Haiti Improved Cooking Technology Program (ICTP)

Final Performance Evaluation Report

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List of Acronyms and Abbreviations

ALRI	Acute Lower Respiratory Illness
ANDH	L'Autorité Nationale Désignée d'Haïti
BME	Bureau des Mines et de l'Énergie
BRIDES	Bureau de Recherche en Informatique et en Développement Économique et Social
CDM	Clean Development Mechanism
COR	Contractive Officer's Representative
CPA	Component Project Activities
DOE	Designed Operational Entity
ENEL	"Ente Nazionale per l'energia Elettrica" (Italian Electric Company).
FDS	Faculté des Sciences
EdM	Entrepreneurs du Monde
GDA	Global Development Alliance
GoH	Government of Haiti
ICS	Improved Cookstove
ICTP	Improved Cooking Technology Program
IHSI	Institut Haïtien de Statistique et d'Informatique
KII	Key Informant Interview
LPG	Liquefied Petroleum Gas
MAP	Metropolitan Area of Port-au-Prince
MARNDR	Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural
MCI	Ministère du Commerce et de l'Industrie
MFI	Micro Finance Institutions
MoU	Memorandum of Understanding

NGO	Non-Governmental Organization
POA	Program of Activity
PPP	Public-Private Partnership
PSU	Primary Sampling Unit
SdE	Section d'Énumération
SFV	Street Food Vendors
SONAPI	Société Nationale des Parcs Industriels
STTA	Short Term Technical Assistance
TOE	Ton of Oil Equivalent
UEH	Université d'État d'Haiti (Haiti State University)
USAID	United States Agency for International Development
WHO	World Health Organization

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Executive Summary

Background context and Objective

In June 2015, USAID awarded to BRIDES a contract to conduct the final evaluation of the Improved Cooking Technology Program (ICTP) implemented in the Metropolitan Area of Port-au-Prince (MAP). The purpose of the final evaluation was to determine the impact of the ICTP and its main objective to set Haiti on a path towards long-term sustainable cooking solutions and achieve a significant reduction in charcoal consumption by large users and households.

The program planned to reduce the charcoal demand by promoting more efficient and substitutive products, presumably cheaper and less harmful to the environment in Haiti. The ICTP was sectioned into five main components with specific intermediate results, namely, 1) establishing a thriving local market and industry for improved biomass household cookstoves, 2) reducing charcoal consumption by large users, particularly street food vendors, schools and orphanages, 3) building a legal and regulatory framework for LPG (Liquefied Petroleum Gas), 4) devising carbon finance and financial incentives for scale up, 5) strengthening the capacity of biomass cookstove enterprises to scale up production and sales.

The evaluation questions provided by USAID/Haiti were as follow:

1. To what extent did the project establish a local market and industry for household improved biomass cookstoves?

2. To what extent did the targeted project beneficiaries switch to LPG technology and what were the driving forces behind this choice?

3. What mechanisms have been put in place to ensure sustainability of the project achievements and to what extent will benefits realized be replicated in the long term by partners?

4. To what extent will the existence or absence of a carbon credit market in Haiti affect the success and sustainability of the ICTP?

Evaluation Methodology.

Both quantitative and qualitative methods were used for this evaluation. Qualitative methods included focus groups with technicians working in cookstoves manufacturing plants, key informant interviews with various stakeholders and beneficiaries, and in depth project document review. Quantitative methods included a mini-survey with large users including 32 orphanages, 31 schools and 60 street food vendors. A household survey was conducted with 973 households in the MAP.

Findings and Conclusions

Question 1.

Based on data collected on the field, major findings regarding the establishment of a local market for (ICS) are the following:

A. The project established and strengthened local institutions and entities of the GoH to produce cookstoves

The evaluation team distinguishes two groups of evidence supporting that ICTP established and strengthened local institutions and entities of the GoH for the promotion and commercialization of improved biomass cookstoves:

a) The ICTP developed a manufacturing base to expand the availability of ICS in the targeted area. The project supported the establishment of the national testing laboratory at the "Faculté des Sciences, UEH". The program identified six improved cookstove models and their manufacturers receive in-kind grants including clippers, guillotine shearing machines, generators, spot welders, etc. In addition to grants, the manufacturers also received other kinds of less direct support such as advertising, orientation to credit institutions, specific support in the organization of an exhibit fair, etc.

b) The ICTP has established a Distribution Network.

The ICTP reported that three new private sector partners, TOTAL Haiti SA, Micama, and Ticadaie, used their distribution networks to support improved charcoal cookstoves (ICS) sales, and about 246 new sales points have been established in the Port-au-Prince Metropolitan Area over the project life. Our household survey indicated that about 40.2 percent of the population knew where to buy an improved cookstove.

B. Marketing and outreach campaign established by the program have reached a huge part of the population living in the metropolitan area of Port-au-Prince

According to ICTP reports, 13 media campaigns covering the target area have been conducted with ICS partners to promote ICS. About 22 radio and TV programs have been produced and broadcasted, and 47 ICS demonstration events have been organized to promote ICS purchase and use. About 66 percent of the respondents have seen commercials on TV about improved cookstoves. The household survey showed that about 69 percent have heard about ICS in radio and only 29 percent have seen billboards about ICS.

C. Financial incentives were not realized on a scale that would drive significant changes

One of the major barriers to change from traditional to improved cookstoves is the cost of the stoves so program design included activities to promote the purchase of improved cookstoves. According to annual reports, the ICTP worked with two Micro Finance Institutions (MFI) — ID Microfinance of EdM and ACME SA — to pilot special consumer microfinance products, including "Kredi enèji & Kredi Enèji vèt". According to key informants, up to the end of the project people didn't have money to buy improved stoves, which tremendously slew down product distribution. According to household survey results about 6 percent of purchased cookstoves were local gifts. About 43 percent of households having purchased improved cookstoves claim to have had credit to purchase. Among improved cookstoves users, 52 percent argue that they would not be able to buy the cookstove without external help

(remittances, credits, gifts, etc.). Among households using traditional stoves, about 70 percent said they would buy an improved cookstove if they had the opportunity to have credit.

D. ICS have not been adopted by households in the metropolitan area of Port-au-Prince

The end results of marketing activities were that the households living in the metropolitan area purchased improved biomass cookstoves and that they are using them in their households.

In the program area, 88 percent of households still use charcoal for cooking at home, with 71 percent of households using charcoal exclusively. About 82 percent of households still have traditional cookstoves. Only 6 percent purchased improved biomass cookstoves, 7.5 percent has LPG stoves and 2 percent have ovens. Wood is also still in use in the metropolitan area, reported as "Other".

E. Cookstoves certification is strengthened but is yet to be functioning at a rate to protect manufacturers intellectual property

An MOU has been signed between the BME, UEH and ICTP for the transfer of the laboratory to UEH. Since its launch, very few stoves have been tested in the laboratory. All manufacturers met are very satisfied with the results of tests conducted in the laboratory of FdS they consider to be of international standard.

Conversely, producers complain about the absence of legislation for the protection of intellectual property. As an example, the Mirak stove is being sold at 500 gourdes, while stove makers are counterfeiting and selling it at 100 gourdes. Producers also complain about the expensive cost of certification for their product.

Q1. Conclusion. The program has established some necessary bases to institute an improved cookstoves market in the metropolitan area of Port-au-Prince, but the massive switch from traditional cookstoves to improved cookstoves is still to be achieved.

Question 2.

Major findings regarding LPG technology are the following:

A. Media campaign for LPG was a success, reaching out to a high percentage of large users

Nearly 80 percent of street food vendors and over 80 percent of schools and orphanages leaders had the opportunity to see a commercial on TV. In any case, 69 percent of orphanages, 75 percent of heads of schools and 73 percent of street food vendors claim to have heard a radio spot. An identical percentage of orphanages but less schools (58 percent) and street vendors (57 percent) claim to have seen billboards. Targeted large users have been reached out by the ICTP media campaign and therefore are potential LPG consumers.

B. Switch to LPG did not follow trends of media campaign coverage among large users.

The mini-survey with schools with canteens in the metropolitan area reported that only 22.6 percent are using LPG (12.9 percent have LPG stove and 9.7 percent have LPG ovens), while 29 percent have traditional charcoal stoves. The mini-survey implemented with orphanages included in the later sample shows that only 44 percent have an LPG stove. About 31 percent are still dependent exclusively on charcoal for cooking and 37 percent are using charcoal

complemented with other energy source. According to the information collected in different areas occupied by the SFV, only SONAPI vendors have been converted to LPG. Outside this area it is very difficult to find a SFV that uses LPG as a source of energy. LPG cookstoves production is strengthened but an increase in production was not significant.

None of the randomly selected dry cleaners, bakeries or prisons were beneficiaries of the project. The only company manufacturing LPG ovens for bakeries stated to have so far produced only one oven. According to the owners met, the challenges to conversion to LPG are strong, including electricity, high cost of stoves, and lack of information.

C. Production is strengthened but increased in production was not significant.

Equipment has been distributed to producers to both have better quality products and increase production. However, most manufacturers were not too happy because they expected to receive cash[1] in lieu of equipment. Further, expectations were often higher than what they actually received. According to the manufacturers, the increase in LPG stoves production was not very significant, following the demand slow growing trend. Manufacturers believe that it is extremely difficult to obtain a change of habits in three years.

D. Driving forces associated with switches to LPG are mainly finance and safety.

According to most of the charcoal large users, the main barriers to conversion are lack of money for upfront investments, and fear of fire or explosion associated with the use of LPG. About 44 percent of orphanages and 54 percent of SFV claimed that the price of the LPG stoves is the main reason preventing the switch. Driving forces to switch to LPG are mainly economics according to 62 percent of orphanages, 36 percent of schools and 59 percent of SFV.

Q2. Conclusion. The major conclusion is that the conversion rate from charcoal to LPG is still low. Many large users are still to be converted.

Question 3.

In Haiti, the law on petroleum products was passed in 1949[2]. Some of its provisions are outdated given the evolution of trade-related techniques for these products, and LPG, which has been on the Haitian market for decades, is not addressed in the law. ICTP has provided substantial technical advice and assistance to the MCI in analyzing the economic environment of the LPG value chain in order to lay the foundation for legislation that is correctly structured and reflects the reality of the sector. Chemonics contracted a firm to write a bill for the group. The bill was presented and discussed in work sessions with the various key stakeholders. According to MCI, this bill needed to be contextualized and more closely adapted to the country's reality.

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[1] They argue that they would get more materials for the same amount of money.

[2] The law on petroleum products effective in Haiti exists since 1949. LPG have a special status, since the customs tax on this product has been abolished in 1987.

In addition to the Chemonics' bill, there was also a bill from Total Haiti, and another one from the Mevs Group. Finally the Ministry of Commerce and Industry sponsored a bill produced by the consultant Paolo Schilozzi, which intended to be a pool of the others.

In addition to this proposed legislation, LPG quality also needs to be regularly controlled and tested. There are currently no quality control mechanisms in place.

According to the submitted and approved plans, the ICTP had to draft key policy, legislation and regulation and provide technical assistance to the GOH to assist them in adopting these legislative, regulatory and policy recommendations. According to the key informants met during this evaluation, the project actually implemented all planned activities. However, the single outcome of that component aiming at the "adoption of an effective regulatory framework for LPG that will enable market expansion" was not achieved. External factors, outside of the project's control, are responsible for this situation. It was expected that the GoH fully play its role and that there also be a functional Parliament during this phase of the project's life.

Conclusions. Overall, the project has the merit of having achieved almost all that was planned. However, the outcome of this project component, which was the adoption of an efficient regulatory framework, was not met.

Question 4.

Three (3) carbon credit projects are currently in implementation or in the registration process in Haiti.

- The first project is the D&E Green enterprises project registered on its own (without the ICTP support) since 2013 with ENEL, a European Electricity Company.
- The second project is the Entrepreneur du Monde, a French entity involved in energy projects in Haiti (EdM Voluntary Gold Standard) to which ICTP provided access to its various studies in order to reduce the costs of the process. The project is in registration process.
- The third project is the POA “Improved Cookstoves for Haiti,” registered to CDM, by ICTP, that presents a possibility to introduce multiple projects during the POA’s 28-year lifetime.

To register and implement a carbon credit project in Haiti, several constraints have been highlighted by key informants:

- **High cost of registration.** It generally costs over US$ 150.000 to fulfil all the requirements and get registered.
- **Registration duration process.** It takes over 2 years to comply with all steps and get registered.
- **Institutional weakness.** The National Designated Authority (ANDH) is not currently fully functional. They need capacity building and staff reinforcement.

Moreover, key informants reported that local partners had reported many difficulties working with C-Quest capital for several reasons. Some producers could not register their projects due mainly to complicated procedures and registration cost. These include Recho Rena and “chabon tout bon” of Ticadaie.

National Institutional scheme for CDM project

A key requirement of local authorities for the CDM project is to put in place a structure for (A) providing an authorization letter to promoters with specific criteria to comply with and (B) promoting the opportunities of CDM projects among potential investors.

To comply with this requirement, the Designated National Authority of Haiti (ANDH) was created within the Ministry of the Environment by a Presidential Decree on May 24, 2010 and is responsible for implementing the provisions of the Clean Development Mechanism (CDM) of the Kyoto Protocol (KP).

In terms of progress related to the establishment of a carbon market in Haiti, ANDH has elaborated and made available a Guide to investors.

International CDM price environment

The average prices of CDM carbon credits dropped significantly in 2012. But it is still valuable to promote POA among buyers who are willing to offer premium prices for carbon credits generated via technologies that have important social benefits, such as improved cookstoves.

State and Trends of Carbon pricing

As of today[3], about 40 countries and 20 sub-regional jurisdictions are putting a price on carbon. Together, these carbon pricing instruments cover almost 6 gigatons of carbon dioxide equivalent to about 12percent of annual global Green House Gas (GHG) emissions.

Conclusion. ICTP's carbon component accumulated a great quantity of information by conducting different studies which 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.

In spite of the decline in the price on carbon credit, there is still room to implement relevant projects in Haiti.

It is, however, very difficult to affirm that a well-established carbon market has been achieved in Haiti by the project. Whether or not the project has influenced the carbon market is not an easy question to answer because no carbon credit has been delivered as a result of the project which would provide financing for stoves and make them affordable for those less fortunate.

At this moment it is clear that the absence or the presence of the carbon credit component of the ICTP project has not influenced the stove market. But one can assume that once the whole cycle is completed, it should have tremendous influence on the stove market.

[3] World Bank: State and Trends of Carbon pricing, May 2015

I. INTRODUCTION

The Improved Cooking Technology Program (ICTP), implemented in Haiti from February 2012 to February 2015, was a bold intervention that planned to reduce the demand for wood and charcoal. The 8.2 million US dollars project was executed to promote more efficient and substitutive products, presumably cheaper and less harmful to Haiti's environment. What are the results of such a program? Under what conditions can it be reproduced or scaled up in future programming? It is generally one of the intents of project evaluation to address these and other key questions.

Evaluation is critical to the success and sustainability of USAID's work. Allowing time at the end of each program cycle to reflect together with partners and communities on what has changed, and to find out what worked or didn't work, is a powerful way of improving the quality of a program. This evaluation intends to analyze the effectiveness of the program, increase accountability to all stakeholders and build the capacity of those with whom USAID works.

This document lays out the project background context, the evaluation methodology and findings

II. BACKGROUND AND CONTEXT

This section describes the problems related to the use of charcoal as an energy source in Haiti and the reasons justifying the implementation of a program aiming at reducing its use. Charcoal is widely used in Haiti as an energy source for household cooking at the expense of the environment. In addition, the use of charcoal is detrimental to the health of individuals who are exposed to charcoal smoke. The following paragraphs detail the stakes linked to charcoal production and use in Haiti.

2.1. Charcoal in Haiti

2.1.1. Charcoal as an energy source

In Haiti, charcoal is the main source of energy, especially for cooking. According to an ESMAP[4] study (2007), Haiti draws 72 percent of its energy consumption from local resources, including firewood and charcoal (66 percent), sugar cane residues (4 percent) and hydropower (2 percent). While richer households have gradually switched to cleaner sources of energy (kerosene and Liquefied Petroleum Gas (LPG), nearly 90 percent of households turn to charcoal or firewood for energy. Nearly 30 percent of households' income in the metropolitan area goes toward the purchase of charcoal. Charcoal is produced mainly in rural areas and sold to

[4]ESMAP (Energy Sector Management Assistance Program)

wholesalers who transport it to the metropolitan area. About 80 percent of this charcoal is consumed in urban areas, while rural households use more firewood.

During the last two decades, an evolution was observed in charcoal consumption as other large charcoal users emerged. These users included street food vendors (SFV), restaurants, hotels, schools and orphanages. According to some specialists, the country sacrifices 12 million trees each year, providing 3.4 to 4.0 million metric tons of firewood or 1.3 to 1.5 million tons of oil equivalent (TOE) to meet the energy needs. Of this total, 37 of percent of that firewood is converted into charcoal, an amount oscillating between 250,000 and 280,000 tons every year.

2.1.2. Charcoal and the environment

Charcoal production has a disastrous impact on the Haitian environment. Environmental degradation accelerated at an alarming rate from the early 1960s to 1985 with serious consequences. Haitian forest cover was estimated at 60 percent in 1923, and has fallen to less than 2 percent according to the MARNDR ("Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural": Ministry of Agriculture). Unregulated deforestation for this source of energy, coupled with uncontrolled urbanization, greatly increases Haiti's vulnerability to climate change and reduces the production capacity of goods and food. Deforestation has resulted in soil erosion and degradation of natural resources. During cyclonic periods, rains often cause major floods with loss of human life and considerable material damage. Soil erosion reduces crop yields and promotes deadly landslides. Since 1975, fertile acreage has decreased by 70 percent, while 70 percent of the population still practices subsistence farming.

2.1.3. Charcoal and health

Charcoal and firewood burn inefficiently in local traditional stoves, with little means of controlling air quality and conserving heat (Smucker, 2007). Their use exposes Haitians, particularly women and children, to smoke and indoor air pollution that escalates related health problems, including respiratory diseases. Acute Lower Respiratory Illness (ALRI) is the number one killer of children under five in Haiti, with ALRI mortality rates estimated to be more than 40 percent (WHO, 2006). Both the promotion of LPG and/or the use of more efficient biomass cookstoves would contribute to decreasing exposure to smoke and indoor air pollution, therefore decreasing ALRI mortality rates.

2.2. Alternative cooking solutions

Due to environmental and health problems related to the production and use of charcoal and traditional stoves in Haiti, USAID Haiti sought to finance projects that promote market expansion of alternative cooking solutions and to capitalize on international assets and opportunities including the Global Alliance for Clean Cookstoves, carbon finance, research of more efficient stoves, and the search for alternative fuels.

2.2.1. Global context: Global Alliance for Clean Cookstoves

In September 2010, the US Secretary of State, Hillary Clinton, announced the launch of the Global Alliance for Clean Cookstoves. The Alliance is a public-private initiative led by the United Nations Foundation. It includes several donor nations and multilateral institutions such as USAID, the World Bank, and the United Nations. The Alliance's vision is for universal adoption of clean cooking solutions. The Alliance's goal is for 100 million homes to adopt clean and efficient stoves by 2020. To reach this target, the Alliance seeks to eliminate global barriers to large scale adoption of clean cookstoves through standards, financing, research and awareness. The Alliance is developing viable solutions in Africa, Asia, Latin America and the Caribbean. In Haiti, the ICTP has been designed to align with the Alliance's goal, which is to promote clean cooking solutions in Haiti.

2.2.2. Global context: Carbon finance

Carbon financing offers an opportunity to find financing to promote growth in the production and use of improved stoves under the ICTP in Haiti. As a results-based financing mechanism, carbon assets (such as improved cookstoves) would be translated into carbon credits with monetary values on the global market or through the Clean Development Mechanism (CDM) (ICTP fully executed contract, 2012). Carbon assets would be developed, monitored and registered (from CO2 emissions reduction through fuel efficient stoves) and manufacturers would benefit from the funds to better contribute toward the program's objective

2.2.3. More efficient cookstoves

The standard charcoal cookstove burns inefficiently with little ability to control air quality or conserve heat. Efforts to introduce improved cooking systems in Haiti include locally manufactured adobe stoves, hand-crafted and mass produced stoves constructed of metal, and solar cookstoves. Efforts to scale up improved cookstoves in Haiti have shown limited success. Among limiting barriers are: the high cost compared to traditional Haitian charcoal stoves; cultural resistance to changing technologies; underdeveloped supply and distribution chains; limited availability of raw materials; lack of quality control for stove production; lack of standards of what constitutes "improved" cookstove technology (ICS); and lack of awareness and education to both encourage the adoption of new technology and to properly implement and sustain positive behavior change.

Two key positive factors that could contribute to improved cookstove market expansion are the high price of charcoal and the ongoing principle of paying for energy in Haiti.

2.2.4. Regulatory framework

Haiti has no legislation concerning the LPG sector, greatly weakening the sector. With undefined technical and commercial standards, actors, manufacturers and distributors are free

to act at their own discretion motivated by profit and ignoring collective security and wellbeing. Prices are not regulated, nor the establishment and operation of filling stations.

The problems, challenges and opportunities above have inspired the design and implementation of the ICTP. The details on the objectives and activities that have been planned or conducted are presented in the following section.

III. THE IMPROVED COOKING TECHNOLOGY PROGRAM (ICTP)

From January 31, 2012, to January 31, 2015, Chemonics (with subcontracts to Mercy Corps, Earth Matters and C-Quest Capital) implemented the Improved Cooking Technology Program (ICTP) under a USAID awarded contract. USAID, though the ICTP, was to provide technical assistance to establish a thriving market on both the supply and demand sides for clean cooking solutions, including Liquefied Petroleum Gas (LPG). Activities were implemented in the greater Port au Prince metropolitan area; including the communes of: Delmas, Petion-ville, Kenscoff, Tabarre, Carrefour and Croix des Bouquets. Primary beneficiaries of the ICTP are manufacturers, distributors and retailers in the ICS and LPG distribution networks, as well as end users such as SFV, schools, orphanages and households.

3.1. ICTP Objective and assumptions

The objective of the program was to set Haiti on a path towards long term sustainable cooking solutions and achieve a significant reduction in charcoal consumption by large users and households. The objective was expected to be achieved by expanding the market for improved biomass cookstoves and cleaner fuels and by developing clean energy businesses. At the end of its implementation, the ICTP expected to reduce pressure on Haiti's forest, encourage local and sustainable solutions and create cooking solutions that are clean, efficient, affordable and suitable to local cooking needs.

The assumptions behind the program objectives were: a) That design and availability of improved biomass (charcoal) cookstoves and expanded use of LPG are the best local cooking technologies for USAID support; b) That expansion of the adoption of improved biomass cookstoves and LPG will reduce demand for charcoal; c) That establishment of regulations for the expanded sale of LPG will attract investment, increase LPG availability and improve safety; and d) That educating the public on the benefits of LPG as a cooking fuel source, improved biomass cookstoves for efficiency, and reduced charcoal use, will lead to lasting behavioral change.

3.2. ICTP components and expected results

The ICTP has five main components with specific intermediate results, namely, 1) establishing a thriving local market and industry for improved biomass household cookstoves, 2) reducing charcoal consumption by large users, particularly street food vendors, schools and orphanages, 3) building a legal and regulatory framework for LPG, 4) devising carbon finance and financial

incentives for scale up, 5) strengthening the capacity of biomass cookstove enterprises to scale up production and sales.

3.2.1. Establishing a thriving local market and industry for household improved biomass cookstoves

As an intermediate result, the ICTP wished to see the local market for improved household biomass cookstoves expanded. To meet this result, the program intended to promote and commercialize the best improved biomass cookstoves; expand the marketing of cookstoves through various outreach activities and marketing campaigns; establish financing mechanisms to facilitate purchases of improved cookstoves; and strengthen the Government of Haiti's (GoH) capacity to develop and manage the certification of cookstoves.

Expected results for this component were a) provide assistance to at least 2-3 stove manufacturers and/or importers and 4-5 distribution/retail companies to enable the expanded availability of improved cookstoves in Port-au-Prince; b) to design and implement a marketing and outreach campaign that is expected to last the life of the project in partnership with the above businesses; c) create at least one financing solution for households in Port-au-Prince to enable their purchase of improved cookstoves; d) establish an ongoing coordination mechanism with GoH working group members and e) conduct at least one re-training solution developed for displaced charcoal workers.

3.2.2. Reducing charcoal consumption by large users, particularly food vendors, schools and orphanages

The ICTP wanted charcoal consumption by large users reduced as an intermediate result. To meet that result, the ICTP intended to increase access to and ensure the availability of LPG and LPG stoves through partnerships with Haitian stove and LPG distributors, increased LPG stove production, and the development of public-private partnerships (PPPs) for LPG stove market expansion.

Expected results at the end of the ICPT are that a) approximately 4139 food vendors and 800 schools and orphanages and other energy intensive entities switched to LPG, and b) a Global Development Alliance (GDA) or MOU is established with LPG companies to leverage their resources and expertise and ensure the reliable distribution of LPG to food vendors, schools, orphanages and other energy intensive entities.

3.2.3. Building a legal and regulatory framework for LPG

As the third intermediate result, the ICTP proposed to have the legal and regulatory framework for LPG strengthened. To meet this result, the ICTP intended to: strengthen overarching regulations; improve the Government's capacity to monitor and enforce LPG sector regulations, standards, and pricing for LPG stoves; and, reinforce the institutional framework for the management of the LPG sector.

The expected result of this component is the adoption of an effective regulatory framework for LPG that will enable market expansion.

3.2.4. Devising carbon finance and financial incentives for scale up

The main intermediate result of this fourth component is the establishment of a carbon finance program for improved cooking technology. The program intended to achieve this result by: collecting and analyzing emissions and market data on household energy consumption; supporting the development of a carbon credit program; designing an effective Program of Activities under the UN Clean Development Mechanism; and, increasing access to investment funds by improved cookstove manufacturers.

The expected result is the development of a carbon asset encompassing a range of improved cooking technologies, which will provide a revenue stream for maintaining and scaling up the program.

3.2.5. Strengthening capacity of biomass cookstove enterprises to scale up production and sales.

The intermediate result under this fifth component is to increase the capacity of enterprises along the biomass cookstove supply chain to profitably scale up production through strengthened sales. To achieve this result, the program intended to focus on the micro-level activities that promise to improve the operations of specific actors along the improved cookstove supply chain. Under this component, the program will provide funds for multiple actors along the supply chain, to test innovative marketing and commercial strategies. This intermediate result was added fourteen months after the inception of the program (May 2013).

IV. EVALUATION PURPOSE

The purpose of this final evaluation was to determine the impact of the ICTP and its main objective to set Haiti on a path towards long-term sustainable cooking solutions and achieve a significant reduction in charcoal consumption by large users and households. Findings of this evaluation should 1) inform USAID/Haiti on the practicality of, and implications for, future programming in the promotion of improved cooking technology in Haiti, and 2) analyze the demand and scalability of improved biomass cook stoves and Liquefied Petroleum Gas (LPG) as the optimal choices for such promotion. The primary stakeholders for this evaluation include the Government of Haiti, USAID, local food vendors, stove manufacturers and retailers, LPG sellers, and the end-users of improved cooking technologies.

V. EVALUATION KEY QUESTIONS

The evaluation addressed the following questions:

1. To what extent did the project establish a local market and industry for household improved biomass cookstoves?

2. To what extent did the targeted project beneficiaries switch to LPG technology and what were the driving forces behind this choice?

3. What mechanisms have been put in place to ensure sustainability of the project achievements and to what extent will benefits realized be replicated in the long term by partners?

4. To what extent will the existence or absence of a carbon credit market in Haiti affect the success and sustainability of the ICTP?

VI. EVALUATION METHODOLOGY

Use of mixed-methods

Both quantitative and qualitative methods were used for this evaluation. Qualitative methods included focus groups, key informant interviews, and in depth project document review. Quantitative methods included a mini-survey and a household survey.

Qualitative and quantitative methods were conducted simultaneously, and the data were analyzed separately. Then, as the data from different methods are often intended to answer the same question, the findings were triangulated.

This evaluation was conducted from July to December 2015.

6.1. Qualitative methods

Using qualitative data collection methods, evaluators were able to better understand the improved cooking stoves and LPG stove manufacturers, where are they located, what was the process leading to the production of improved cookstoves, etc. Qualitative methods were used as well to understand what the driving forces were behind households' and large users' switch to improved biomass cookstoves or LPG technology. Information gathered through qualitative methods allowed evaluators to analyze the replicability and the sustainability of the project, and finally to produce a comprehensive analysis of the carbon credit market in Haiti. Based on the evaluation objectives and questions, semi-structured guides were developed in order to conduct data collection for qualitative methods.

The team met with the COR before the evaluation was launched to ensure clarity of expectations and the results of the evaluation. The evaluation team met as well with key ICTP staff in order to better understand the implementation process and to discuss the sharing of relevant documents.

6.1.1. In depth review of project documentation

The members of the evaluation team reviewed all relevant documents of the project such as periodic reports produced, approved PMPs, Workplans, list of beneficiaries, etc. throughout the evaluation process. The intensive review not only helped the members of the evaluation team to better prepare the field work but also facilitated the understanding of the relationships of cause and effect behind the project design and the environmental factors that affect project beneficiaries.

6.1.2. Semi-structured interview with key informants

Thirty eight Key Informant Interviews (KII) were conducted with members of partner institutions directly involved in the implementation of the project. These included: improved biomass cook stoves private sector partner representatives (Total Haiti, Micama, Ticadaie), "recho pa-w" hotline coordinator, Bureau of Mines and Energy director, laboratory for cookstove manager, etc. These interviews, in addition to providing answers to the project evaluation questions, helped to evaluate the role and level of participation of different stakeholders in the project's implementation. A summary of KII implemented is presented in the summary table of data collection.

6.1.3. Focus Group (FG) Discussions

Specific groups considered for this data collection method include business women and community leaders trained in commercialization and technicians trained to repair LPG stoves. In accordance with the number and location of these target groups, four focus groups (FG) were needed. As explained in the limitation section, only one FG was conducted in this evaluation. A focus group guide was developed as the main tool for conducting the discussions, this guide included open questions revolving around relevant indicators to measure in the study. This technique was applied to technicians trained to repair LPG stoves in order to respond to the evaluation questions one and two.

6.2. Quantitative methods

6.2.1. *Household survey*

A household survey was used mainly to answer the first evaluation question and shed light on the second question. The methodology for the quantitative survey involved two steps: the elaboration of a sampling frame and the design of the sampling plan.

A. Sampling frames

The quantitative survey was limited to the Metropolitan Area of Port-au-Prince (MAP) which includes urban areas of the municipalities of Port-au-Prince, Delmas, Carrefour, Pétion-Ville, Tabarre, Croix des Bouquets and Kenscoff. For this survey the Primary Sampling Units (PSU) were the Sections d'Enumeration (SDE) that correspond to the project's target area. In the last

population census in 2003, the "Institut Haitien de Statistique et d'Informatique" (IHSI) established a list of SDE and their size (in terms of number of households and population).

B. Basis for sample size

The calculation of the sample size is based on three precision statistical parameters, namely the confidence interval (set at 90 percent), the margin of error (set at 4 percent), and the variance of the total population of households. Such considerations lead to the calculation of the sample size that minimizes the margin of error and optimizes the confidence interval.

This leads to the use of a statistical formulation linking these three parameters:

$$n = \frac{Z^2 \propto/2\sigma^2 p}{E^2 p} \times Deff \qquad (1)$$

Where

$Z^2\alpha/2$: is the z-score associated with the reduced level of 90 percent of the Gaussian bell curve.

$\sigma^2 p$: is the variance of the population for the estimate of any proportion. It is determined by the equation:

$$\sigma^2 p = PQ = 0.25 \qquad (2)$$

This is the maximum variance where P= 0.5 and Q =0.5.It is also the most unfavorable case.

Ep: is the margin of error associated with the estimation of parameters. This is the value to be added and subtracted to the estimated value in the sample to obtain the confidence interval. This margin is estimated at 4 percent.

Deff: is the design effect, which is round up to 2 in the case of clustered sample.

These statistical techniques, based on the use of the parameters mentioned above, have allowed identification of a random sample size of n =846 households for all six municipalities of metropolitan area.

C. Sampling plan

The sample size was adjusted to 900 to take into account non responses. Thus, we will end up implementing a 30*30 clustered design, consisting of 30 SDE chosen randomly according to probability proportional to size in the first stage, and 30 households chosen randomly within SDE according to the random walk method in the second stage.

6.2.2. Mini-survey

Regarding large users such as Street Food Vendors (SFV), Orphanages and schools with a "school feeding" program, a mini survey was done to collect quantitative data to supplement qualitative information. This choice was motivated by the interest in broad patterns, trends,

and tendencies rather than in precise measurements. The mini survey was done on a smaller scale, and concentrated on a few variables and using a small sample.

The evaluation team chose to interview 60 SFV, 31 orphanages and 32 schools. For schools and orphanages, a systematic random sampling was applied to select the two samples from existing lists. In the case of street food vendors, the sample was chosen directly in large zones changed to LPG under ICTP i.e. SONAPI, in the industrial park, next to the international airport and in the main grouping arteries namely Fermathe, Mariani, "Rue Courte" in downtown, Delmas 31 area and Pétionville at the Derenancourt street.

6.3. Data Collection process

In order to ensure high-quality data, several steps were taken during data collection. Enumerators were selected through a competitive process, and then completed a three-day training on tablet use and methodology of the survey. About 20 candidate enumerators were trained and 15 were selected for fieldwork. After completing the household survey, the enumerators completed the mini-survey.

6.4. Quality Monitoring

BRIDES collected the data electronically using a Samsung SM-T211 7 Tablet (Android 4.1). Data collected were downloaded on a daily basis. For this purpose, each team was provided with a Portable3G/4G router with an internet plan with national coverage. This technology allowed our IT specialist to perform daily quality control of the data collected in order to take corrective measures.

6.5. Data analysis

The evaluation report used a descriptive analytic approach. Results were tabulated with the descriptive variables presented. Most data are presented as column percentages, means or medians, and are carried out to one decimal point. The analysis and interpretation of key informant interviews and the focus group were conducted using the content analysis method. We used qualitative data to deepen explanations of findings and triangulate with quantitative information. Our analysis makes good use of existing data gathered through extensive literature review.

6.6. Limitations

• The database and list of beneficiary institutions provided to us by ICTP personnel included institutions that are not really beneficiaries. This is the case of some schools, orphanages and street food vendors. This observation was made when administering the survey resulting in questions in the mini-surveys that were unfortunately not applicable due to the fact of the reduced sample size.

• It was especially difficult to organize focus groups with technicians and sellers who have benefited from training sessions organized by the project. Of four planned FG, only one took place. The technicians work mostly in manufacturing plants or distributers and were therefore not free to come to FG. In addition, after asking many times, we realized that the lists of persons trained were unfortunately not available.

• The opinion of the C-Quest Capital staff regarding the carbon credit component of the program was extremely important for this evaluation. The evaluation team tried by several means to reach them, but without success.

7. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.1. To what extent the program established a local market for improved household biomass cookstoves?

7.1.1. Findings on the establishment of a local market for ICS

Based on data collected on the field, major findings regarding the establishment of a local market for (ICS) are the following (A) The project established and strengthened local institutions and entities of the GoH to produce cookstoves, (B) Marketing and outreach campaign established by the program have reached a huge part of the population living in the metropolitan area of Port-au-Prince, (C) Financial incentives were not realized on a scale that would drive significant changes, (D) ICS have not been adopted by households in the metropolitan area of Port-au-Prince, (E) cookstove certification system is yet to be implemented in a way to protect manufacturers intellectual property. Evidence supporting the findings are presented in below sections.

A. The project established and strengthened local institutions and entities of the GoH to produce cookstoves

The evaluation team distinguishes two groups of evidence supporting that ICTP established and strengthened local institutions and entities of the GoH for the promotion and commercialization of improved biomass cookstoves: a) the ICTP developed a manufacturing base to expand the availability of ICS in the targeted area, b) The ICTP has established a Distribution Network.

a). Develop a manufacturing base to expand the availability of ICS in the targeted area

The project supported the establishment of the national testing laboratory at the “Faculté des Sciences, UEH”. According to the Director of the Laboratory, the laboratory strengthened the Government of Haiti’s capacity to regulate models of stoves on the Haitian market and ensure that they are safe to use and they are saving on charcoal. Once tested, they can seek certification to access to the carbon market.

The program identified six improved cookstove models and their manufacturers were selected and participated in the program's efforts to promote the fabrication, commercialization and use of improved charcoal cookstoves (ICS) in Port-au-Prince. The six ICTP-promoted stoves models were: 1) Prakti Wouj, assembled by Prakti, 2) Plop Plop produced by International Lifeline Fund (ILF), 3) Eco Recho produced by D&E Green Enterprise (D&E), 4) Recho Men produced by Haiti Metal S.A. (Haiti Metal) 5) Mirak, produced with the support of the Bureau of Mines and Energy, 6) Rena, produced by Ticadaie S.A..

According to annual reports and interviews with manufacturers, the 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. 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 lines from manual to semi-industrial. ICTP assessed manufacturers' business management and production capacity and provided Short Term Technical Assistance (STTA) to all manufacturers who meet efficiency standards.

As mentioned, the stoves that passed the test from FdS were selected and received several kinds of support from the project. In fact, in-kind grants have been provided to several enterprises that make ICS stoves. In-kind donations include clippers, guillotine shearing machines, generators, spot welders, etc. It is also important to mention that, of all these enterprises, D&E Green is the one that received the most equipment. The manager of this enterprise, who is very satisfied with the project's results, claims to have received direct support in equipment after its workshop was destroyed, following the January 12, 2010 earthquake. Unlike D&E Green, most of the other producers we met wished they had received direct grants causing much disappointment at the end of the project. In addition to that, one of the producers we met confirmed that, in spite of the fact that his stove was selected, he didn't receive any direct support beyond the effects of advertising, from which everyone benefited. D&E went from a small workshop producing 400 stoves a months to a major enterprise producing more than 5,000 stoves a month. We must add that the enterprise, with its installed capacity, can produce more.

In addition to grants, the manufacturers also received other kinds of less direct support such as advertising that will be detailed in the next section, orientation to credit institutions, specific support in the organization of an exhibit fair, etc.

b). Establishment of Distribution Networks in the Metropolitan Area of Port-au-Prince

The ICTP reported that three new private sector partners, TOTAL Haiti SA, Micama, and Ticadaie, used their distribution networks to support improved charcoal cookstoves (ICS) sales, and about 246 new sales points have been established in the Port-au-Prince Metropolitan Area over the project life.

To have a sense of the spread of the distribution network and how much this network has been reaching the public, the evaluation team asked interviewed households some key questions on this matter. The information retrieved about promoted ICS is laid out in the table below.

Table 1. About promoted ICS

Citing brand names of promoted improved cookstoves (n=973)			**Don't have but Know where to purchase a promoted cookstove (n= 973)**		
	#	%		#	%
Prakti-wouj	79	8.1	Yes	391	40.2
Plop-plop	283	29.1	No	582	59.8
Men recho	68	6.9			
Rechomirak	448	46.0	**Having the following in the household (n=973)**		
Rena	38	3.9	Oven	228	23.4
Eco-Recho	121	12.4	Refrigerator	385	39.5
Don't know	340	34.9	TV	746	76.7

Source: ICTP final evaluation survey - 2015

The survey measured how much the population knows about the aforementioned brands of cookstoves promoted by the program. They were asked to name all brands of improved cookstoves to the best of their knowledge. The result in table 4 provides evidence of promotion of both offer and demand for cookstoves.

ICTP promoted ICTP cookstoves are well known by the population living in the metropolitan area to some extent.

It is worthless to have a good distribution networks if people don't know about the existence and availability of the products. The program promoted six cookstoves that passed the appropriate tests. The Miracle cookstove is the most popular among stoves because 46 percent of respondents could mention its name as ICS. Plop-plop comes in second position with 29 percent of respondents. The least popular among those ICS promoted by the program is Rena with only 4 percent of respondents and Prakti-Wouj with 8 percent of the respondents. The remaining 36 percent of the population cannot quote a brand name of ICS.

The survey tested the knowledge of the population about existence of sales points. As mentioned in the above table, about 40.2 percent of the population knew where to buy an improved cookstove. This information provides an idea of the distribution network that has been established on the field.

The ICTP reported that a Recho Paw hotline was developed to promote the products as well. About 9069 callers were directed to available sales points through the system. The ICTP encouraged partners to promote and sell ICS in public events or fairs. Three distributors had the opportunity to sell ICS in three events, and three distributors participated in 21 public demonstrations organized by ICTP.

B. Marketing and outreach campaign established by the program have reached a huge part of the population living in the metropolitan area of Port-au-Prince

According to ICTP reports, 13 media campaigns covering the target area have been conducted with ICS partners to promote ICS. About 22 radio and TV programs have been produced and broadcasted, and 47 ICS demonstration events have been organized to promote ICS purchase and use. To measure the coverage of the media campaign, the survey asked respondents whether they had the opportunity to be reached by one of the media used during the campaigns.

Table 2 Coverage of media campaign

Having seen an ad on TV about improved cookstoves (n=973)			Having heard about improved cookstoves on the radio (n=973)		
	#	perc		#	percent
Yes	643	66.1	Yes	673	69.2
No	330	33.6	No	300	30.5
Having seen billboard in the streets about improved cookstoves (n=973)			Having friends or family using improved cookstoves (n=973)		
Yes	278	28.6	Yes	294	30.2
No	695	71.1	No	679	69.7

Source: ICTP final evaluation survey - 2015

Table No 2 indicates that about 66 percent of the respondents have seen commercials on TV about improved cookstoves. About 69 percent have heard about ICS in radio and only 29 percent have seen billboards about ICS. Considering that only 77 percent have TV at home and 66 percent have seen commercials on TV, we may deduce that (1) TV is an effective way to reach people in the metropolitan area of Port-au-Prince, (2) the result of the coverage of the media campaign was excellent.

The ICTP encouraged partners to promote and sell ICS in public events or fairs. Three distributors had the opportunity to sell ICS in three events, and three distributors participated in 21 public demonstrations organized by ICTP. According to ICTP, the demonstrations

highlighted as well 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.

C. Financial incentives were not realized on a scale that would drive significant changes

One of the major barriers to change from traditional to improved cookstoves is the cost of the stoves so program design included activities to promote the purchase of improved cookstoves. According to annual reports, the ICTP worked with two Micro Finance Institutions (MFI) — ID Microfinance of EdM and ACME SA — to pilot special consumer microfinance products, including "Kredi enèji & Kredi Enèji vèt". Marketing materials highlighted efficient use of charcoal and of the promoted stoves.

According to program reports, a total of 43 retailers had access to financing through MFIs or distributors and three consumer specific microfinance products were developed. According to key informants, even at the end of the project people did not have money to buy improved stoves subsequently tremendously slowing product distribution. Companies take risks with their own funds, i.e. if a retailer or a consumer decides not to pay back it's a waste and slows the microfinance products. Added to this, the ICTP should encourage new customers to join the microfinance institutions for credit energy, but to quote the leaders of ACME SA for example, no new clients were referred to them. They had to drive the energy credit program with their former clients. The institution was therefore not sufficiently solicited for these services.

Some activities related to this result were not completed notably the activities linking consumers to remittances services was first postponed, then discarded.

The survey measured the results of such activities on the consumers end by asking questions related to financing improved stoves. Some questions were pertinent only to cookstove owners while another question about receiving credits was for all respondents. The results are presented in table below.

Table 3. Financing improved cookstoves at household level

Where did you find money to buy ICS? (n=188)			**Would be able to buy ICS without help? (n=188)**		
	#	percent		#	percent
Household members	122	64.8	Yes	81	43.0
Remittance	8	4.2	No	107	56.9
Gift	11	5.8	**Did you receive credits to buy ICS? (n=973)**		
Other	47	25.0	Yes	98	10.1
Where did you hear about ICS? (n=188)			No	875	89.1

Radio	87	46.2			
TV	109	57.9	**Would you buy if you had credits? (n=785)**		
Friends/Family	27	14.3	Yes	543	69.1
Other	19	10.1	No	84	10.7
			Don't know	158	20.1

Source: ICTP final evaluation survey- 2015

Consequently, following extensive program activities, improved cookstoves were purchased with money of household members or remittances from diaspora. About 6 percent of purchased cookstoves were local gifts. About 43 percent of households having purchased improved cookstoves claim to have had credit to purchase. Among improved cookstoves users, 52 percent argue that they would not be able to buy the cookstove without external help (remittances, credits, gifts, etc.)

Among households using traditional stoves, about 7 out of ten said they would buy an improved cookstove if they had the opportunity to have credit.

D. ICS have not been adopted by households in the metropolitan area of Port-au-Prince

The end results of marketing activities were that the households living in the metropolitan area purchased improved biomass cookstoves and that they are using them in their households. During the survey, the evaluation team wanted to know to what extent improved cookstoves are being used in the targeted program area. Information about that is revealed in table below.

Table 4. The use of charcoal and ICS in households

Do you use charcoal to cook food? (n=973)			**Type of stove used in the households (n=973)**		
	#	percent		#	
Yes	858	88.2	Traditional charcoal stove	797	81.9
No	115	11.8	Improved charcoal stove	58	6.0
Do you use charcoal only? (n=858)			Propane stove	73	7.5
Yes	607	70.7	Oven	18	1.8
No	251	29.3	Other	27	2.8

Source: ICTP final evaluation survey - 2015

In the program area, 88 percent of households still use charcoal for cooking at home, with 71 percent of households using charcoal exclusively. About 82 percent of households still have traditional cookstoves. Only 6 percent purchased improved biomass cookstoves, 7.5 percent

has LPG stoves and 2 percent have ovens. Wood is also still in use in the metropolitan area, reported as "Other".

E. Cookstoves certification is strengthened but is yet to be functioning at a rate to protect manufacturers intellectual property

An MOU has been signed between the BME, UEH and ICTP for the transfer of the laboratory to UEH, the latter has renovated a space to host the laboratory, and equipment has been moved to UEH/FDS. According to the people in charge of the laboratory, it is the only one of its kind in the whole Caribbean.

The laboratory for cookstoves certification has been functional at Université d'Etat d'Haiti (UEH), Faculté des Sciences (FDS). Since its launching, very few stoves have been tested in the laboratory. According to project reports, the laboratory is underutilized and there is a need to revitalize the industry. Because of its capacity, the laboratory can test up to three stoves in one day, at the rate of three tests per stove.

All manufacturers met are very satisfied with the results of tests conducted in the laboratory of FdS they consider to be of international standard. The FdS laboratory has established strong ties with the United States University of Berkeley's regional laboratory called "Aprovecho." Aprovecho's representatives attended the setting up of the laboratory and remained available to confirm the results of the tests run in Haiti when doubts arose.

Conversely, producers complain about the absence of legislation for the protection of intellectual property. As an example, the Mirak stove is being sold at 500 gourdes, while stove makers are counterfeiting and selling it at 100 gourdes. Certification thus becomes an essential aspect of the stove market in order to protect producers and consumers. Producers also complain about the cost of certification for their product, according to Dr. Cheremond Yves, manager of the FdS laboratory. In fact, producers pay 34,000 gourdes to test stoves made in Haiti and 40,000 gourdes to test the imported stoves. Then, BME requires the payment of USD 400 or 500 respectively for the certification, depending on the said stove's origin.

7.1.2. CONCLUSIONS

The program has established some necessary bases to institute an improved cookstoves market in the metropolitan area of Port-au-Prince, but the massive switch from traditional cookstoves to improved cookstoves is still to be achieved.

First off, the program strived to ensure the availability of several brands of improved cookstoves on the market. The program has tested and supported six different brands of cookstoves that are very competitive with a range of price and performance. The program supported manufacturers to establish and grow the shops to ensure the development and sustainability of the supply of ICS. Selling points were established and well distributed over the metropolitan area for distributing ICS. A wide variation exists in the popularity of the promoted cookstoves brands.

The program has established an institutional basis to ensure sustainable ICS performance analysis. A laboratory is established at the FDS to conduct performance analysis, while BME delivers the certification. However the laboratory is little solicited because the tests are expensive and the manufacturers are not required to seek certification unless willing to access the carbon market. Manufacturers consider paying too much for certification, according to key informants, and fail to see there much interest in certification. They feel that their intellectual property is not protected, despite of expensive certification.

The program tried to reach out to the population regarding the benefits of improved stoves through a wide media campaign. The campaign had a wide coverage over the metropolitan area, encouraging households to switch from traditional cookstove to improved cookstove. About 66 percent of households reported have seen commercials on TV while only 76 percent of households had TV at home. Stove brand names promoted by the program are known at varying degrees by the population. This information confirms the existence of these cookstoves on the market on one hand, and on the other hand it indicates the degree of popularity of these cookstoves. Brands like Miracle and Plop Plop are very well known, others like PraktiWouj and Rena are not well known.

The program and its partners have established a relatively good network of distribution in the metropolitan area resulting in a quarter of traditional cookstove users claiming to know where to buy ICS. The hotline system worked very well, facilitating the availability and accessibility of information on improved stoves in real time.

One can hear, understand and appreciate the messages about the benefits of improved stoves on radio or on television and yet be slow to make the decision to change from traditional to improved cookstoves. In reality, a very small percentage, 6 percent of households, have adopted improved cookstoves at home. The vast majority of households living in the metropolitan area of Port-au-Prince are still using traditional stoves at home.

Because of financial burden associated with decision making within households, the ICTP initiated financial programs and contributed positively to the acquisition of improved cookstoves. However, the scope of the credit program was not large enough to satisfy the needs and generate impact. Two thirds of households with traditional cookstoves said they would buy, but financing mechanisms like credit was unavailable to them.

7.1.3. Recommendations on the establishment of a local market for ICS

The project has certainly contributed to increased use of improved cookstoves in the metropolitan area, but the utilization rates of ICS in the metropolitan area is not large enough to have the impact hoped. It is therefore recommended a second phase of the project should aim at increasing scale.

We specifically recommend:

- Supporting manufacturers to better promote improved stoves and be able to produce much more for about 400,000 households living around the metropolitan area.

- Forbidding the sales of stoves without certification by helping the government of Haiti enforce certification as a requirement to sell cookstoves on the market through an anti-piracy system and regular testing for quality control.
- Lowering the cost of testing and the cost of certification.
- Establishing a wider financing system which would facilitate the purchase of ICS: credit to purchase, subsidies, etc.
- According to distributors, the credit granted has too much risk for the lending institution and is not attractive. The project should have revolving funds for the benefit of all stakeholders, a kind of cascade credit involving manufacturers, large distributors and retailers.
- Continuing the meetings that promote synergy in the sector (now that the project ended, the actors no longer meet; there is no longer any coordination).

7.2. To what extent did the targeted project beneficiaries switch to LPG technology and what were the driving forces behind this choice?

7.2.1. Findings on the charcoal consumption reduction by large users

Major findings regarding LPG technology are the following: (A) Media campaign for LPG was a success, reaching out to a high percentage of large users, (B) Switch to LPG did not follow trends of media campaign coverage among large users, (C) LPG cookstoves production is strengthened but an increase in production was not significant, (D) Driving forces associated with switches to LPG are mainly finance and safety. Evidence supporting these findings are presented in below sections.

E. Media campaign for LPG was a success, reaching out to a high percentage of large users

To catalyze the demand for LPG stoves and favor the use of LPG, a large promotional campaign was established by the ICTP in the media for LPG stoves. Eight marketing messages were developed and used in the ICTP promotional media campaign. A logo was selected and was used in all ICS promotional activities. The table No. 5 below shows to what extent the media campaigns have reached targeted large users.

Table 5. Coverage for LPG promotion campaign

		Orphanages (n=32)		**Schools (n=31)**		**Street Food Vendors (n=44)**	
		n	%	n	%	n	%
Have seen advertisement on TV about LPG and LPG cookstoves	Yes	26	81.2	26	83.9	35	79.5
	No	6	18.8	5	16.1	9	20.5

Have listen to advertisement on radio about LPG and LPG	Yes	22	68.8	23	74.2	32	72.7
	No	10	31.2	8	25.8	12	27.3
Have seen billboards on the streets about LPG and LPG cookstoves	Yes	22	68.8	18	58.1	25	56.8
	No	10	31.2	13	41.9	19	43.2

Source: ICTP final evaluation survey - 2015

The result of the media campaign is expressed in the precedent table in terms of coverage of the metropolitan area. The commercials on television reached more people than radio spots and billboards. Nearly 80 percent of street food vendors and over 80 percent of schools and orphanages leaders had the opportunity to see a commercial on TV. Considering that only 76 percent of households have at least one television, it's pretty impressive results. One is invited to suppose that the percentage of people watching television is higher than that listening to the radio. In any case, 69 percent of orphanages, 75 percent of heads of schools and 73 percent of street food vendors claim to have heard a radio spot. An identical percentage of orphanages but less schools (58 percent) and street vendors (57 percent) claim to have seen billboards. People are affected by the messages of the program and therefore are potential LPG consumers.

As a result of the media campaign, the ICTP reported that LPG sales have tremendously increased from a target of 15,000 metric tons a year to a top 25,088 MT.

F. Switch to LPG did not follow the success of the media campaign among large users

One of the key outcomes expected is the conversion of schools, orphanages with a canteen program, street food vendors and other large users to LPG.

Conversion of schools to LPG

The ICTP reported that a database of all schools with canteens in the Port-au-Prince metropolitan area has been established. According to ICTP reports, from 1311 schools with canteens, in addition to other schools that are already using LPG, about 212 schools were converted to LPG through loans or in collaboration with other agencies or organizations. The mini-survey with schools with canteens[5] in the metropolitan area reported that only 22.6 percent are using LPG (12.9 percent have LPG stove and 9.7 percent have LPG ovens), while 29 percent have traditional charcoal stoves. Unfortunately, 35.5 percent of these schools no longer had a functional canteen at the time of the survey, so the question was not applicable in their case. Due to the conversion process, from the 29 percent of schools that have traditional charcoal stoves installed, 25.9 percent are still using charcoal as energy source.

[5] Sample of schools with canteen randomly established from database provided by ICTP.

Table 6. Use of charcoal stove by large users

		Orphanages (n=32)		Schools (n=31)		Street Food Vendors (n=44)	
Large users still using charcoal as energy source		n	%	N	%	n	%
	Charcoal only	10	31.2	6	19.4	29	66.0
	Charcoal and other	12	37.5	2	6.5	3	6.7
	No	10	31.2	23	74.2	12	26.7
What type of stoves are they having?	Traditional charcoal	12	37.5	9	29.0	31	70.0
	Improved charcoal	3	9.4	0	0	1	2.2
	LPG stove	14	43.8	4	12.9	10	22.7
	LPG oven	3	9.4	3	9.7	1	2.2
	Other	0	0	4	12.9	1	2.2
	N/A	0	0	23	35.5		0

Source: ICTP final evaluation survey - 2015

Conversion of orphanages to LPG

A database of the metropolitan area of Port-au-Prince orphanages has been established, according to ICTP reports. In total, 224 orphanages received background information and documentation about LPG stoves. As a result of the ICTP, 38 orphanages converted to LPG. The program reported that From 244 orphanages in the database, 188 or 77.0 percent are now using LPG. However, the mini-survey implemented with orphanages included in the later sample shows that only 44 percent have an LPG stove. About 31 percent are still dependent exclusively on charcoal for cooking and 37 percent are using charcoal complemented with other energy source.

Facilitate Street Food Vendors' Conversion from Charcoal to LPG Cook stoves

The ICTP reported that a database of about 4139 street food vendors (SFV) was maintained. A total of 3707 are among the SFV now using LPG. According to the information of Table 6, the majority of street food vendors (66 percent) are still using charcoal. According to the information collected in different areas occupied by the SFV, only SONAPI[6] vendors have been converted to LPG. Outside this area it is very difficult to find a SFV that uses LPG as a source of energy. According to SFV themselves and the members of the project staff, it is very difficult to work with street food vendors or those who sell along the street because they have to move their stoves daily. Ministry of Commerce reported in the interview that this success is apparently due to joint support they have provided to the SFV i.e. from ICTP and from MCI.

Other large users targeted by ICTP

[6] SONAPI: Société Nationale des Parcs Industriels.

None of the randomly selected dry cleaners, bakeries or prisons were beneficiaries of the project. The only company manufacturing LPG ovens for bakeries stated to have so far produced only one oven. According to the owners met, the challenges to conversion are high:

- Electricity Problems: the equipment required for the conversion of dry cleaners require much power to operate a steam boiler, which further increases production costs.
- In the prisons visited, the estimated cost stoves were overpriced. They need external support for the first acquisition of necessary equipment.
- The profitability of the GPL is especially wide for dry cleaners, they think they must invest heavily to bring in cash. Whereas with the timber, they can buy very small amounts.
- The lack of information or knowledge of the system generates a great fear that keeps making the decision to change.

Also according to the owners, the majority of bakeries are still using wood they now mix with leftover fabric to increase wood endurance. They think it must have negative impacts on employees' health and the health of all persons in the immediate environment, but seem to be helpless about the decision to change the source of energy.

G. LPG cookstoves production is strengthened but increased in production was not significant

Support to manufacturers

In Haiti, TOTAL, SODIGAZ and ECOGAZ are the main suppliers of LPG, with the first two supplying more than 90 percent of the market. According to annual reports, three MoU were signed with LPG suppliers and micro-filling centers or LPG cylinders distributors to facilitate the conversion of large charcoal users to LPG. Resources have been leveraged from three LPG suppliers, namely Valerio Canez, TOTAL and DINASA.

Two importers and manufacturers of LPG stoves were visited during this evaluation. One of them was not aware of the memorandum they have signed with the project but they acknowledge having received direct supports which were grants in kind in the form of equipment and training for the benefit of employees of these companies. They, like all manufacturers, moreover, largely benefited from the promotional campaign implemented by the project.

It is important to note that most manufacturers were not too happy because they expected to receive cash[7] in lieu of equipment. Further, expectations were often higher than what they actually received. If a

According to the manufacturers, the increase in LPG stoves production was not however very significant

[7]They argue that they would get more materials for the same amount of money.

few were satisfied with the equipment, they felt they could do better with the amount that was spent for them. Some of them have not received support at all (Ticadaie and Rena). Some did not need support at all (Haiti Metal).

Equipment has been distributed to producers to enable them on one hand to have better quality products and, secondly, to increase production. According to the manufacturers, the increase in LPG stoves production was not, however, very significant. Offer responds to demand in general, and in this case, the demand for LPG stoves failed to increase significantly. Many LPG stoves were sold, but it is far from their targets. Manufacturers believe that it is extremely difficult to obtain a change of habits in three years. Typically for a normal change of this magnitude, it takes, according to their understanding, a lot more time of promotion and raising awareness.

Trainings for technicians

Several technicians, working mostly for stoves LPG factories, were selected and trained as part of this project. Technicians were chosen by their direct employers to benefit this training. They are technicians who, long before the training, intervened regularly with clients for maintenance, repair network or any other similar activities. Technicians were trained in five days on repairing LPG stoves. Technicians interviewed feel that the modules have been well developed and they also had the opportunity to do practical tests. They, among others, learned to maneuver and cut the copper. They have learned to better know the names and utility of tools, gas table fittings, etc.

Each trained technician received a tool kit and a certificate. It is important to note that there have been two training sessions of similar content. Technicians, part of the first cohort, in addition to the training, received funds to start their own factory.

According to trained technicians, training provides enough skill to embark on the labor market. The level of satisfaction is high. The technicians especially liked the trainers' convenience and patience. "My employees are better equipped technically for performing certain tasks including repairing burners" mentioned a manufacturer to praise the training received by its technicians. The concepts learned are applied to the workplace, but most technicians do not really have the opportunity to practice the assembly or production of cookstoves because they are working in distribution centers.

The Hotline

In addition to support already mentioned above, the manufacturers and distributors of LPG stoves have also benefited from the establishment of a hotline by the project. A unique number was provided to operators that match and keep track of the different calls. In general, according to the hotline manager, the services offered are varied, they refer people to sales points of LPG stoves and improved cookstoves. People call to ask for information of any kind like to know how to become a distributor. In terms of monitoring, a whole network of technicians who received training on the installation and repair of LPG stoves were connected to the hotline. People calling for malfunctioning stoves were given the contact information of

available technicians. The call motives were recorded. On a weekly basis, a progress report was presented to the whole staff for appropriate action.

The hotline number was placed on all support materials developed for advertising through flyers, commercials, broadcasts over the radio or television in order to be sure that the number is known to the public.

The Hotline has worked very well. After each TV program on stoves, operators have noted a significant increase in the number of received calls including calls from other cities.

The hotline was set up towards the end of the project and lasted less than a year. The project staffs interviewed were quite satisfied at the beginning when there was a lot of enthusiasm. This has decreased a bit as curiosity has declined.

H. Driving forces associated with switches to LPG are mainly finance, safety and environmental impact

Between the reception of the message and the decision to adopt LPG as an energy source for cooking, many other factors can come into play and taint the effect of the message. The table No 7 below shows the status of the switch to LPG in the ICTP targeted area.

Table 7. Source of energy for large charcoal users

		Orphanages (n=32)		Schools (n=31)		Street Food Vendors (n=60)	
		n	%	n	%	n	%
Using charcoal in the last 12 months	Yes	23	71.9	12	38.7	47	78.3
	No	9	28.1	19	61.3	13	21.7
Change energy source in the last 12 months	Yes	13	40.6	4	12.9	11	18.3
	No	19	59.4	27	87.1	49	81.7
Do you know where to buy LPG stoves?	Yes	18	56.2	8	25.8	20	33.3
	No	14	43.8	21	74.4	40	66.6

Source: ICTP final evaluation survey - 2015

Just hearing commercials does not mean that large users will automatically change the source of energy. The table 7 shows that 72 percent of orphanages, 39 percent of schools and 78 percent SFV have used charcoal in the last 12 months. However 41 percent of orphanages, 13 percent of schools and 18 percent of SFV have changed energy source in the last 12 months.

To those who are still using charcoal, the evaluation team asked to provide the reasons that prevent buying a LPG cookstoves. The results are indicated in the following table.

Table 8. Why not switching to LPG?

	Orphanages (n=18)	Schools (n=29)	Street Food Vendors (n=44)

		n	%	n	%	n	%
Why not buying LPG cookstove	Too expensive	8	44.4	4	13.7	24	54.5
	Too rare	2	11.1	2	6.8	3	6.8
	Don't know how	1	5.5	4	13.7	4	9.0
	Not safe		-		-	6	13.6
	Other	7	38.8	19	65.5	7	15.9
Would buy if credits program were	Yes	11	78.5*	1	50.0**	32	72.7
	No	3	21.5	1	50.0	12	27.3

*n=14, **n=2

Source: ICTP final evaluation survey - 2015

According to most of the large users, the main barriers to conversion are lack of money for first investments and fear of fire or explosion associated with the use of LPG. About 44 percent of orphanages and 54 percent of SFV claimed that the price of the LPG stoves is the main reason preventing the switch. About 14 percent of SFV admit that safety is a major concern as well. Everyone would have liked to switch to LPG which is according to them a form of social ascension, but they still need to be able to afford initial expenses.

We have seen that they agreed that LPG is cheaper than charcoal, and they evoke budget constraints as a major obstacle to purchase the necessary equipment. When asked about what could drive the switch to LPG, the main reasons and their relative weights are displayed in the table below.

Table 9. Purchasing LPG cookstove

		Orphanages (n=32)		Schools (n=31)		Street Food Vendors (n=44)	
		n		n		n	percent
What could drive conversion to LPG from charcoal	Economics	20	62.5	11	35.5	26	59.1
	Good information	1	3.1	3	9.7	4	9.1
	The environment	8	25.0	12	38.7	4	9.1
	Cleanliness	2	6.2	3	9.7	6	13.6
	Health	0	0.0	2	6.5		0.0
	Other	1	3.1		-	4	9.1
Plan to buy in this next 12 months?	Yes	21	65.6	14	45.2	23	52.2
	No	11	34.4	17	54.8	21	48.8

Source: ICTP final evaluation survey - 2015

The majority of large users visited during the mini-survey plan to buy a LPG stove in the next 12 months. This is the case for 65 percent of the orphanages, 45 percent of schools and 52 percent of SFVs. However, this plan can be taken lightly to the extent that there are strong barriers to conversion to LPG. Among the incentives to conversion, the economy is dominant according to the majority of orphanages (62 percent) and SFVs (60 percent).

Driving forces to switch to LPG, with associated weights, are mainly economics, according to 62 percent of orphanages, 36 percent of schools and 59 percent of SFV. Impacts on the environment are a major player that could drive the switch to LPG, according to orphanages (25 percent) and schools (39 percent).

7.2.2. CONCLUSIONS

The major conclusion is that the conversion rate from charcoal to LPG is still low. Converting to a new energy source is proof of the program's success, many large users are still to be converted.

A large media campaign was undertaken to show the benefits of LPG and encouraging large charcoal users to change source of energy for cooking. It reached the vast majority of large users, including orphanages (81 percent) and schools (84 percent) and FCS (80 percent). The majority of large users had the opportunity to see at least one spot on TV about LPG cookstoves. They have been reached to a lesser extent through radio spots and billboards.

Charcoal remains a major energy source for the majority of SFV (66 percent), a good percentage of schools (19 percent) and orphanages (31 percent). As of now, orphanages (44 percent) and to a lesser degree the schools (13 percent) and SFV (22 percent) are using LPG. The distribution network of LPG stoves seems to be well established. Among the large users who do not have LPG stoves, the majority know where to buy them.

Given that structures are in place for the production and distribution of stoves, the numbers should be on the rise in terms of use of LPG, the impact of the project is expected to increase with time. But such expectation may have low probability with barriers to conversion such as high startup cost and fear of danger associated with the use of LPG.

Project managers definitely understood that charcoal cannot be banned. Decision makers will have to develop more energy sources in relation to different segments of the population.

7.2.3. RECOMMENDATIONS

- The reasons that keep the users from changing energy sources are mainly the risks of explosion and funding. It is therefore recommended a second phase to build on the base of the project. This would be the opportunity to strengthen the media campaign with clear messages about the security measures and benefits of LPG. The communication on the safety aspects must be strengthened in order to dispel the fear that usually draws its

origin from the lack of information. Messages should be clear and compelling as well to carry people to action.

- The dry cleaners and bakery LPG equipment and materials are expensive; a credit system should be established in the long term at low rates for this category.
- Flexible funding mechanisms should target not only the large users, but also households. Projects should focus essentially on reducing initial expenses which are a common barrier to conversion.
- A similar project should be more intentional on the sharing of information about the benefits of other types of energy compared to charcoal, including the environmental and health impact.
- The training of technicians has been highly appreciated by all key informants including technicians. Nevertheless, technicians think that soldering should be added to the already developed modules.
- In the case of SFV, one of the major constraints identified by project staff concerns frequent travel and lack of security of hawkers situated along the streets. Consideration should be given to organize food court like that of SONAPI to support them.

7.3. Building a legal and regulatory framework for LPG in Haiti

7.3.1. General findings on the establishment of a regulatory framework for LPG

In Haiti, the law on petroleum products was passed in 1949[8]. Some of its provisions are outdated given the evolution of trade-related techniques for these products, and LPG, which has been on the Haitian market for decades, is not addressed in the law. In order to develop a sustainable LPG industry and promote the long-term adoption of LPG as a cooking fuel by households, the GOH[9] has expressed a desire for outside experts to assist them with the development of the necessary legal and regulatory framework for LPG. More specifically, rules must be developed and adopted to ensure safety, develop appropriate licensing regimes, discourage predatory commercial practices, and encourage investment, especially, cylinders and downstream distribution by the LPG industry.

[8] The law on petroleum products effective in Haiti exists since 1949. LPG have a special status, since the customs tax on this product has been abolished in 1987.

[9] According to the Program proposal, the GoH has expressed a desire for outside experts to assist them with the development of the necessary legal and regulatory framework for LPG.

According to the project members interviewed, ICTP first held several training and discussion sessions for the benefit of the main stakeholders involved in the LPG sector in Haiti. ICTP has provided substantial technical advice and assistance to the MCI in analyzing the economic environment of the LPG value chain in order to lay the foundation for legislation that is correctly structured and reflects the reality of the sector. ICTP worked with the Fire Department to develop and deliver a training program on the monitoring of LPG safety based on international standards.

According to key informants, ICTP convened about ten meetings that included representatives from the Ministries of Commerce and Industry, Economics and Finance, Public Works, Transportation and Communication, the Office of Mining and Energy and private sector representatives. The topics dealt with were diverse and ranged from meetings with very divergent points of view of the sector to entire meetings discussing specific issues, such as gas cylinders ownership and maintenance.

Chemonics contracted a firm to write a bill for the group. This bill was presented and discussed in work sessions with the various key stakeholders mentioned above. According to MCI, this bill needed to be contextualized and a more closely adapted to the country's reality.

In addition to the Chemonics' bill, there was also a bill from Total Haiti, and another one from the Mevs Group. And finally there was that of the Ministry of Commerce and Industry, which intended to be a pooling together of the other bills by the consultant Paolo Schilozzi. The bill needed to be conformed to the Haitian legal format. Progress has been hampered by divergent opinions supported by documentation. The situation generated a lot of debate and, at the end of the day, there was no consensus.

In addition to this proposed legislation, LPG quality also needs to be regularly controlled and tested. The LPG sold is a mixture of propane and butane that sometimes doesn't consistently meet the standard proportions. There are currently no quality control mechanisms in place. The three control points that are closest to Haiti are Trinidad, Texas (USA) and Ecuador.

In the Dominican Republic, LPG is widely used and informally serves also as vehicle fuel. It is a practice that is slowly spreading throughout Haiti, especially for certain public transportation vehicles, and presents another reason why the industry urgently requires regulation.

According to MCI representatives, all the measures aiming at partially controlling the LPG industry must be linked to an approved law, unless there is an emergency. Unfortunately, this legislation is not yet effective.

Discussions

MCI’s role is to work with the various key stakeholders in order to get to a legislation regulating the LPG industry. The right to introduce legislation, according to the current Haitian Constitution, articles 11 and following, is within the responsibility of the executive power. In the

specific case before us, the Ministry of Commerce should write a bill on this commercial product while taking into account the legitimate concerns of all stakeholders and present it to the Parliament for ratification.

The MCI Minister, assisted by a member of his cabinet, originally led all the meetings, thus playing his mediation role among the various stakeholders. Following the different proposals, MCI finally proposed a summary document designed by a consultant. This text did not win unanimous support since it didn't reflect all stakeholder concerns, and therefore, it was not adopted by the working group.

The single outcome of that component representing the mid-term expected impact and aiming at the "adoption of an effective regulatory framework for LPG that will enable market expansion" is not achieved.

With regards to the ICTP project managers, they were able to gather the main stakeholders in spite of their differences. Among other things, their mission was, according to the submitted and approved plans, to draft key policy, legislation and regulation and technical assistance to the GOH to assist them with adopting these legislative, regulatory and policy recommendations. According to the key informants met during this evaluation, the project actually implemented all the planned activities. However, the single outcome of that component representing the mid-term expected impact and aiming at the "adoption of an effective regulatory framework for LPG that will enable market expansion" was not achieved. The first question that may be asked is the following: Were the activities planned in this component sufficient or effective? Or even, did the project express the right assumptions and anticipate the appropriate mitigation activities? According to results-based management principles, the totality of planned activities lead to the outcome only if the related risks located out of the project's control do not happen. In this particular case, the project carried out all the planned activities but had to face the limit of its actions. As mentioned, only the executive power has the ability to submit a bill to the Parliament. If the executive power does not fully play its role, the project will not meet the final expected outcome even if all the planned activities were carried out. We now understand that, on one hand, the goal might be too ambitious for an NGO and, on the other hand, the government should have received more support from the project in order to reach the desired consensus on legislation.

The private sector, composed in this case of representatives from for-profit institutions, does its best to protect its interests. They have major interests and try, as much as possible, to influence the process to their own benefit.

Finally, we are not able to test the project's approach that is related to this component since the goal was not met, meaning the legislation or regulatory mechanisms are not in place, and this doesn't allow us to draw conclusions on investments in the industry. However, we can say at least that, according to the various key stakeholders we met, there is a significant increase in

LPG demand, which could explain the increase and then the multiplication of distribution centers often outside of minimum standards.

7.3.2. Conclusions on the establishment of a regulatory framework for LPG

Overall, the project has the merit of having achieved almost all that was planned and, in some aspects, elements were exceeded. In most of the work meetings on legislation, the Ministries' representatives were Ministers, General Directors, sometimes assisted by cabinet members, which gives the appearance that discussions were politically motivated, according to key informants. There has been no technical team to discuss or to work together on the issue. The outcome of this project component, which was the adoption of an efficient regulatory framework, was not met. External factors, outside of the project's control, are responsible for this situation, meaning it was expected that the State fully play its role and that there also be a functional Parliament during this phase of the project's life.

7.3.3. Recommendations on the establishment of a regulatory framework for LPG

- A team of technicians must be set up to reconcile and contextualize the various draft bills written until now. The bill must cover all aspects of the industry from importation, storage, transportation and sale. The bill must take into account the various components of the industry such as fire and safety, municipalities, TPTC, MDE, MCI, Ministry of Finances, BME, private sector representatives, etc.
- In the region, there are countries of our size that have already made these steps. It is necessary, for example, that technicians organize visits to these countries to inquire about their situation and build from there.
- MCI must assume increased responsibility in this process towards regulating the industry.

7.4. Carbon Credit market in Haiti

7.4.1. General Findings on carbon credit

Questions: To what extent will the existence or absence of a carbon credit market in Haiti affect the success and sustainability of the ICTP?

To answer this question, a situational analysis was produced on the collection and analysis of data related to the carbon market as part of this project. While highlighting the contribution of the project in this direction, the analysis also focused on recent developments achieved in the regulation of the carbon credit market in Haiti.

To establish a carbon market in Haiti, ICTP reported to have successfully submitted a Program of Activity (POA) under the U.N.'s Clean Development Mechanism. Known as “Improved Cookstoves for Haiti,” the POA is said 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 (Clean Development Mechanism) 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.

DISCUSSIONS

Three (3) carbon credit projects are currently in implementation or in the registration process in Haiti. Two of them are on a voluntary market basis and the third one is a CDM project

The first project is the D&E Green enterprises project registered personally (without the ICTP support) since 2013 with ENEL, an European Electricity Company, guaranteeing 5 euros per ton of carbon dioxide equivalent for 21 years. D&E enterprises produce two models of improved stoves: Echo-Recho and PlopPlop. D&E Green Enterprises reported that both are registered. Echo-Recho reduces 2.1 tons of carbon dioxide per year per unit while Plop Plop achieves a reduction of 2.5 tons of carbon dioxide equivalent per year per unit. Carbon credit has not yet been received. The next monitoring phase is scheduled on December 2015 according D&E Green Enterprises.

The second project is the Entrepreneur du Monde, a French entity involved in energy projects in Haiti (EdM Voluntary Gold Standard) to which ICTP provided access to its various studies (baseline, tests and monitoring/assessment reports) in order to reduce costs for these partners, while increasing the chances for a functioning carbon market to take shape in Haiti beyond ICTP’s support and lifetime. The project is in the registration process.

The third project is the POA “Improved Cookstoves for Haiti,” registered to CDM, by ICTP, that presents a possibility to introduce multiple projects during the POA’s 28-year lifetime. The first component project activities (CPA) under this POA include Eco-Zoom Jet which is an imported stove from Kenya. This approach is questionable, because the Echo-Zoom Jet is not available on the local market according to a Key Informant Interview. The team did not find this model in use in the project area. A questionnaire addressed via email to C-Quest Capital was not returned.

C-Quest Capital is the POA’s coordinating and managing entity, who 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.

C-Quest Capital reported: 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.

To register and implement a carbon credit project in Haiti, several constraints have been highlighted by key informants:

High cost of registration. It generally costs over US$ 150.000 to fulfil all the requirements and get registered. In the case of D&E Green enterprises, this cost has been covered by ENEL the European Electricity Company. But funding is reported to be available at CDMP to help needed countries.

Registration duration process. It takes over 2 years to comply with all steps and get registered.

Institutional weakness. The National Designated Authority (ANDH) is not currently fully functional. They need capacity building and staff reinforcement. However, according to one key informant, ENEL would be interested in financing the ANDH to make them able to efficiently accomplish their duties.

Moreover, key informants reported that local partners had reported many difficulties working with C-Quest capital for several reasons.

Some producers could not register their projects due mainly to complicated procedures and registration cost. These include Recho Rena and “chabon tout bon” of Ticadaie.

National Institutional scheme for CDM project

A key requirement of local authorities for the CDM project is to put in place a structure for (A) providing an authorization letter to promoters with specific criteria to comply with and (B) promoting the opportunities of CDM projects among potential investors.

To comply with this requirement, the Designated National Authority of Haiti (ANDH) was created within the Ministry of the Environment by a Presidential Decree on May 24, 2010 and is responsible for implementing the provisions of the Clean Development Mechanism (CDM) of the Kyoto Protocol (KP).

The Designated National Authority of Haiti (ANDH) contributes nationally to achieve the criteria and objectives of sustainable development through the implementation of projects to reduce greenhouse gas emissions as planned in the CDM.

To meet the commitments that countries have emerged from the third Conference of Parties (COP 3) at the Kyoto Protocol, policies and regional or national measures are gradually implemented. Complementing these efforts, three market mechanisms, known as Flexibility Mechanisms have been designed: the first one is the International Exchange of a share of emissions rights, and the other two are the Joint implementation and the Clean Development

Mechanism (CDM), which both allow an investor country to obtain emission credits by investing in projects to reduce or avoid greenhouse gas emissions in a host country. ANDH focuses on the Clean Development Mechanism that provides multiple benefits to Non-Annex I countries like Haiti.

In terms of progress in the establishment of a carbon market in Haiti, ANDH has elaborated and made available a Guide to investors, and two projects are registered: the Eco-Recho from D&E Green Enterprises and a POA from USAID after an approval letter from ANDH.

But, ANDH has expressed many constraints to fulfilling their mandate, including:

- Lack of own resources. Resources of the Climate Change Department are used for the work of the ANDH
- Loss of professionals due to multiple changes during the last decade at the Ministry of Environment
- Lack of qualified counterparts to handle the duties as a result of many Ministers changing
- Need to strengthen the ANDH to be able to fulfil their duties.
- Lack/weakness of budget necessary to make known to local entrepreneurs the opportunities provided by Carbon Credit facilities

• International disengagement regarding CDM leading to a drastic reduction in the price of Carbon Credit. ANDH then expects to see COP 21, the next conference in Paris, reach binding agreements for higher prices.

In terms of progress related to the establishment of a carbon market in Haiti, ANDH has elaborated and made available a Guide to investors.

International CDM price environment

The average prices of CDM carbon credits dropped significantly in 2012. But it is still valuable to promote POA among buyers who are willing to offer premium prices for carbon credits generated via technologies that have important social benefits, such as improved cookstoves.

State and Trends of Carbon pricing

As of today[10], about 40 countries and 20 sub-regional jurisdictions are putting a price on carbon. Together, these carbon pricing instruments cover almost 6 gigatons of carbon dioxide equivalent to about 12percent of annual global Green House Gas (GHG) emissions.

7.4.2. Conclusions on carbon credit

ICTP's carbon component accumulated a great quantity of information and conducted a longitudinal study and national baseline studies on household, street-food vendor, and school

charcoal consumption which 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.

In spite of the decline in the price on carbon credit, there is still room to implement relevant projects and it is expected that the next conference of parties in Paris will bring binding agreements regarding carbon pricing.

It is, however, very difficult to affirm that a well-established carbon market has been achieved in Haiti by the project. Whether or not the project has influenced the carbon market is not an easy question to answer because no carbon credit has been delivered as a result of the project which would provide financing for stoves and make them affordable for those less fortunate.

At this moment it is clear that the absence or the presence of the carbon credit component of the ICTP project has not influenced the stove market. But one can assume that once the whole cycle is completed, it should have tremendous influence on the stove market.

Many constraints have been reported from the National Designated Authority in order to comply efficiently their responsibilities. The international institutional environment had also not facilitated the registration process as indicated by C-Quest Capital. They reported specifically a 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.

7.4.3. Recommendations on carbon credit

Based on the above conclusions, following are recommendations to improve any next phase of the project:

- There is a need to include all potential partners from the beginning of any process to facilitate their interests through a basic consensus. This will prevent further friction between partners and promote transparency which is not currently at the strength of the ICTP. Several key informants have pointed out that this aspect is vitally important.
- Strengthening the institutional capability of ANDH is crucial to avoid delay in the registration process and shorten duration. D&E Green enterprises has reported that ENEL is willing to assist ANDH and strengthen this important structure.
- Reduce the registration cost burden by implementing proper networking. As it is reported, supports in that matter are available throughout the region like in Grenada, Bogota etc.

8. APPENDICES

Appendix A: Bibliography

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Appendix B. The mini-surveys conducted with large users.

Mini-surveys provide information about charcoal consumption as energy source. Information about the samples is provided in table below.

Table. Number of mini-survey conducted.

	Orphanages	Schools	Street food vendors
Carrefour	4	6	10
Delmas	7	6	7
Petion ville	1	5	16
Port-au-Prince	1	3	15
Tabarre	7	3	12
Kenskoff	3	1	0
Croix des Bouquets	9	7	0
Total	32	31	60

The observation units during the mini-surveys of schools, orphanages, or SFV are very well distributed in random manner on the geographical area of the study.

Appendix C: Energy sources at schools and orphanages

Electricity from EDH is available in 84 percent of orphanages and 68percent of schools in the metropolitan area. However 94 percent of orphanages and 58 percent of schools have an alternative source of electricity. This can be easily understood given that orphanages are often sponsored and generally host vulnerable children. Very few orphanages (9 percent) and schools (3 percent) use electric energy for cooking. So with the promotion of propane, activities of the program should reduce the consumption of coal to propane.

Table. Energy sources at schools and orphanages

		Orphanages (n=32)	Schools (n=31)
Access to electricity from national firm EDH	Yes	84.4	67.7
	No	15.6	32.3
Other sources of electricity	Yes	93.8	58.1
	No	6.2	41.9
Other sources of electricity	Solar cells	30.0	22.2
	Inverter	43.3	44.4
	Generator	70.0	61.1
	Other	6.7	0.0
Electricity for cooking	Yes	9.4	3.2
	No	90.6	96.8

Appendix D. Complete Evaluation Methodology

Research design consideration

The collection and analysis of information about the characteristics and outcomes of the ICTP was applied as a post-test only design. The results are intended as a basis for judgments, to improve effectiveness, and/or inform decision making and future programming.

For this evaluation, a baseline study was not conducted before the intervention began. The evaluation team is assuming that the two comparison groups are similar and data from a baseline study is not essential. This post-test only design differs from the ideal design of one with two comparison arms, i.e. the intervention and the control arms (control arm basically receives no intervention at the time the project begins) and both arms would be assessed simultaneously, at least the two time points mentioned.

Use of mix-methods

Different methods were used in parallel combinations for this evaluation.

Qualitative methods:

- Focus Group,
- Key Informant Interview,
- In depth project document review.

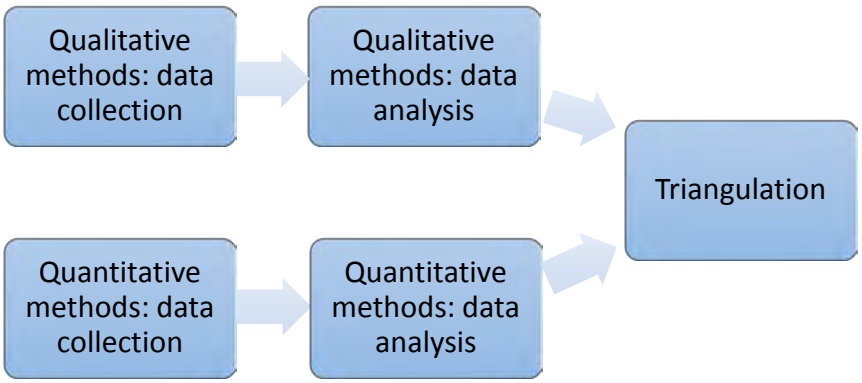
Quantitative methods:

- Mini-survey,
- Household survey.

Above methods were used separately and findings were not integrated until after data analysis. The same evaluation team was involved in implementing multiple evaluation methods, and the actual data collection and analysis happened over the same period of time. The key point is that each method was conducted in its entirety and separately from the other methods.

Qualitative and quantitative methods took place simultaneously, and the data were analyzed separately. Then, as the data from different methods are often intended to answer the same question, the findings were triangulated.

FIGURE 1: Parallel combinations



Qualitative methods: data collection

The following qualitative methods were used for data collection: In-depth review of project documentation, key informant interviews and focus groups. Based on the evaluation objectives and questions, semi-structured guides were developed in order to conduct data collection. Qualitative data helped better understand who were the improved cooking stoves manufacturers or LPG stoves manufacturers, where are they located, what was the process leading to the production of improved cookstoves, etc. In addition, qualitative methods were used as well to understand the driving forces that pushed households and targeted large users to switch to improved biomass cookstoves or LPG technology. Information gathered through qualitative methods allowed analysis of replication and

the sustainability of the project, and finally to produce a comprehensive analysis of the carbon credit market in Haiti.

Preliminary meetings with project key staff

The team met with the COR to ensure clarity regarding the expectations and the results of the evaluation. During the meeting, discussions focused on the evaluation questions, the key aspects of the project context and the documents to be examined. The team leader, the assistant team leader and the technical expert advisor took part in this meeting for BRIDES. The evaluation team met as well with key ICTP staff in order to better understand the implementation process and to discuss the sharing of relevant documents.

In depth review of project documentation

The members of the evaluation team reviewed all relevant documents of the project throughout the evaluation process. Archived material related to the whole project, and the initial material used in project preparation, approved project documents, project monitoring documents, beneficiary lists, intermediate and final reports, annual PMPs and any other available information were considered together with the qualitative and quantitative primary data to answer the evaluation questions. The intensive review not only helped the members of the evaluation team to better prepare the field work but also facilitated the understanding of the relationships of cause and effect behind the project design and the environmental factors that affect project beneficiaries. This revision also helped the team to assess the project's achievements relative to expectations and the level of efficiency.

Semi-structured interview with key informants

Thirty eight Key Informants Interviews (KII) were conducted with members of partner institutions directly involved in the implementation of the project as improved biomass cook stoves private sector partners representatives (Total Haiti, Micama, Ticadaie), “recho pa-w” hotline coordinator, Bureau of Mines and Energy director, laboratory for cookstove manager, etc. Other interviews were held similarly with some project management staff involved in the project. These interviews, in addition to providing answers to the project evaluation questions, helped to evaluate the role and level of participation of different stakeholders in the project’s implementation. Wherever possible, like at the FDS cookstoves laboratory, facilitators observe the facilities set up in the context of this project.

This technique is used in all four (4) evaluation questions.

A summary of KII implemented is presented in the summary table of data collection.

Focus Group (FG) Discussions

Specific groups considered for this data collection method include business women and community leaders trained in commercialization and technicians trained to repair LPG stoves. In accordance with the number and location of these target groups, four (4) focus groups (FG) were needed. An

exhaustive list of FG conducted is presented in the summary table of data collection. A focus group guide was developed as the main tool for conducting the discussions, this guide included open questions revolving around relevant indicators to measure in the study. These indicators were defined using the PMP and during brainstorming with USAID Experts.

This technique was applied mainly to technicians trained to repair LPG stoves in order to respond to the evaluation questions one and two. During focus groups, discussions were conducted under the leadership of a facilitator. A note taker was responsible for data collection. An observer assisted the focus groups as well to capture other significant information like group dynamics, behaviours and reactions.

Quantitative methods: data collection

Household survey

A household survey was used mainly to meet the first evaluation question and bring some clarity to the second question as well. The methodology for the quantitative survey involves two steps: the elaboration of a sampling frame and the design of the sampling plan.

A. Sampling frames

The **quantitative survey** was limited to the Port-au-Prince Metropolitan Area (PMA) which includes urban areas of the municipalities of Port-au-Prince, Delmas, Carrefour, Pétion-Ville, Tabarre, croix des bouquets and Kenscoff. In order to draw a good sampling frame, BRIDES deemed necessary to specify the list of primary sampling units (PSU) in order not to lose important information for the success of this survey. For this survey the PSUs were the Section d'Enumeration (SDE) corresponding to the PMA available in the IHSI 'Atlas Critique d'Haiti'. An Sd'E is a census unit comprising a number of households in a given area generally entrusted to an enumerator. In the last population census in 2003, the "*Institut Haitien de Statistique et d'Informatique"* (IHSI) established a list of Sd'E and their size (in terms of number of households and population).

B. Sampling Plan

A two stages clustered 30*30 sampling methodology was applied as sampling plan. The first stage involved sampling 30 SDE in the sampling frame. Selected SDEs were the primary units of the frame, within which 30 households were selected in the second degree by simple random sampling.

Basis for sample size

To calculate the sample size, BRIDES assumed that the sample size does not solely depend on the size of the population from which it is drawn. It is rather based on three precision statistical parameters namely confidence interval (set at 90percent), the margin of error, (set at 4percent), and variance of the total population of households. Such considerations lead researchers to calculate the minimum sample size that minimizes the margin of error by optimizing the confidence interval.

This leads to the use of statistical formulation linking these three parameters and thereby guaranteeing optimal accuracy results:

$$n = \frac{Z^2_{\alpha/2}\sigma^2_p}{E^2_p} * Deff \qquad (1)$$

Where

$Z^2_{\alpha/2}$: is the z-score associated with the reduced level of 90 percent of the Gaussian bell curve. The confidence level is the probability that the estimated proportion in the sample population is found within the limits of the confidence interval.

σ^2_p: is the variance of the population for the estimate of any proportion. It is determined by the equation:

$$\sigma^2_p = PQ = 0.25 \qquad (2)$$

This is the maximum variance where P= 0.5 and Q =0.5.It is also the most unfavorable case.

E_p: is the margin of error associated with the estimation of parameters. This is the value to be added and subtracted to the estimated value in the sample to obtain the confidence interval. This margin is estimated at 4 percent. We can afford to take a high margin of error in order to minimize the size of the sample because the investigation will be conducted in a densely populated area.

Deff: is the design effect, which is round up to 2 in the case of clustered sample.

These statistical techniques, based on the use of the parameters mentioned above, have allowed identification of a random sample size of **n =846** households for all six municipalities of metropolitan area.

To sample size is adjusted to 900 to take into account non responses. Thus, we will end up implementing a 30*30 clustered design, consisting of 30 SDE chosen in the first stage and 30 households within SDE in the second stage.

Size distribution of the sample clusters

Given that the population of individuals and households by municipality is known (Census 2003IHSI), we determined the structure of the household population by commune. This structure is then applied to the sample size to calculate quotas or partial sizes to be allocated to each municipality.

$$p_i = \frac{\text{Number of households in Municipality "i"}}{\text{Total number of households in the six municipalities}} \quad (3)$$

$$n_i = (n * p_i) \quad (4)$$

During 2003 census, IHSI divided the municipalities into Sd'Es, they are here considered as clusters of households which is the minimum collection area for an enumerator. We needed to determine the number of clusters to be drawn by municipality. In order to draw a representative sample of clusters which is as randomly dispersed as possible within each municipality, BRIDES set a fixed number of 30 households to be interviewed by clusters. The quota sample by commune $\mathbf{n_i}$ or divided by this fixed number of households per cluster (30) gives the number of Sd'E or clusters for each commune (SeeTable No 1 below).

Table. Number of households per municipality

	Population	Percentage	Number	# SDE
Carrefour	393986	0.187762	5.63287	6
Delmas	314029	0.149657	4.489714	5
Petion Ville	280214	0.133542	4.006256	5
Port au Prince	736618	0.351051	10.53152	11
Tabarre	97027	0.04624	1.387208	2
Kenskoff	45731	0.021794	0.653822	1
Croix des bouqets	230718	0.109954	3.298606	3

Primary sample selection

As the number of Sd'E to be drawn by area is known, for the optimal representativeness of the sample and its greater dispersion within a municipality, BRIDES applied the selection method "probability proportional to size" where the choice of Sd'E or primary survey unit is random and systematic.

This method consists of:

- Establishing a numbered list of SDE per municipality, indicating the size of each list
- Establishing the cumulative size of SDE

- Calculating the sampling interval $(IE)_i$ by comparing the latest cumulative value $(PT)_i$ to the number of SDE to be sampled in the "i" zone $(IE)_i = (PT)_i / N_i$
- Randomly selecting a number between 1 and $(IE)_i$ and comparing that number to the cumulative values so to locate the nearest accumulated size number. The corresponding Sd'E to the location line of this number is the first household cluster sampled for the area.
- Selecting the following SDE systematically adding $(IE)_i$ in randomly selected number and continuing until the list is completed.

The application of this method for each municipality resulted in obtaining the list of randomly selected SDE to be visited per municipality.

Mini-survey

Regarding Street Food Vendors (SFV), Orphanages and schools with “school feeding” program, a mini survey was selected by the evaluation team to collect quantitative data to supplement qualitative information. The reasoning for this choice was the interest in broad patterns, trends, and tendencies than in precise measurements. The mini survey was done in a smaller scale, and concentrated on a few variables and will use a small sample. Therefore, the mini survey focused on narrowly defined set of questions such as: what were the driving forces behind the choice of the food vendors to switch to LPG technology? Overall, how satisfied are they with their improved or LPG cookstove? Additional questions were added to help understand their rational.

The number of questions was deliberately kept small. In this respect, the mini survey differed significantly from the design chosen for traditional households, whose questionnaires run into several pages. The mini survey questionnaires were designed to be completed within half an hour, at most. The sample size was also be kept small. The evaluation team chose to interview 60 SFV, 31 orphanages and 32 schools.

For schools and orphanages, a systematic random sampling will be applied to select two samples from existing lists. In the case of street food vendors, sample was chosen directly in large zones changed to LPG under ICTP i.e. SONAPI, in the industrial park, next to the international airport and (See table XXX) in the main grouping arteries namely Fermathe, Mariani, “Rue Courte” in downtown, “Delmas 31” – Kokoye hotel area and Pétionville at Derenancourt street.

Data Collection process

Once the design of the evaluation and identification of data needs and sources was completed, the next step was to carry out the data collection. In order to ensure high-quality data, several steps have been taken. Enumerators were selected through a competitive process, overseen at all steps by the BRIDES team. After the selection process, candidate enumerators were trained during three days on tablets use and methodology of survey. Field Teams consisted of four enumerators and one supervisor who will play the role of field team leader. Based on the sample size estimate and our experience (approximatively 6 questionnaires by day by enumerator during 13 days), 20 candidate enumerators were trained and 15 were selected for fieldwork. Survey teams were grouped into three sub-teams of four enumerators each. After completing the household survey, the enumerators completed the mini-survey.

Quality Monitoring and Data Cleaning

BRIDES collected the data electronically using a Samsung SM-T211 7 Tablet (Android 4.1). Data collected were downloaded on a daily basis. For this purpose, each team was provided with a Portable3G / 4G router with an internet plan with national coverage. BRIDES had already tested this configuration providing expected results with daily submitted data. This technology allowed our IT specialist to perform daily quality control of the data collected in order to take corrective measures. The BRIDES IT specialist, also a researcher and statistician, properly ensured data quality control, data cleaning and data conversion on SPSS statistical software to be delivered to USAID-Haiti.

Data analysis

The evaluation report used a descriptive analytic approach. Results were tabulated with the descriptive variables presented. Most data are presented as column percentages, means or medians, and are carried out to one decimal point. The analysis and interpretation of focus groups were conducted with a great deal of judgement and care using content analysis methods. We used qualitative data to deepen explanations of the findings and triangulate with quantitative information. Survey findings provided answers to the first evaluation question. Our analysis makes good use of existing data gathered through extensive literature review. It takes into account the limitations to the evaluation, with particular attention to the limitations associated with the evaluation methodology (selection bias, recall bias, unobservable differences, etc.).

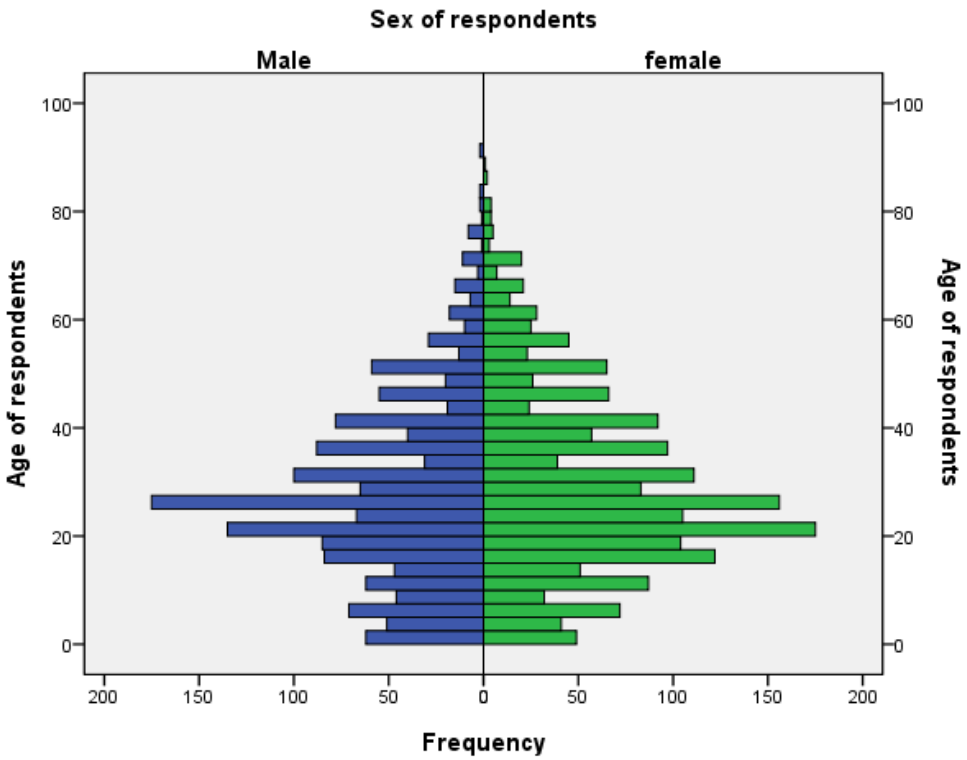
Appendix E. List of Key Informants

Institution/category	Name	Position
Entreprise pénitentiaire de Pétionville	1. Dieucilhomme Jasmin	Police Inspector
Centre de Rééducation des Mineurs en Conflit avec la Loi **{Prison Delmas 33}**	2. Molière	Police Inspector
Haiti Métal S.A.	3. Jean Hector S. Guirand	Executive Director
Jean-Baptiste Entreprise (JBE)	4. Serge Jean-Baptiste	Executive Director
Tony Dry Cleaning	5. Tony Paul	Owner
Le Rocher Boulangerie	6. Bertrude Couloute	Owner
ACME	7. Pierre Legrand	Director
SHAMA dry cleaning	8. Richemide Prince	Owner
	9. Pierre Ronel Prince	
Boulangerie de Carrefour Feuille	10. Dominique Sandrine Landrin	Owner
	11. Toussaint Phalande Stéphanie	
Boulangerie St-Yves (Carrefour)	12. Pierre Phito	Owner
	13. Tony Baptiste	
Ministère du Commerce et de l'Industrie	14. Ghisler Dugas	Executive Director
	15. Francis Gratia	Minister's Office director
	16. Duchatelier Paul Junior	Minister's Office
ICTP personal	17. Cécile Duchier	ICS leader
	18. Esther Bonté	Hotline Supervisor
	19. Daniel Charles	LPG Specialist
	20. Jean Denis Lys	M&E Specialist
	21. Michelet Fontaine	Director
Mercy Corps	22. Elizabeth Sipple	Alternative Energy and Renewable Resources Program Manager

Technicians trained	23. John Smith Charlotin	Technician
	24. Jonel Fréjuste	Technician
	25. Gaus Jules	Technician
	26. Undrick Céus	Technician
D&E Green	27. Fednard Duquesne	Executive Director (products : plop plop and Echo recho)
TICADAIE	28. Philippe Villedrouin	Executive Director
RENA	29. Alix Villedrouin	Executive Director
Faculté des Sciences	30. Dr Cheremond Yvens	Professeur à l'UEH
TOTAL Haiti	31. Aude Humbert	Directr
Bureau des Mines et de l'Energie	32. Altidor Jean Robert	Directeur des ressources énergétiques
Ministère de l'Environnement	33. Moise Jean-Pierre	Directeur de changement climatique
	34. Pachuco jean-Baptiste	Consultant in Energy and Environment
USAID	35. Marcia Urquhart Glenn	Senior Urban Planning and Policy Advisor
	36. Harry François	Mission Monitoring and Evaluation Officer
Palmis Enèji	37. Christophe Duchier	PDG
OMNIGAZ	38. Bertrand Berthomieux	PDG

Appendix F. Sampling Characteristics

Figure. Ages pyramid



Other characteristics

Table No. 2: Structure of household members by age and sex

Age group (Year)	Sex of member of household					
	Male		Female		Total	
	N	%	N	%	N	%
< 5	373	23.9	380	20.5	753	22.0
15-29	577	36.9	697	37.6	1274	37.3
30-44	356	22.8	420	22.6	776	22.7
45-59	186	11.9	250	13.5	436	12.8
60 or +	70	4.5	109	5.9	179	5.2
Total		**100.0%**		**100.0%**		**100.0%**

The structure of the sample in terms of distribution of age groups by gender translates information already known to the Haitian population. Indeed people are very young here with almost 59 percent below 30 years, with slightly more female than male in this age group. The population of old men and women, age 60 and over, represented only 5 percent of the current population. With such a structure of the population, it proves important to have this concern for protection of natural resources, including timber resources to serve the rising generation.

More characteristic.

Number of persons n Household (HH)

N	**valid**	**973**
	Missing	0
Mean		3.51
Std error of Mean		0.58
Median		3.0
Mode		3
Std Deviation		1.79

Appendix G. Key Informant Interview

Private sector partners

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during our interview has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How did you find out this information?
3. How were you selected as a partner? /
4. How were you involved in the project? / Which activities were implemented?
5. To what extent was it easy to establish the sales points? What strategy did you use to establish sales points? (credit/ financial support/ remittances?)
6. What results were achieved? How satisfied are you with your performance?
7. What worked very well and what could be done better?
8. What are the biggest challenges that the project faces?
9. In your opinion, what motivates people switch and buy LPG stoves?
10. What are some suggestions for improving the project in the future?
11. To what extent has the intervention contributed to positive changes in the community?
12. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant Interview

Hotline

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during our interview has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How did you find out this information?
3. How do you involve in the project? / Which activities were implemented?
4. What do you do to let people know that this hotline exists?
5. How does it works? (Type of service available? Type of inquiries? Complaints? Information recorded? Follow-up?)
6. How was your experience with the technicians?
7. What results were achieved? How satisfied are you with performance? (Average calls per month?)
8. What worked very well and what could be done better?
9. What are the biggest challenges that the project faces?
10. In your opinion, what motivates people switch and buy LPG stoves?
11. What are some suggestions for improving the project in the future?
12. To what extent has the intervention contributed to positive changes in the community?
13. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant Interview

Bureau of Mines and Energy

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during our interview has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves? How did you find out this information?
2. How were you involved in the project? / Which activities were implemented? What can you tell us about the tests performed by the cookstove lab installed at the FDS? What kind of test that can perform in this lab?
3. To what extent was it easy to establish a cookstove laboratory at the FDS and make it run?
4. What are the management mechanism between BME and FDS? How works the validation process of a stove? In terms of international standards, what are the choices that have been made by the Haitian authorities? Is there any link between this laboratory and similar laboratories outside of the country? Are you part of networks?
5. What results were achieved? How satisfied are you with the lab performance?
6. How many carbon projects have been registered to date? How many carbon projects are waiting to be registered?
7. What type of markets have been targeted, CDM, Gold Standard, voluntary market? What are the criteria that have guided this choice? What are the procedures until the disbursement of money?
8. What is the progress in the carbon market establishment in Haiti?
9. What are the constraints to establishing a carbon market in Haiti?
10. To what extent did the existence or inexistence of carbon market influence the local market for improved biomass or LPG cookstoves? Or the ICTP specifically?

11. What are the benefits of C-Quest Capital interventions?
12. In your opinion, what motivates people switch and buy LPG stoves?
13. What worked very well and what could be done better?
14. What are the biggest challenges that the project faces considering all aspects of its implementation?
15. To what extent has the intervention contributed to positive changes in the community?
16. Have there been any unintended or negative changes that can be attributed to the intervention?
17. What are some suggestions for improving the project in the future?

Key Informant Interview

"Faculté des Science" Cookstove laboratory

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during our interview has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How did you find out this information?
3. How were you involved in the project? / Which activities were implemented?
4. To what extent was it easy to establish a cookstove laboratory at the FDS and make it run?
5. What are the management mechanism between BME and FDS? How works the validation process of a stove?
6. What results were achieved? How satisfied are you with the lab performance?
7. What type of analyses you preform? What level of performance is achievable? Any relationship with other regional lab?
8. Is there a need for double checking analysis by other labs?
9. What is the capacity of intervention of the lab related to large demand for analysis?
10. Are you willing to sustain large demand in case of substantial carbon finance projects implementation?
11. What type of support did you benefit in establishing the laboratory?
12. What mechanism is in place to ensure the sustainability of the lab?
13. To what extent did the carbon market influence the local market for improved biomass or LPG cookstoves?
14. What worked very well and what could be done better?
15. What are the biggest challenges that the project faces?
16. In your opinion, what motivates people switch and buy LPG stoves?
17. What are some suggestions for improving the ICSP project in the future?

18. To what extent has the intervention (ICSP) contributed to positive changes in the community?
19. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant Interview

Improved biomass cookstoves manufacturers

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during our interview has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How did you find out this information?
3. How were you involved in the project? / Which activities were implemented?
4. Did you have your stoves evaluated by the FDS cookstove lab?
5. What results were achieved? How satisfied are you with the lab performance?
6. What do you know about carbon finance?
7. Do you know you can get finance from carbon finance?
8. Did you or do you plan to register for carbon finance?
9. What is the progress in the carbon market establishment in Haiti?
10. To what extent did the carbon market influence the local market for improved biomass or LPG cookstoves?
11. What worked very well and what could be done better?
12. What are the biggest challenges that the ICSP project faces?
13. In your opinion, what motivates people switch and buy LPG stoves?
14. What are some suggestions for improving the ICSP project in the future?
15. To what extent has the intervention contributed to positive changes in the community?
16. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with LPG cookstoves manufacturers

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview. It will take about 15 minutes.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How were you selected as a manufacturer?
3. How do you participate in the project? /Which activities were implemented?
4. What results were achieved? (Size of business, price of cookstoves, market shares)
5. How satisfied are you with the program's activities
6. What worked very well and what could be done better?
7. What are the biggest challenges that the project faces?
8. Did you benefit some form of training provided by the project?
9. How efficient was the training if any?
10. What changes would you make to improve the training aspect of the project?
11. To what extent do you have access to new investment funds (with the project or not)?
12. To what extent the outcomes of different marketing and commercial tested were effective?
13. What aspects of the program that have most influenced promotion of your business?
14. Overall, how are the feedbacks about your LPG cookstoves? (Ease of use, preparation time, cooking results)? What makes it special?
15. What measures ~~are~~ should be taken to ensure the sustainability in the use of ICS or LPG cookstoves?
16. What do you do in case of return for breakdown or malfunction?
17. Did you sell stoves through a credit program? What institution? Amount of credit? Rate used? In what extent did you get repaid?

18. What are some suggestions for improving the project in the future?
19. To what extent has the intervention contributed to positive changes in your business?
20. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with Mercy Corps (MC)

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. What were the responsibilities of Mercy Corps? Which activities did you implemented?
3. What results did you achieve?
4. What worked very well and what could be done better?
5. What are the biggest challenges that the project faces?
6. What aspects of the program that have most influenced the choice of end users to switch from charcoal to LPG stoves? What other factors that could increase end users interest in switching to LPG?
7. What measures are taken to ensure the sustainability in the use of LPG cookstoves?
8. Was MC involved in the credit program? With what institution? Amount of credit? Rate used? In what extent did the beneficiaries repaid?
9. What are some suggestions for improving the project in the future?
10. To what extent has the intervention contributed to positive changes in the targeted communities?
11. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with LPG suppliers partners

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview. It will take between 15 and 30 minutes.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How were you selected as a partner and what were the terms of this partnership?
3. What were your responsibilities according to the MoU?
4. How did you participate in the project? /Which activities were implemented?
5. What results were achieved?
6. Did your imports of LPG increased with the project implementation? and roughly by how much? (The project claims xxx% in general)
7. What do you think about the LPG legal framework?
8. How an appropriate legal framework could affect you business?
9. What worked very well and what could be done better?
10. What are the biggest challenges that the project faces?
1. What aspects of the program that have most influenced your participation as LPG suppliers? What factors that could increase end users interest in switching to LPG?
11. Overall, how satisfied are you with your participation in this effort aiming at reducing charcoal use? Do you see yourself in business for long time within this partnership?
12. What measures are taken to ensure the sustainability in the use of LPG cookstoves? (Stability, safety, availability of LPG, etc.)
13. Do you know what to do in case shortage of LPG?
14. What are some suggestions for improving the project in the future?

15. To what extent has the intervention contributed to positive changes in the targeted communities?

16. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with LPG stove manufacturer

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview.

2. What do you know about the project related to LPG cookstoves?
3. How did you find out this information?
4. How were you selected as a partner?
5. How do you participate in the project? /Which activities were implemented?
6. What results were achieved?
7. Did your sales increased due to the project implementation? And roughly by how much?
8. Now the project is over, how this affect your business?
9. Did you benefit some sort of training provided by the project?
10. How effective were the training?
11. Do you become a more efficient and performant producer?
12. Did the project implementation give you more ((reconnaissance))
13. Did you or do you benefit from any type of financing to support your business?
14. Are you participating in the carbon finance process that is being put in place?
15. Did the market awareness program of the project have increased your sales?
16. What worked very well and what could be done better?
17. What are the biggest challenges that the project faces?
18. What aspects of the program that have most influenced the choice of schools/ orphanages to switch from charcoal to LPG stoves? What other factors that could increase interest in switching?

19. What measures are taken to ensure the sustainability in the use of LPG cookstoves?
20. Do you know what to do in case of breakdown or malfunction?
21. What are some suggestions for improving the project in the future?
22. To what extent has the intervention contributed to positive changes in your business?
23. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with other large users (prisons, bakeries, dry cleanings)

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview.

1. What do you know about the project improved biomass and LPG cookstoves?
2. How did you find out this information?
3. How were you selected as a beneficiary?
4. How did you participate in the project? /Which activities were implemented?
5. What results were achieved?
6. What worked very well and what could be done better?
7. What are the biggest challenges that the project faces?
8. What aspects of the program that have most influenced your choice
9. Overall, how satisfied are you with your LPG cookstoves? (Ease of use, preparation time, cooking results)
10. What measures are taken to ensure the sustainability in the use of your LPG cookstoves?
11. Do you know what to do in case of breakdown or malfunction?
12. Did you bought the stove through a credit program? What institution? Amount of credit? Rate used? In what extent did the beneficiaries repaid?
13. What are some suggestions for improving the project in the future?
14. To what extent has the intervention contributed to positive changes in your life?
15. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with Ministry of Commerce and Industry (MCI)

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview.

1. What do you know about the project improved biomass and LPG cookstoves?
2. How do you participate in the project? /Which activities were implemented? (Strategy for the reform of LPG sector/ Analysis of the economic environment of the LPG sector/ LPG legislation)
3. How is the implementation of the carbon market in Haiti? Biggest challenges? Opportunities? What did the MCI do regarding the carbon credit program?
4. What is the current status of the LPG legal framework? How do you plan to enforce it?
5. Do you think it is a necessary piece for the development of this sector?
6. What results were achieved?
7. What worked very well and what could be done better?
8. What are the biggest challenges that the project faces?
9. What aspects of the program that have most influenced the use of LPG in Haiti?
10. Overall, how satisfied are you with the program's activities in LPG technology?
11. What measures are taken to ensure sustainability in the use of LPG cookstoves?
12. What measures are taken to ensure safety in the use of LPG cookstoves?
13. What are some suggestions for improving the project in the future?
14. To what extent has the intervention contributed to positive changes in the energy sector?
15. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with ICTP key stakeholders

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview.

1. What were your roles and responsibilities in the ICTP?
2. How is the implementation of the carbon market in Haiti? Biggest challenges? Opportunities?
3. What did the ICTP do regarding the carbon credit program?
4. What did the program do to strengthen the LPG sector? Or the improved biomass cookstoves production?
5. In your opinion, what has prevented the project to introduce legislation to regulate the LPG sector?
6. What worked very well and what could be done better?
7. What aspects of the program that have most influenced the choice of end users to switch from charcoal to LPG stoves? What other factors that could increase end users interest in switching to LPG?
8. What are some suggestions for improving the project in the future?
9. To what extent has the intervention contributed to positive changes?
10. What is your overall appreciation of the performance of implementing partners?

Key Informant interview with C-Quest Capital

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

Be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. What were the responsibilities of C-Quest Capital? Which activities did you implement?
3. What results were achieved?
4. How many projects have been registered to date?
5. What type of markets have been targeted, CDM, Gold Standard, voluntary market?
6. Where are we exactly with the carbon credit program? How many projects are waiting to be registered?
7. What are the constraints to establishing a carbon market in Haiti?
8. What is the progress in the carbon market establishment in Haiti?
9. To what extent did the carbon market influence the local market for improved biomass or LPG cookstoves?
10. What are the effects of the Haiti carbon credit program on the ICTP and vice versa?
11. What worked very well and what could be done better?
12. What are some suggestions for improving the project in the future?
13. What are the biggest challenges that the project faces considering all aspects of its implementation?
14. What aspects of the program that have most influenced the choice of end users to use more efficient biomass cookstoves or to switch from charcoal to LPG stoves? What other factors that could increase end users' interest in switching to LPG?
15. To what extent has the intervention contributed to positive changes in the community?
16. Have there been any unintended or negative changes that can be attributed to the intervention?

Key Informant interview with Ministry of Environment

Thank you for agreeing to participate. We are very interested in hearing your views on improved biomass and LPG stoves. We hope to learn things that will orient interventions for future programming.

All that will be said during the meeting has great value and we would like your opinion on each question. If you do not want to answer a question, it is your right not to respond. However, be certain that the information provided is completely confidential and will only be used for one purpose: to help us understand the situation of your institution. With your permission, we will take note of everything that was said during the meeting. We strongly wish that you accept the interview.

1. What do you know about the project related to improved biomass and LPG cookstoves?
2. How do you participate in the project? /Which activities were implemented? (Strategy for the reform of LPG sector/ Analysis of the economic environment of the LPG sector/ LPG legislation)
3. How is the implementation of the carbon market in Haiti? Biggest challenges? Opportunities? What did the Ministry of Environment do regarding the carbon credit program?
4. What results were achieved?
5. How many carbon projects have been registered to date?
6. What type of markets have been targeted, CDM, Gold Standard, voluntary market?
7. How many projects are waiting to be registered?
8. What are the constraints to establishing a carbon market in Haiti?
9. What are the constraints for ANDH being fully operational?
10. What is the progress in the carbon market establishment in Haiti?
11. To what extent did the carbon market influence the local market for improved biomass or LPG cookstoves?
12. Where are we exactly with the carbon credit program?
13. What are the effects of the Haiti carbon credit program on the ICTP and vice versa?
14. What are the benefits of C-Quest Capital interventions?

15. In your opinion, what motivates people switch and buy LPG stoves?
16. What are some suggestions for improving the project in the future?
17. What worked very well and what could be done better?
18. What are the biggest challenges that the project faces considering all aspects of its implementation?
19. What aspects of the program that have most influenced the use of more efficient biomass cook stoves of LPG in Haiti?
20. What are some suggestions for improving the project in the future?
21. To what extent has the intervention contributed to positive changes in the energy sector?
22. Have there been any unintended or negative changes that can be attributed to the intervention?

Appendix H. Evaluation Scope of Work (SoW)

RFP IMPROVED COOKING TECHNOL

Appendix I. Evaluation Matrix

Evaluation Questions	Primary Information Need	Methods	Sources of Information	Data analysis method
1. To what extent did the project establish a local market and industry for household improved biomass cook stoves?	Changes in the production of efficient cooking stoves Sales points for improved stoves before and after project Changes in sales of improved cooking stoves as a result of the project To what extent did the profitability of ICS supply chain vary Changes in the management systems along the cookstoves supply chain	1. Documents review 2. Key informant interview (KII) 3. Focus group 4. Household Survey	*Document review:* • Project periodic reports, evaluation reports, design documents, any other relevant documentation. *KII:* • Private sector partners promoting and selling cookstoves • "Recho pa-w" hotline coordinator • Bureau of Mines and Energy (BME) • Laboratory for cookstove Manager (UEH/FDS) • Improved biomass cook stoves manufacturers supported by ICTP (plus Observations) • Mercy Corps • Micro-Finance institution *Household Survey:* • Household *Focus Group:* • Business women and community leaders trained in commercialization	1. Thorough data analysis 2. Content analysis 3. Descriptive statistics 4. Triangulation techniques
2. To what extent the targeted project beneficiaries switched to	1. To what extent can we say that access to and availability of LPG stoves have	1. Documents Review 2. Key Informant Interview	*Document review*: • Project periodic reports, evaluation reports, design documents, any other relevant documentation.	1. Thorough data analysis 2. Content analysis 3. Descriptive statistics

LPG technology and what were the driving forces behind this choice?	improved? 2. The production of LPG cookstove during the project life. 3. In the case of substantial increase, is it sustainable?	(KII) 3. Focus group (FG) 4. Mini-survey	*KII:* • LPG suppliers partners • JBE • LPG stove manufacturers • Other large users (prisons, bakeries, dry cleanings) *FG*: • Technicians trained to repair and maintain LPG stoves *Mini-survey:* • Street food vendors • Schools • Orphanages	4. Triangulation techniques
3. What mechanisms have been put in place to ensure sustainability of the project achievements and to what extent will benefits realized be replicated in the long term by partners?	Progress made in terms of: LPG management guidelines/ Strategy for the reform of the LPG sector/ LPG legislation. Replication of and scaling up the project.	1. Document review 2. Key Informant Interview (KII)	*Document review*: • Project periodic reports, evaluation reports, design documents, any other relevant documentation. *KII:* 1. Ministry of Commerce and Industry (MCI) 2. ICTP key personnel 3. LPG suppliers partners 4. Department of Pompiers	1. Thorough data analysis 2. Content analysis 3. Triangulation techniques
4. To what extent will the existence or absence of a carbon credit market in	a) Emission and market data were analyzed, b) Carbon credit program was	1. Document review 2. Key Informant Interview	*Document review*: • Project periodic reports, evaluation reports, design documents, any other relevant documentation.	1. Thorough data analysis 2. Content analysis 3. Descriptive statistics

Haiti affect the success and sustainability of the ICTP?	developed, c) Program of Activities was implemented, d) ICS manufacturers' access to investment funds has increased.	(KII)	*KII:* • ICTP key personnel • C-Quest Capital • Bureau of Mines and Energy (BME) • Ministry of Environment	4. Triangulation techniques

Final Evaluation
Improved Cooking Technology Program
Household survey- August 2015

Introduction: I am_____I work for BRIDES.
• Your name was randomly selected from the list of 'Recho Paw' program beneficiaries to participate in this investigation.
• This survey allows us to get information to evaluate the 'Recho Paw' program. This will allow us to see what the program achieved and how to better scale up.
• Information that you provide will remain confidential and will be used only to make a report on the situation in general. We will not quote names; no one will know which one gives us information.
• This survey is voluntary and you can choose not to participate
• Now we will ask you a few questions and it will not last the whole 10 minutes

1. Questionnaire Identification

101. Partner _____	102. Surveyor ID :_____	103. Supervisor ID :_____	
104. Départment : _____	105. Commune : _____	106. Communale Section _____	107. Household number (1-24): /_____/
108. Locality :_____	109. No SDE_____		
110. Date of enterview	_____/_____/_____		

2. Information about the household

201 Name of respondent _____	202. Age : /____/ year	203. Sex of respondent___ 1=Masculin 2=Feminin	204. Relation with head of household:_____ 1=Chef 2=Epoux (se) 3=Enfant 4=Père/Mere 5=frere/soeur 6=employee
205. Name of household :	/_____/		
206. Number of employees in the household |_____|			

3. Household Caracteristics

301. Name	302. Sex 1=male 2=female	303. Age (en years)	304. if age < 5ans, age en mois	305. Si 6<age<18 ans, Does the child go to school? 1. Yes, 2. No

4. Information on basic services: Water
401. Do you have drinking water from DINEPA in your household in the last 12 months? __1.Oui, 2.Non
402. Did you buy treated water in the last 12 months? /___/1.Oui, 2.Non
403. How many liters of treated water? / ___ /
404. What is the greatest need in your household? / _____ / 1. Money, 2. Food, 3. Apartment, 4. Water 5. Other _____
5. Information on basic services: Sanitation
501. Do you have toilet in your household? __1.Oui, 2.Non
502. What type of toilet is it? / ___ / 1.
503. How do you treat the water in the household? 1. Purchase Water Treaty 2. Heat 3. Chemical (aquatap), 4.
504. Do you treat water using coal in the household? / ___ / 1.Yes, 2.No
6. Information on the basic services: Electricity / Energy
601. Has electricity been in your household over the last 12 months? __1.Oui, 2.No
602. Apart from EDH, is another source of electricity at your household? / ___ / 1.Yes, 2.No _____ **if no 604**
603. What other sources of electricity? /____/ 1. Solar Panels, 2. Inverter 3. Both 4. Other_____
604. Do you cook with electric current in the household? / ___ / 1.Yes, 2.No
605. Do you heat water to the electric current in your household? / _____ /1.Yes, 2.No
7. Improved cookstoves
701. Do you use charcoal in your household? __1.Yes, 2.No **If no, go to 703**
702. If yes, what for? /___/1.Cooking 2. Boil the water, 3. Ironing 4. Autres_____
703. If not, why not? / ___ / 1.Have better source, 2. Too expensive, 3. Too dirty, 4. Too rare 5. Other
704. Do you heat water with charcoal to your household? / ___ / 1.Yes, 2.No
405. What kind of rechaud do you use in the household? / __ / 1. Traditional, 2. Improved 3. Other ___ **if not 3, go to 712**
706. If improved, for how many years?
707. Where did the money to get the cookstove come from? /___/
708. Have you benefited from credit and other funds to purchase the cookstove? / ___ / 1.Yes, 2.No
709. Do you would buy the rechaud through the credit or the remittance program?
710. Where have you heard about the improved cookstove?
711. What did push you to buy the improved cookstove? 1. Economic, 2. Environment, 3. Advertising, 4. Autre_____
712. **If not**, did you hear talking about improved cookstove in the media?

713. Why not buy a rechaud improves? /___/ 1. Stove too expensive, LPG 2. Rarity 3. Do not know or find 4. Other___
714. Would you buy if you benefited a credit or transfer from abroad?
715. Can you name a 'brand' of rechaud improves? /____/ if yes what is it _____
716. Can you name a place or buy improved stoves
717. Who in the household decides about acquisition improved cookstoves?
8. Charcoal
801. Do you use charcoal in your household over the last 12 months? __1.Oui, 2.Non
802. Where did you get this charcoal in the last 12 months? /___/1.
803 Did you change cooking energy source in the last twelve months? / ___ / 1.Yes, 2.No
804. Are you satisfy with your cooking source of energy? / ___ / 1.Yes, 2.Non
805. How much is sold a charcoal bag _____?
806. Do you save on a bag of charcoal using propane? / ___ / 1.Yes, 2.No; If so how non _____
807. Between charcoal and gas, which source is most economical to use? /___/ 1. Propane, 2. Charcoal. If 2, go to 808
808. How much should be sold propane to make it economical?
9. Feedback on improved cookstoves

901. Did you regret to have bought an improved cookstove? /____/1: Yes 2. No
902. What do you reproach to the use of improved stoves? 1. Too dangerous, 2. Too expensive 2. Gas difficult to find, 4. Other
903. Would you buy an improved cookstove in the next 12 months? (Start here if the person/household doesn't own an improved cookstove?)
904. What would push you to buy one more rapidly?
905. Would advise you to a friend to buy? /_____/1: Yes 2. No
906. Have you seen a television spot on improved stoves? /_____/1: Yes 2. No
907. Have you, a radio, heard of improved stoves? /_____/1: Yes 2. No
908. Do you have a relative or friend who uses it? /_____/ 1: Yes 2. No
909. Do they speak in good or in bad terms about improved cookstoves? Good_____Bad _____1: Yes 2. No
10. Conclusion
Information on basic services: Water Y-1001 was he drinking water from DINEPA in your household in the last 12 months? __1.Oui, 2.Non 1002. Buy you water deals in the last 12 months? /___/1.Oui, 2.Non 1003. How many liters of treated water? / ___ / 1.Yes, 2.Non 1004. What is the greatest need in your household? / _____ / 1. Money, 2. Food, 3. Apartment, 4. Water 5. Other _____

Mini Survey: Orphanage and School with canteen.

Pawòl entwodiksyon : Mwen se_____Mwen travay pou BRIDES.

• Non ou te chwazi pa chans pou patisipe nan ankèt sa.

• Ankèt sa a pemèt nou jwenn enfomasyon pou evalye pwogram Recho Paw la. Sa ap pèmèt nou wè kisa pwogram nan rive reyalize epi nan ki mezi program sa ka agrandi pou touche plis moun.

• Enfomasyon ke ou ap bay yo ap rete konfidansyèl e yap itilize selman pou fè yon rapò sou sitiyasyon general zòn nan, nou pap site non moun. Pap gen mwayen pou konnen ki lès ki bay nou enfomasyon sa yo.

• Ankèt sa a volontè e ou kapab chwazi pou pa patisipe/ • Koulye a nou pral poze ou kek ti keksyon e sa ka dire 15 minit konsa.

1. Idantifikasyon

101. Enstitisyon : 1. Òfelina 2 Lekòl	102 : Non Enstitisyon-an :		
103. Anketè ID	104. Komin _____	105. Seksyon Kominal _____	106. Nimewo entèviou-a /_____/
107. Localite/katye :			
108. Dat entèviou-a	_____ /_____/ 2015		
109 : Non moun kap reponn kesyon yo :	110. Seks: M F	111. Wòl moun kap reponn kesyon yo :	
112. Konbyen lane enstitisyon sa genyen?	113. Konbyen moun antou kap fonksyone nan espas sa? (personnel/élèves/orphelins, etc.)		

2. Enèji

201. Eske te gen kouran EDH nan lekòl/òfelina nan dènye mwa sa? / __ /1.Wi , 2.Non
202. Apre EDH eske gen lòt sous kouran nan lekòl/òfelina? /_____/1Wi, 2.Non
203. Ki lòt sous kouran ki gen-yen ? /____/ 1. Pano solè, 2. Envètè, 3. Delco. 4. lòt_____ (*Plusieurs réponses sont possibles*)
204. Eske nan lekòl/òfelina nou fè manje ak kouran ? /___/ 1.Wi, 2.Non
205. Eske ofelina/lekòl la chofe oswa bouyi dlo ak kouran_____1.Wi, 2.Non
206. *(Pa poze kesyon sa si 101 egal 2)* Ak ki sous enèji nou repase rad nan kay la ? 1. Kouran, 2. Chabon, 3. Lòt_____

3. Itilizasyon gaz propan

301. Eske nou itilize chabon nan lekòl/òfelina kounye-a? __1.Wi chabon sèlman, 2. Wi an pati 3.Non ***Si Non, ale nan 303***
302. ***Si Wi (1 ou 2),*** kisa ke nou fè ak chabon? /___/1. Manje 2. Bouyi dlo pou bwè, 3. Chofe dlo pou benyen, 4. Repase rad 5. Lòt: _____
303. Si Non, poukisa? / ___ / 1.Nou gen pi bon sous enèji, 2. Twò chè, 3. Twò sal, 4. Pa fasil pou jwenn 5. Lòt:
304. Ki kalite recho ke nou itilize nan lekòl/1ofelina? 1. Tradisyonèl chabon, 2. Amelyore chabon 3. Recho propann, 4. Fou propann, 5. Lòt ___ **Si repons la diferan de 3 ale nan 310**
305. Si se recho propann, depi konbyen tan/lane ke wap itilize-l?

306. Kisa ki te pouse enstitisyon wap dirije-a soti nèt nan chabon poul vire nan sèvi ak gaz propa-n? 1.Mwayen ekonomik, 2. Bon jan enfòmasyon, 3. Pwoteje Anviwònman, 4. Pwopwete, 5. Sante, 6. Lòt.
307. Ki kote ou te jwenn kòb pour achte recho propann? /___/ 1. Kredi enstitisyon, 2. Lajan enstitisyon-an 3. Don/kado de lòt enstitisyon, 4. Lajan ayisyen lòt bò dlo voye, 5. Lòt…
308. Ki kote ou te tande pale de recho propann yo? 1. Radyo, 2. Televizyon, 3. Pankat nan lari, 4. Zanmi, 5. A travè lòt enstitisyon, 6. Lòt…
309. *(Si Non poze 310-312),* eske ou tande pale de recho propann yo nan media oswa nan pankat/bandwòl lari (radio, TV, etc.) 1. Wi, 2. Non
310. Kisa ki anppeche enstitisyon-an achte recho propann? /___/ 1. Recho propann twò chè, 2. Ou pa jwenn yo fasil 3. Pa konnen kòman pou jwenn yo 4. Lòt___
311. Eske ou tap achte yon recho propann si-w te jwenn yon kredi oswa si-w te resevwa lajan ki sot lòt bò dlo ke Ayisyen voye? 1. Wi, 2. Non
Kesyon pou tout moun
312. Eske ou ka site yon mak recho chabon amelyro ki ap vann an Ayiti? 1. Wi 2.Non _____
313. Si 313 se wi, ki mak/non recho ou konnen?
314. Eske-w ou konnen yon kote ou ka achte recho amelyore oswa recho propann ? 1. Wi, 2. Non
315. Si 314 se wi, ki kote?
316. Kilès nan enstitisyon an ki te pran oswa ki ka pran desizyon pou achte recho propann?
317. Dapre ou menm kisa ki ka fè yon moun soti nèt nan chabon poul vire nan sèvi ak gaz propa-n lakay li? 1. Mwayen ekonomik, 2. Bon jan enfòmasyon, 3. Pwoteje Anviwònman, 4. Pwopwete, 5. Sante, 6. Lòt. _____
4. Chabon
401. Eske nou te itilize chabon nan òfelina/lekòl la nan 12 mwa ki sot pase la yo? __1.Wi, 2.Non
402. Si wi, ki kote nou te achte/jwenn chabon say o? 1. Nan mache nan Pòtoprens, 2. Nan mache an deyò de Pòtoprens, 3. Don/kado, 4. Lòt.
403 Eske nou te chanje sous enèji nou itilize pou fè manje nan dènye 12 mwa ki sot pase la yo? 1.Wi, 2.Non
404. Eske ou satisfè de sous enèji ke wap itilize kounye-a pou fè manje? / ___ / 1.Wi, 2.Non
405. Chabon oswa Propann, kilès nan yo ki pi ekonomik pou itilize? 1. Propann 2. Chabon. 3. Pa konnen.
406. Konbyen bonbònn 25 liv propann lan ta dwe van-n pou li ekonomik ?
5. Feedback
Enstitisyon kap itilize propann
501. Eske ou konn regrèt ou te vire nan/chwazi propann nan plas chabon? /____/1: Wi 2. Non
502. Kisa ou ka reproche recho propann yo? 1. Twò danjere, 2. Twò chè 2. Li difisil pou jwenn gaz, 4. Lòt
Enstitisyon kap itilize chabon
503. Eske ou gen plan pou achte recho propann nan 12 mwa kap vini la yo? ? /____/1: Wi 2. Non
504. Ki sa ki ka fè-w pran desizyon sa pi vit?
505. Eske ou wè deja yon reklam nan televizyon kap pale de recho propann? ? /_____/1: Wi 2. Non
506. Eske ou tande deja yon reklam nan radyo kap pale de recho propann? /_____/1: Wi 2. Non
507. Eske ou wè deja nan lari yon bilbòd, pankat, bandwòl, etc. kap pale de recho propann? 1: Wi 2. Non
508. An general, eske-w pale an byen ou an mal de recho propann yo?1. byen_____2. mal_____

Program Recho pa-w
Evalyasyon final – Septanm 2105
Street Food Vendors (SFV)

Pawòl entwodiksyon : Mwen se_____Mwen travay pou BRIDES.

• Non ou te chwazi pa chans pou patisipe nan ankèt sa.
• Ankèt sa a pemèt nou jwenn enfomasyon pou evalye pwogram Recho Paw la. Sa ap pèmèt nou wè kisa pwogram nan rive reyalize epi nan ki mezi program sa ka agrandi pou touche plis moun.
• Enfomasyon ke ou ap bay yo ap rete konfidansyèl e yap itilize selman pou fè yon rapò sou sitiyasyon general zòn nan, nou pap site non moun. Pap gen mwayen pou konnen ki lès ki bay nou enfomasyon sa yo.
• Ankèt sa a volontè e ou kapab chwazi pou pa patisipe
• Koulye a nou pral poze ou kek ti keksyon e sa ka dire 15 minit konsa.

1. Idantifikasyon

101. No entèviou-a	102 : Non machann nan:	103. Anketè ID
104. Komin	105. Seksyon Kominal	106. Localite/katye :
107. Dat entèviou-a	_____ /_____/ _2015	
108. Seks: M F	109. Konbyen lane depi wap vann manje?	

1. Itilizasyon gaz propan (plis obsèvasyon)

201. Eske ou itilize chabon pou fè manje kounye-a? __1.Wi chabon sèlman, 2. Wi an pati 3.Non
Si Non, ale nan 303

202. Si Non, poukisa? / ___ / 1.Nou gen pi bon sous enèji, 2. Twò chè, 3. Twò sal, 4. Pa fasil pou jwenn 5. Lòt:

203. Ki kalite recho ke ou itilize?
1. Tradisyonèl chabon, 2. Amelyore chabon 3. Recho propann, 4. Fou propann, 5. Lòt ___
Si repons la diferan de 3 ale nan 310

204. Si se recho propann, depi konbyen tan/lane ke wap itilize-l?

205. Kisa ki te pouse-w soti nan chabon pou vire nan sèvi ak gaz propa-n?
1.Li pi ekonomik, 2. Bon jan enfòmasyon, 3. Pwoteje Anviwònman, 4. Pwopwete, 5. Sante, 6. Lòt.

206. Ki kote ou te jwenn kòb pour achte recho propann? /___/
1. Kredi enstitisyon, 2. Pwòp lajan-m 3. Don/kado de lòt enstitisyon, 4. Lajan ayisyen lòt bò dlo voye, 5. Lòt…

207. Ki kote ou te tande pale de recho propann yo?
1. Radyo, 2. Televizyon, 3. Pankat nan lari, 4. Zanmi, 5. A travè yon enstitisyon, 6. Lòt…

208. *(Si 203 se 1 ou 2 poze 208-210),* eske ou tande pale de recho propann yo nan media oswa nan pankat/bandwòl nan lari (radio, TV, etc.)
1. Wi, 2. Non

209. Kisa ki anppeche-w achte recho propann? /___/ 1. Recho propann twò chè, 2. Ou pa jwenn yo fasil 3. Pa konnen kòman pou jwenn yo 4. Lòt___

210. Eske ou tap achte yon recho propann si-w te jwenn yon kredi oswa si-w te resevwa lajan ki sot lòt bò dlo ke Ayisyen voye? 1. Wi, 2. Non

Kesyon pou tout moun

211. Eske ou ka site yon mak recho chabon amelyro ki ap vann an Ayiti? 1. Wi 2.Non
_____

212. Si 211 se wi, ki mak/non recho ou konnen?
213. Eske-w konnen yon kote ou ka achte recho amelyore oswa recho propann ? 1. Wi, 2. Non
214. Si 213 se wi, ki kote?
215. Dapre ou menm kisa ki ka fè yon moun soti nèt nan chabon poul vire nan sèvi ak gaz propa-n lakay li oswa nan ti komès vann manje? 2. Mwayen ekonomik, 2. Bon jan enfòmasyon, 3. Pwoteje Anviwònman, 4. Pwopwete, 5. Sante, 6. Lòt. _____
2. Chabon
301. Eske nou te itilize chabon nan 12 mwa ki sot pase la yo? __1.Wi, 2.Non
302 Eske ou te chanje sous enèji ou itilize pou fè manje nan dènye 12 mwa ki sot pase la yo? 1.Wi, 2.Non
303. Eske ou satisfè de sous enèji ke wap itilize kounye-a pou fè manje? / ___ / 1.Wi, 2.Non
304. Chabon oswa Propann, kilès nan yo ki pi ekonomik pou itilize? 1. Propann 2. Chabon. 3. Pa konnen.
305. Konbyen bonbònn 25 liv propann lan ta dwe van-n pou li ekonomik ?
3. Feedback
Machann manje kap itilize propann
401. Eske ou konn regrèt ou te vire nan/chwazi propann nan plas chabon? /____/1: Wi 2. Non
402. Kisa ou ka reproche recho propann yo? 1. Twò danjere, 2. Twò chè 2. Li difisil pou jwenn gaz, 4. Lòt
Machann kap itilize chabon
403. Eske ou gen plan pou achte recho propann nan 12 mwa kap vini la yo? ? /____/1: Wi 2. Non
404. Ki sa ki ka fè-w pran desizyon sa pi vit?
405. Eske ou wè deja yon reklam nan televizyon kap pale de recho propann? ? /_____/1: Wi 2. Non
406. Eske ou tande deja yon reklam nan radyo kap pale de recho propann? /_____/1: Wi 2. Non
407. Eske ou wè deja nan lari yon bilbòd, pankat, bandwòl, etc. kap pale de recho propann? 1: Wi 2. Non
408. An general, eske-w pale an byen ou an mal de recho propann yo?1. byen_____2. mal_____
4. Conclusion

END OF REPORT