UEH.

Indicator Code	Performance Indicator	Unit of Measure	Baseline Dec 2011	FY 2012 Jul-Sep 2012 Results	FY 2013 Oct 2012-Sep 2013 Results	FY 2014 Oct 2013-Sep 2014 Results	FY 2015 Oct-Dec 2014 Results	Life-of-Project Results	Life-of-Project Targets	Percent of Target Reached	Notes
Sub-IR 1.5. Economic opportunity for urban charcoal workers increased											
11	Number of charcoal workers trained on alternative economic opportunities	Number	0	0	56	-	-	-	100	N/A	Deactivated
Intermediate Result 2. Charcoal consumption by large users reduced											
12	Number of large users of charcoal that have switched to LPG as a result of project assistance	Number	0	66	380	1,648	454	2,548	4,939	52%	Final figure of 2,548 included 239 schools and 39 orphanages.
13	Quantity of LPG sold annually in metropolitan Port-au-Prince	MT	10,847	16,610	20,508	25,088	6,034	68,240	60,000	114%	
Sub-IR 2.1. Access and availability of LPG stoves improved											
Sub-IR 2.2. LPG cookstoves production increased											
14	Number of commercial LPG stoves sold by manufacturers in target area	Number	59	86	493	2,143	591	3,313	4,939	67%	Figure of 3,313 included stoves from schools and orphanages. This indicator is calculated based on a ratio of 1.3 stoves per large user.
15	Number of technicians trained in LPG stove repair and manufacturing	Number	0	26	37	27	6	96	90	107%	
Sub-IR 2.3. PPPs for LPG stove market expansion developed											
16	Number of PPP agreements signed that expand the market for LPG	Number	0	1	1	-	1	1	4	25%	PPP for SONAPI food court.
Sub-IR 2.4. Agreements with funding institutions to support sustained production developed											
17	Total public and private funds leveraged by the U.S. government for energy projects (FACTS 4.4.1-32)	U.S. \$	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Per discussions with USAID, this indicator does not apply to ICTP.
18	Number of loans from funding institutions to large users to purchase stoves from manufacturers	Number	0	2,098	-	425	300	2,823	3,000	94%	Traditional loans through microfinance institutions have not been successful. The process takes too long and requires too much paperwork for ICTP

Indicator Code	Performance Indicator	Unit of Measure	Baseline Dec 2011	FY 2012 Jul-Sep 2012 Results	FY 2013 Oct 2012-Sep 2013 Results	FY 2014 Oct 2013-Sep 2014 Results	FY 2015 Oct-Dec 2014 Results	Life-of-Project Results	Life-of-Project Targets	Percent of Target Reached	Notes
											beneficiaries. Distributors and manufacturers provided direct loans to clients.
Intermediate Result 3. Legal and regulatory framework for LPG strengthened											
19	Number of policy reforms/laws/regulations/administrative procedures drafted and presented for public/stakeholder consultation to enhance sector governance and/or facilitate private sector participation and competitive markets as a result of U.S. government assistance (FACTS 4.4.1-33)	Number	0	N/A	-	1	-	1	1	100%	Draft LPG legislation submitted to the Ministry of Commerce and Industry.
20	Number of Haitian government staff trained by project on regulation and enforcement of LPG distribution	Number	0	0	-		3	3	6	50%	
21	Percent of micro-filling stations in metropolitan area that follow new regulations on the sale and distribution of LPG	Percent	0	-	-	52%	52%	52%	80%	65%	Because the regulations do not yet exist, no micro-filling station can be said to be following them. However, stations affiliated to DINASA follow standard corporate safety regulations and guidelines. Monitoring and inspection handled directly by DINASA/SODIGAZ. Same for LPG stations affiliated with TOTAL.
22	Increase in sales of household LPG stoves as a result of the program's promotion of LPG	Number	8,318	0	38,532	36,679	3,558	78,769	42,000	188%	

Indicator Code	Performance Indicator	Unit of Measure	Baseline Dec 2011	FY 2012 Jul-Sep 2012 Results	FY 2013 Oct 2012-Sep 2013 Results	FY 2014 Oct 2013-Sep 2014 Results	FY 2015 Oct-Dec 2014 Results	Life-of-Project Results	Life-of-Project Targets	Percent of Target Reached	Notes
Intermediate Result 4. Carbon finance program for improved cooking technologies scaled-up											
23	Number of baseline studies on carbon reductions based on household charcoal consumption	Number	0	0	5	-	-	5	3	167%	CQC survey: street-food vendor charcoal consumption, Papyrus survey, market analysis, Haitian HH charcoal consumption, Schools Baseline Charcoal Consumption Study.
24	Number of stove models available in target areas that meet carbon emission reduction requirements	Number	0	2	4	1	-	5	4	125%	Plop plop, Echo Recho, Prakti, Men Recho, Rena.
Intermediate Result 5. Capacity of enterprises along the biomass cookstove supply chain (manufacturers, distributors, and retailers) to profitably scale-up production and sale of ICS strengthened											
Sub-IR 5.1. Improved cookstoves supply chain (from manufacturers, to distributors, to retailers) becomes more profitable											
25	Increased profit margin for actors along the supply chain	Percent	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Per discussions with USAID, this indicator does not apply to ICTP.
26	Amount of investment leveraged in U.S. dollars, from public and private sources, for climate change as a result of U.S. government assistance	U.S. \$	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Per discussions with USAID, this indicator does not apply to ICTP.
Sub-IR 5.2. Management systems of enterprises along the improved cookstoves supply chain strengthened											
27	Number of institutions with improved capacity to address climate change issues as a result of U.S. government assistance (GCC 4.8.2-14)	Number	0	N/A	-	55	-	55	35	157%	
Custom/GCC Indicators. Access to improved cooking technologies expanded											
28	Number of stove/equipment manufacturers, distributors and retailers developed through U.S. government assistance	Number	0	0	60	191	-	251	50	502%	

Indicator Code	Performance Indicator	Unit of Measure	Baseline Dec 2011	FY 2012 Jul-Sep 2012 Results	FY 2013 Oct 2012-Sep 2013 Results	FY 2014 Oct 2013-Sep 2014 Results	FY 2015 Oct-Dec 2014 Results	Life-of-Project Results	Life-of-Project Targets	Percent of Target Reached	Notes
29	Total reduction in energy expenditures by households and businesses	U.S. \$	0	399,721.00	4,393,229	12,041,208	16,763,783	16,763,783	15,323,047	109%	This indicator is calculated from survey results for indicators 3, 12, and 22. See formula sheet. Figures are cumulative.
30	Quantity of GHG emissions, measured in CO ₂ MT, reduced as a result of U.S. government assistance	MT	0	18,191	314,869	419,588	71,282	823,930	695,272	119%	The value of this indicator is calculated directly from indicator 2. A reduction in consumption of charcoal use by 1 kg reduces the emission of GHG in terms of equivalent CO ₂ by 4.09 + 2.75 = 6.84 Kg. So the formula to calculate this indicator is: indicator 2 results × 6.84.

ANNEX B.

FINAL ENVIRONMENTAL MONITORING AND EVALUATION TRACKING TABLE

(Environmental Monitoring Report Table 3)

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
IR 1. Local market for improved household biomass cookstoves expanded								
IR 1.1. Leading efficient improved biomass cookstoves promoted and commercialized								
1.	<p>Activity: Develop a manufacturing base to expand the availability of improved biomass cookstoves in Port-au-Prince for a reduction of wood charcoal consumption.</p> <p>1. Increase production of efficient biomass stoves 3. Increase sales of improved cookstoves</p> <p>Mitigation: Training and capacity building activities should include a strong focus on implementation of best management practices and environmentally sound resource management.</p>	Training and capacity building materials with best management practices (BMPs) recommendations.	Review of training materials, record in field log books on training and demonstration sessions, training, and technical assistance reports.	No specific additional costs are required.	Quarterly starting in FY 2013.	None	Training took place on a regular basis through October 2014, date of the last formal training program.	No specific training materials were developed for stove production, but training activities included efficient use of charcoal and promoted stoves, waste management, safety, and best management practices, as appropriate. Training on the use of new production materials used the guidelines provided by equipment's manufacturers.
2.	<p>Activity: Mapping of improved stoves distribution channels and identification of distribution networks.</p> <p>2. Increase sales points for improved stoves</p> <p>Mitigation: No specific measure is required, but as part of due diligence, training and capacity building materials will promote BMPs and will incorporate environmental concerns.</p>	Training and capacity materials with BMPs recommendations.	Review of training materials, training reports.	No specific additional costs are required.	Regular visits to sales points.	None	N/A	Activities focused on creation of improved stoves sales points with basic training on commercialization and marketing techniques. Training covered waste management and safety at sales points.
IR 1.2. Marketing and outreach cookstove campaigns expanded								

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
3.	<p>Activity: Create widespread public awareness of the benefits of improved cookstoves.</p> <p>1. Media campaigns conducted to promote improved cookstoves</p> <p>Mitigation: Demonstration and similar events should set an example for domestic waste management and effective use of improved biomass cookstoves.</p>	Cleanliness of demonstration sites during and after the event, as illustrated by pictures and videos.	Visual observations, record in field log books, photos and videos of demonstrations and similar events.	Photographs and videos taken as integral part of this activity will be used at no additional costs.	Visual inspection after each event and fair.	None	Effective: All demonstration sites were left clean and trash collected.	The demonstration activities raised awareness on efficient use of charcoal and biomass cookstoves and on domestic waste management.
IR 1.3. Financing mechanisms for manufacturers, retailers, and consumers to access improved cookstoves established								
4.	<p>Activity: Facilitate access to financing for manufacturers and consumers service delivery.</p> <p>1. Financing mechanism for manufacturers and retailers established</p> <p>2. Financing mechanism for consumers established</p> <p>Mitigation: Best management practices, environmentally sound resources management guidelines, scrap metal and other waste proper management or disposal, improvement of working conditions will be included in the stove production plan with manufacturers' active participation. Technical assistance and training should be provided to the manufacturers for effective implementation of the above.</p>	Stove production plans with the relevant BMPs and guidelines. Capacity building materials and training session reports on implementation of the BMPs and guidelines.	Review of training materials for BMPs recommendations. Record in field log books. Training and TA reports. Environmental screening form (ESF) report for production scale-up activities.	Hiring of short-term assistance to identify and incorporate the BMPs and environmental guidelines in the production plans: \$5,000.	Short-term production specialist visits and works at D&E Green Enterprise. Various visits this quarter at D&E Green and different sales points.	No specific issues encountered or identified.	N/A	<p>Successful training program conducted by short-term production specialist for D&E Green staff using manufacturer's guidelines.</p> <p>ICTP staff trained in Reg. 216 compliance conducted training for stove manufacturers, distributors, and sales points managers on environmental compliance.</p>
IR 1.4. Haitian government working group on certification of cookstoves strengthened								
5.	<p>Activity: Haitian government working group on improved cookstoves re-launched and strengthened.</p> <p>Mitigation: No mitigation measures are needed, but the working group will ensure that environmental concerns are taken into account and addressed in its recommendations.</p>	N/A	N/A	N/A	N/A	None	N/A	No activities.

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
6.	<p>Activity: Certification process strengthened and logo recognized by consumers.</p> <p>1. Establish certification procedures</p> <p>Mitigation: All testing protocols, as well as specifications and guidelines for laboratory materials and equipment, will be scrupulously respected and adhered to. As appropriate, training and technical assistance will be provided to ensure full respect for and adherence to relevant specifications and guidelines for laboratory materials and equipment.</p>	Stove testing protocols reflecting relevant specifications and guidelines.	Review of testing protocols, laboratory log books, training and technical assistance reports.	No specific additional costs required for the environmental aspect.	July and September 2014.	None	N/A	Staff trained and technical assistance provided on full respect for and adherence to relevant specifications and guidelines for laboratory materials and equipment. Testing protocols and safety procedures and guidelines developed.
IR 1.5. Economic opportunities for urban charcoal workers increased								
7.	<p>Activity: Promotion of alternative livelihood opportunities for workers in the charcoal value chain.</p> <p>1. Opportunities identified for charcoal workers in Port-au-Prince</p> <p>Mitigation: The ESF process is required to analyze potential impact before promoting an alternative livelihood activity.</p>	Report and/or minutes of consultations, meetings, and workshops on alternative livelihood activities. ESF reports on prospective livelihood activities.	ESF report for the proposed alternative livelihood activities.	TBD	N/A	N/A	N/A	Activity eliminated
IR 2. Charcoal consumption by large users reduced								
IR 2.1. Access to and availability of LPG stoves improved								
8.	<p>Activity: Facilitate street-food vendors' conversion from charcoal to LPG cookstoves.</p> <p>1. Strengthen partnerships with LPG suppliers to convert large users of charcoal to LPG biomass stoves</p> <p>2. Conversion of schools to LPG</p> <p>3. Conversion of orphanages to LPG</p> <p>4. Conversion of street-food vendors to LPG</p> <p>7. Conversion of other large users to LPG</p> <p>Mitigation: Education and training on the safe</p>	Education materials and training sessions reports on ways to safely fill, transport, store, and use of compressed gas.	Review of training materials and reports. Record in field log books on training sessions.	Short-term technical assistance for development and implementation of awareness and training activities: \$4,000.	Regular visits to street-food vendors, demonstrations and fairs. Meetings with manufacturers and distributors.	None	Effective	<p>All project activities, awareness campaigns, demonstrations, consultations, and meetings continue to emphasize safety in LPG use.</p> <p>Training on LPG safety planned took place in October 2014.</p>

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
	filling, storage, transport, and use of LPG is a cornerstone of this program.							
9.	<p>Activity: Development and implementation of LPG cookstoves marketing and awareness campaigns.</p> <p>5. Sustained media campaign focuses on large users of charcoal</p> <p>6. Internet-based stove sales strengthened</p> <p>Mitigation: Awareness and marketing campaigns will cover the safe filling, storage, transport, and use of LPG.</p>	Awareness and marketing materials on safe filling, storage, transport, and use of compressed gas.	Review of awareness and training materials and reports. Record in field log books. ESF report for production scale-up activities.	No specific additional costs are required.	Review of radio and TV program recordings. Inspection of demonstrations and fair sites.	None	Effective	All media campaigns, training activities, fairs, and public demonstrations focused on LPG benefits and emphasized safety in LPG use.
IR 2.2. LPG cookstoves production increased								
10.	<p>Activity: Ensure availability of and access to LPG cookstoves at affordable price.</p> <p>1. Provide technical support to manufacturers of commercial stoves</p> <p>2. Training of LPG technicians to repair and maintain stoves</p> <p>Mitigation: Standards and specifications for production scale-up will incorporate safety considerations. They will also take into account:</p> <ul style="list-style-type: none"> The improvement of working conditions, workers' health and safety The management and disposal of scrap metal and other waste The need for noise abatement or reduction for workers and neighbors 	<p>Production scale-up documents incorporating BMPs, safety, and other relevant recommendations.</p> <p>ESF reports on proposed activities</p> <p>Design documents with relevant recommendations if new construction is considered.</p>	Review of training materials for BMPs recommendations. Record in field log books. Training and technical assistance reports. Visual observations.	Hiring of short-term environmental engineer to guide facilities construction for production scale-up: \$8,000.	Regular visits to partner manufacturers, and training programs for LPG stove installation and repair specialists.	At the beginning of FY 2014, safety and protective gear were not always used, though available. Their use improved gradually and significantly.	Significant improvement from quarter to quarter, through the end of the program.	Awareness sessions through the end of the program stressed the importance of safety and protective gear.
IR 2.3. Public-private partnerships for LPG stoves market expansion developed								
IR 2.4. Agreements with funding institutions to support sustained production developed								
11. & 12.	Activities: Develop agreements between importers and large-scale consumers to ensure continuity of project objectives. Facilitate negotiations between microfinance institutions and grant foundations with street food, schools, and other stakeholders.	Copies of agreements and other documents with relevant safety clauses.	Review of agreements and other relevant documents.	No specific additional costs are required for this activity because it will be covered as	Regular monitoring visits to SONAPI.	Only SONAPI is an operational PPP. No environmental and/or safety	Mitigation is effective.	N/A

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
	1. Development of PPPs between TOTAL, SODIGAZ, and the Port-au-Prince Communes to support LPG for street-food vendors Mitigation: All agreements and other relevant documents will include clauses on safe filling, transport, storage, and use of compressed gas.			part of IR 2.		issues have been identified at SONAPI. Second PPP for the airport food zone initiated at the end of program.		
IR 3. Legal and regulatory framework for LPG strengthened								
IR 3.1. Haitian government capacity to monitor and enforce regulations improved								
13.	Activity: Work with Haitian government to reconvene the LPG working group. Mitigation: No mitigation measures are needed, but the working group will ensure that environmental concerns are taken into account and addressed in the LPG legal framework.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IR 3.2. Regulations, standards, and pricing for LPG strengthened								
14.	Activity: LPG laws and regulations published and released. 1. Develop capacity of Department of Pompiers to regulate microcenters 2. Adoption of LPG management guidelines and standards by key stakeholders Mitigation: The laws will incorporate BMPs and include environmental guidelines on LPG handling (filling, storage, transport, and use).	Copies of laws and regulations with relevant environmental guidelines.	Review of laws and regulations for relevant environmental guidelines.	The same short-term technical assistance to ensure that ISO standards and other environmental concerns are written into the law will also cover this one.	N/A	N/A	N/A	N/A
IR 3.3. Institutional framework for LPG strengthened								
15.	Activity: Strengthen the institutional framework for LPG through transparency Categorical Exclusion - N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
IR 4. Carbon finance program for improved cooking technologies scaled-up								
IR 4.1. Emissions and market data analyzed								
16.	Activity: Conduct market analysis. Categorical Exclusion - N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17.	Activity: Conduct a longitudinal study to understand stove durability and consumers' preference. 1. Longitudinal study completed Categorical Exclusion - N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18.	Activity: Use baseline studies to determine current fuel consumption and non-renewable biomass fraction. Categorical Exclusion - N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IR 4.2. Carbon credit program developed								
19. & 20.	Activities: Design a carbon credit program (pre-validation) and prepare the program of activities design document. Finalize national baseline reports No mitigation measures are required, but relevant BMPs and environmental concerns will be incorporated in all documents.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IR 4.3. Implement the program of activities								
21. 22. & 23	Activities: Conduct a market pilot test, implement the CPA, execute monitoring and verification. Register POA. Categorical Exclusion - N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
IR 4.4. Improved cookstoves manufacturers' access to investment funds increased								
24.	<p>Activity: Investments made to generate carbon credits through production and sale of improved cookstoves.</p> <p>Develop financial products with finance institutions.</p> <p>Mitigation: Grants or project-generated fund transfers to other organizations (sub-partners) or institutions will incorporate recommendations in this environmental mitigation and monitoring plan and stipulate the need for an annual environmental monitoring report. They will include provisions for technical assistance and training to ensure implementation of all required mitigating measures.</p>	TBD	TBD	TBD	TBD	None	N/A	No investments took place under the carbon credit program
25.	<p>Activity: Facilitate other investors' access to POAs to support improved cookstoves.</p> <p>Categorical Exclusion - N/A</p>	N/A	N/A		N/A	N/A	N/A	N/A
IR 5. Capacity of biomass cookstove supply chain enterprises to profitably scale-up production and sale of ICS strengthened								
IR 5.1. Profitability of improved cookstove supply chain (manufacturers, distributors, and retailers) increased								
26.	<p>Activity: Develop business plans and growth strategies to assist enterprises in expanding the availability of improved biomass cookstoves in the target area to reduce charcoal consumption.</p> <p>Mitigation: Training and capacity building activities will include a strong focus on implementation of best management practices and environmentally sound resource management.</p>	Training and capacity building materials with best management practices recommendations.	Review of training materials. Record in field log books on training and demonstration sessions. Training and technical assistance reports.	No specific additional costs required for the environmental aspect.	N/A	None	N/A	<p>Training included efficient use of charcoal and promoted stoves, waste management, safety, and best management practices, as appropriate. Training on use of the new production materials used guidelines provided by equipment's manufacturers.</p> <p>Marketing materials highlighted efficient use of charcoal and of the promoted stoves.</p>
27.	Activity: Increase manufacturers and consumers access to financing for increased use of improved cookstoves.	Stove production plans with relevant BMPs and guidelines.	Review of training materials for BMPs recommendation. Record in field log	Hiring of short-term assistance to identify and	Short-term production specialist works with D&E Green	At the beginning of FY 2014, safety and	Significant improvement from quarter to quarter,	Awareness sessions through the end of the program stressed the importance of safety and protective gear.

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
	<p>Mitigation: Best management practices, environmentally sound resource management guidelines, scrap metal and other waste proper management or disposal, and improvement of working conditions will be included in the stove production plan with manufacturers' active participation.</p> <p>Technical assistance and training will be provided to the manufacturers for effective implementation of the above.</p>	Capacity building materials and training session reports on implementation of the BMPs and guidelines.	books. Training and technical assistance reports. ESF report for production scale-up activities.	incorporate the BMPs and environmental guidelines in production plans: \$5,000.	<p>Enterprise on its production line with focus on safety and environmental compliance.</p> <p>ICTP staff regular visits to manufacturers' partners.</p>	protective gear were not always used, though available. Their use improved gradually and significantly.	through the end of the program.	
28.	<p>Activity: Implement cost-sharing investments for expanding critical manufacturing, assembly, distribution, and sales.</p> <p>Mitigation: All grants or project-generated fund transfers to other organizations (sub-partners) or institutions will incorporate the recommendations in this Environmental Mitigation and Monitoring Plan and stipulate the need for an annual environmental monitoring report. They will include provisions for technical assistance and training to ensure implementation of required mitigating measures.</p>	<p>Training and capacity building materials with best management practices recommendations.</p> <p>Stove production plans with relevant BMPs and guidelines.</p> <p>Capacity building materials and training session reports on implementation of BMPs and guidelines.</p>	Review of training materials for BMPs recommendations. Record in field log books. Training and technical assistance reports. ESF report for production scale-up activities.	Hiring of short-term assistance to identify and incorporate the BMPs and environmental guidelines in production plans: \$5,000.	<p>Short-term production specialist works with D&E Green Enterprise on its production line with a focus on safety and environmental compliance.</p> <p>ICTP staff regular visits to manufacturers' partners.</p>	At the beginning of FY 2014, safety and protective gear were not always used, though available. Their use improved gradually and significantly.	Significant improvement from quarter to quarter, through the end of the program.	Training and awareness sessions through the end of the program stressed the importance of safety and protective gear, scrap metal and other waste proper disposal, and environmentally sound resource management.
IR 5.2: Management Systems of Enterprises Along the Cookstoves Supply Chain Strengthened								

No.	Description of Activities and Mitigation Measure(s)	Monitoring Methods		Estimated Costs	Results			Comments/ Recommended Adjustments
		Indicator(s)	Methods		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
29.	<p><u>Activity:</u> Pilot different marketing and commercial strategies for increased public awareness on the benefits of improved cook stoves</p> <p><u>Mitigation:</u> The demonstration and similar events should set the example in domestic waste management and effective use of improved biomass cookstoves.</p>	Cleanliness of demonstration sites during and after the event, as illustrated by pictures and videos.	Visual observations, Record in field log books, photos and videos of demonstrations and similar events.	Photographs and videos taken as integral part of this activity will be used at no additional costs.	Inspection of demonstrations and fairs sites.	None	Effective	N/A
30.	<p><u>Activity:</u> Train selected value chain actors on business and financial management, marketing, sales and other skills necessary to improve their business operations</p> <p><u>Mitigation:</u> Training and capacity building activities should include a strong focus on the implementation of best management practices, and environmentally sound resources management.</p>	Training and capacity building materials with best management practices (BMPs) recommendations	Review of training materials, Record in field log books on training and demonstration sessions, Training and TA reports.	No specific additional costs are required for the environmental aspect.	After each training session	None	On-going	Training and awareness sessions through the end of Program stressed the importance of the safety and protective gear, scrap metal and other waste proper disposal, and environmentally sound resources management.

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