MONITORING REPORT

Proyecto Mirador
Enhanced distribution of efficient wood stoves in Honduras
GS Project No. 690

Second verification period: 1 December 2010 – 30 November 2011

CONTENTS

MONITORING REPORT

Proyecto Mirador
Enhanced distribution of efficient wood stoves in Honduras
GS Project No. 690

Second verification period: 1 December 2010 – 30 November 2011

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

1. <u>Purpose of the project activity and the measures taken to reduce greenhouse gas emissions.</u>

The objective of our project, Proyecto Mirador, is to create an organization that disseminates fuel-efficient stoves and utilizes carbon finance to provide a market-based financial solution to address the problems of deforestation, indoor air pollution, global warming, and slow economic development through the creation of microenterprises in rural Honduras. Proyecto Mirador has proven its ability to serve as a model for other stove projects by monetizing certified carbon savings and greatly accelerating the dissemination of fuel-efficient stoves in rural Central America where degraded conditions of forests, indoor air pollution and rural poverty exceed acceptable levels.

The original model La Justa stove was pioneered by the Aprovecho Research Lab and was engineered to burn hotter and use 1/2 to 1/3 the wood of traditional *fogon* stoves, thus reducing the time devoted to wood collection and/or money spent on wood. The La Justa also efficiently vents smoke outside of the house, helping to prevent respiratory and other illnesses caused by excessive exposure to toxic gases and particulate matter emitted by burning wood.

La Justa stoves reduce emissions of greenhouse gases (GHG) that are causing the Earth's average temperature to rise to dangerous levels. A field study was conducted by Professor Robert Bailis, PhD, author of the Kitchen Performance Test (the Gold Standard baseline methodology for cookstoves, hereinafter referred to as "KT"), and an assistant professor at the Yale School of Forestry and Environmental Studies (FES), in June and July of 2007. This study, hereinafter referred to as the "Yale 2007 Study," showed that the replacement of one traditional *fogon* stove with one La Justa stove reduces GHG emissions by between 1.2 and 1.7 $mtCO_2e$ /year.

Subsequent to the Yale 2007 Study, PM made additional design improvements to the original La Justa stove with assistance from Aprovecho Research Lab. The Aprovecho Lab studies methods for designing, building, and disseminating cooking and heating technology by using vernacular (locally available) low cost materials that can be found easily in the towns and villages where improved stoves are needed.

A study completed by Nordica MacCarty of Aprovecho Research Lab on April 28, 2009, showed that the improved "La Justa Model 2x3" generates even greater wood savings than the original La Justa. Further, laboratory tests showed that the La Justa Model 2x3 reduced Carbon Monoxide emissions and particulate matter by 79%, CO_2 by 43% and CH4 by 94% compared to traditional stoves (McCarty, N., Apr. 2009). What was referred to as the La Justa Model 2x3 during the First Verification Period is now called the "Estufa Dos por Tres" to reflect the uniqueness of Proyecto Mirador's improved design. It is the same stove as the improved La Justa Model 2x3, and is the stove installed throughout the Second Verification Period.

Since the 2009 Aprovecho lab test, and in accordance with a Forward Action Request issued by the Gold Standard as part of the final Registration Review in June 2010, Proyecto Mirador completed a

paired sample, n=55 quantitative Fuelwood Consumption Study (July-September 2010) indicating that each stove reduces GHG emissions by 2.73 $mtCO_2e$ /year. This study was conducted under the supervision of Professor Robert Bailis, with data collected from July to September 2010.

PM's previously projected GHG emissions reduction of 2.23 $mtCO_2e$ /year, as set forth in the PDD, was based on Aprovecho's findings, together with the Yale baseline study conducted in 2007, and calculated based on mean fuel consumption. The projected emissions reduction of 2.23 $mtCO_2e$ /year was replaced with the new and more accurate projection of 2.73 $mtCO_2e$ /year for the purposes of the First Verification Period (1 May 2009 – 30 November 2011).

For the purposes of the Second Verification Period we will continue to assume an emissions reduction figure of 2.73 $mtCO_2e$ /year, as the stove design has not changed and all other factors previously established remain valid.

2. Brief description of the installed technology and equipments.

A standard La Justa stove consists of a ceramic firebox for the stove mouth, a steel plancha, a chimney, and a sophisticated system of insulated interior walls constructed from adobe blocks or ceramic bricks that channels the heat under the plancha and smoke and particulates out the chimney.

The improved model of La Justa stove is now called the "Estufa Dos por Tres" (formerly the "La Justa Model 2x3") and is the model covered in this Second Monitoring Report. The Estufa Dos por Tres includes a few important structural modifications relative to the original La Justa stove: First, the grate in the stove mouth has been raised slightly in order to raise the fuel off the stove floor, thus making the wood burn more thoroughly and efficiently. Second, the dimensions of the steel cooktop *(plancha)* have been changed, allowing the *plancha* to heat up faster and distribute the heat more evenly than before. Third, the *plancha* has been lowered closer to the level of the wood ash insulation in order to use the firepower of the stove more efficiently. From the user's point of view the Estufa Dos por Tres is functionally the same stove as the traditional *fogon,* and PM staff have observed that it has been positively received by the beneficiaries.

PM donates to each beneficiary the steel cooktop (*plancha*), the chimney and chimney top, and the six custom ceramic pieces for the stove mouth or firebox, and the installation and training. These components are sourced and manufactured locally in Santa Barbara Province, creating local jobs through eight material provider businesses. Beneficiaries contribute the remaining components, including cement, rebar, bricks, adobe blocks and wood ash, all of which are common items available in all villages of Honduras. This cost-sharing arrangement is part of PM's philosophy of *"No Cuesta, No Cuida,"* which asserts that beneficiaries will better care for their donated stove if they invest some of their own resources in its acquisition. Old stoves are removed at the time the new Estufa Dos por Tres stoves are installed.

Traditional La Justa stove **New Estufa Dos por Tres stove**

3. Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.).

Construction of stoves for the crediting period began on May 1, 2009 and will continue through April 30, 2019. Construction of fuel-efficient stoves by Proyecto Mirador began in June, 2004.

Qualitative surveys conducted by Proyecto Mirador in 2011 indicate Estufa Dos por Tres stoves are used in homes an average of 6.5 hours per day, every day. We expect stoves to operate in homes for the duration of 5-7 years, after which time they will be retired and replaced.

The stoves are not all installed at the start of the project, but are installed progressively during the 10-year crediting period. The chart on the following page reflects an actual installation rate of 3,489 stoves in Year 1 (1 May 2009 – 30 April 2010); 5,524 stoves in Year 2 (1 May 2010 – 30 April 2011); and subsequent years adjusted according to current growth projections. Our estimates reflect Proyecto Mirador's growing experience as an organization, and also the success of Proyecto Mirador's *Programa de Contratistas* (Associates Program) in scaling the project. In this microenterprise program, entrepreneurs are trained and paid by Proyecto Mirador to build and install Estufa Dos por Tres stoves under Proyecto Mirador's leadership and verification. Scaling the project at currently projected rates will create additional jobs for more *Contratistas* and Stove Technicians; Proyecto Mirador supervisors; material suppliers; IT providers and other support organizations. Proyecto Mirador is counting on proceeds from the sale of Gold Standard certified carbon credits to fund the added employees and stove building materials.

In this way Proyecto Mirador will continue to expand its own operations and support our partners through the *Programa de Contratistas.* Using carbon finance we are empowering stove builders to expand their operations, ultimately resulting in an overall expansion of the stove industry.

Total emission reductions estimated for the crediting period.

The results of the 2010 Paired Fuelwood Consumption Study determined that each Estufa Dos por Tres generates actual emissions reductions of 2.73 $mtCO_2e$ /year. All calculations set forth herein are based on an emissions reduction of 2.73 $mtCO_2e$ /year per stove. (Verification of the Second Verification Period will be confined to the figures presented in Section E.4 of this report.)

Crediting Year (May 1 – April 30)	Average Number of Net Stoves in Operation	Annual estimation of emission reductions ($mtCO_2e$)
1 (A)	1,692	4,625
2 (A)	5,899	15,577
3 (E)	15,506	40,541
4 (E)	32,906	84,611
5 (E)	42,092	103,081
6 (E)	39,310	89,724
7 (E)	34,859	73,369
8 (E)	27,988	53,385
9 (E)	17,434	29,492
10 (E)	5,479	7,900
Total estimated reductions for the crediting period ($mtCO_2e$)		**502,304**
Total number of crediting years		10
Annual average over the crediting period of estimated reductions ($mtCO_2e$)		50,230

Table 1

Table 1 above shows the total estimated emissions reductions of the project activity in the 10-year crediting period (1 May 2009 - 30 April 2019). The figures in Table 1 are revised to reflect realistic expectations of capital and project capacity. The result is based on an estimate of the reduction in GHG emissions of 2.73 $mtCO_2e$/year per stove, which compares the baseline wood consumption from the 2010 Paired Fuelwood Consumption Study against paired data for the project scenario (using the Estufa Dos por Tres). It then applies emission factors measured in laboratory tests (Aprovecho, April 28, 2009), and adjusts for an NRB fraction explored and quantified within the Yale 2007 Study as well as the Yale 2009 Study.

The estimates above also account for dropoff estimates based on 2011 survey results (see attached ANNEX 1: "A01_Dropoff Summary 2011") and a stove degradation rate of 6% (See "ANNEX 2: "A02_Aging Stove KT Report 2011.docx" and ANNEX 3: "A03_Aging Stove KT 2011 Raw Data.xls") increasing appropriately by year. The numerical analysis can be found in ANNEX 4: "A04_REVISED Financing Plan 2011.xls" (see "CO2 Projections" worksheet, Rows 107 and 121). The table above is meant only as an estimate, and the actual emission reductions for the Second Verification Period are calculated and reported in Table 2 in Section E.4 of this Second Monitoring Report v.3. Dropoff estimates are substantiated in Parameter ID 11; and the 6% aging factor (degradation rate) is substantiated in Section E.4.

A.2. Project Participants

Project Participant is a non-profit organization, Proyecto Mirador Foundation, which intends to use the sale of VERs along with donations to install improved stoves in Honduras. In 2004, the Overlook International Foundation (OIF), a U.S.-based 501(c)3 corporation, created Proyecto Mirador LLC (PM), a registered charity in Honduras led by Doña Emilia Giron de Mendoza. Together the two organizations initiated a program to reduce indoor air pollution by disseminating improved Estufa Dos por Tres wood stoves into poor, rural homes in the highlands of Western Honduras in Santa Barbara Province.

In 2010 this corporate structure was revised as follows: Proyecto Mirador Foundation was established as a separate entity with $2M in capital ($1M from The Grantham Foundation for the Protection of the Environment and $1M from the Overlook International Foundation). Proyecto Mirador Foundation subsequently replaced OIF as the Sole Member and funding entity for Proyecto Mirador LLC. Proyecto Mirador Foundation's official date of establishment as a 501(c)(3) non-profit organization is June 10, 2010.

Since inception in early 2004 PM has installed over 25,000 stoves for individual families, built an efficient organization that has provided employment for 70 direct and indirect employees, and overcome the challenges of executing a successful stove project.

Richard H. Lawrence Jr., Managing Director of Proyecto Mirador Foundation, is also the Executive Director of Overlook Investments Limited, an investment management business headquartered in Hong Kong. Richard founded the organization over 20 years ago. Overlook Investments Limited invests in public listed equities in Asia. Dee Lawrence and Esther Adams also help manage the activities of OIF and PM.

A.3. Location of the project activity:

Complete information of the location of the project activity: town, city, country and GPS coordinates.

Country: Honduras
Region: Western Highlands
Stoves are being distributed to the Western Highlands of Honduras in the four provinces of Santa Barbara, Copan, Lempira, and Intibucá.

GPS Coordinates for the center of operations for the project are:
Latitude 14º 55' 26" N
Longitude 88º 13' 44" W

The following statistics reflect 2010 census figures as quoted from:
http://www.citypopulation.de/Honduras.html

Santa Barbara (SBA)
Capital – Santa Barbara
Population 402,400

Copan (COP)
Capital – Santa Rosa de Copán
Population 362,200

Lempira (LEM)
Capital – Gracias
Population 315,600

Intibucá (INT)
Capital – La Esperanza
Population 232,500

Number of municipalities in each province:
Santa Barbara – 28
Copan – 23
Lempira – 28
Intibucá – 17

Proyecto Mirador – Area of Operations

In addition to the boundaries described above (and already Registered by the Gold Standard), Proyecto Mirador intends to petition the Gold Standard in 2012 to expand its project boundary to include other areas of Central America which otherwise meet our cluster definition.

A.4. Technical description of the project

Description of the technology applied in the project activity and detailed technical process, including diagrams.

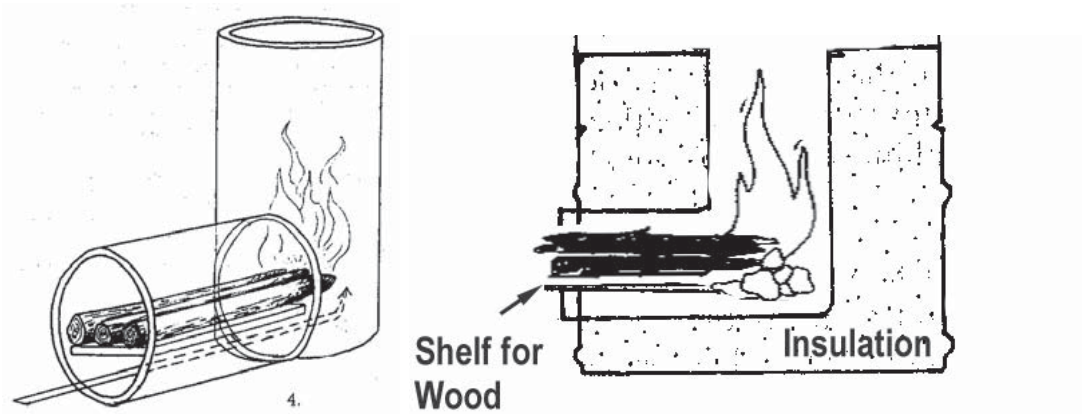
The original La Justa fuel-efficient stove was invented by Dr. Larry Winiarski of Aprovecho Research Center in association with Trees, Water and People, a non-profit organization headquartered at Fort Collins, Colorado. The La Justa stove was specifically designed for Honduran cooking habits and optimizes cooking temperatures by placing the *plancha* (reinforced steel rectangle cooktop) at the hottest point above the combustion chamber, and using the conductivity of the metal plancha to spread the heat evenly over the cooking surface. Compared with other stove alternatives, the La Justa stove is an effective and easily assimilated replacement for the traditional *fogon* type of stove already prevalent in Honduras.

The La Justa stove combines an adaptation of clean combustion principles (known as Rocket Elbow technology) to the local cooking practices of Honduran families. The rocket elbow is an easy-to-build, highly adaptable and inexpensive cooking device characterized by a hollow, L-shaped shaft made of ceramic that acts as the combustion chamber. The firebox sits in an adobe or brick container and the space around the elbow and within the container is filled-in with wood ash or other lightweight insulation.

Rocket Elbow technology uses a grate under the fire to enable air to pass under the fuel source. Optimum results are achieved when the air passes under the shelf and through the coals so that when it reaches the fire it is preheated to help the gases reach complete combustion.

The key advantages of the La Justa stove technology are:

1) The design promotes the flow of air across the wood, into the firebox and out the chimney. This improves the efficiency of the combustion and removes the smoke from the house.
2) The small size of the firebox encourages beneficiaries to utilize small pieces of wood or alternative fuel sources such as corncobs and reduces wood consumption.
3) The La Justa allows beneficiaries to use identical cooking habits, which permits quick and easy cultural adoption of the stove.



More information can be found in the Aprovecho publication, "Design Principles of Wood Burning Cook Stoves," at the following address: http://www.aprovecho.org/lab/pubs/arcpubs.

The Estufa Dos por Tres uses all the principles of Larry Winiarski's technology, but with a few important design and structural improvements that maximize the reduction of GHG emissions reduction. First, the grate in the stove mouth has been raised slightly in order to raise the fuel off the

stove floor, thus making the wood burn more thoroughly and efficiently. Second, the dimensions of the steel cooktop *(plancha)* have been adjusted, allowing the *plancha* to heat up faster and distribute the heat more evenly than before. In addition, the *plancha* has been lowered closer to the level of the wood ash insulation in order to use the firepower of the stove more efficiently. Also, a maintenance tool called the *Cinco* has been introduced to help stove users carry out the comprehensive cleaning and maintenance of the stove. Lastly, stove beneficiaries are thoroughly educated on the use of the stove during five separate training sessions, and through written materials that are left behind. From the user's point of view the Estufa Dos por Tres is functionally the same stove and PM staff have observed that it has been positively received and easily assimilated by the beneficiaries.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

According to the Gold Standard Tool Kit the project fits into the category of:
End-use Energy Efficiency Improvement category is defined as the reduction in the amount of energy required for delivering or producing non-energy physical goods or services.

The project uses Gold Standard approved baseline and monitoring methodology: *Methodology for Improved Cook-stoves and Kitchen Regimes,* Version 01.

This methodology is applicable to programs or activities introducing improved cook-stoves and practices to households within a distinct geographical area. The project activity is implemented by a project coordinator who acts as a project participant. The individual households will not act as project participants.

The methodology addresses the switch from cook-stoves and kitchen regimes used in domestic homes having significant greenhouse gas emissions to those having considerably less or zero emissions.

Reference and version of the baseline.

The baseline scenario reflects that each household uses a traditional *fogon* stove prior to becoming a project beneficiary, and assumes that installation of the new improved stove has not yet occurred. This scenario is captured by assessing fuel wood supply, wood consumption patterns and environmental behaviors among households that use traditional wood stoves. These data define the baseline situation, which we use to characterize conditions that would prevail in the absence of the project activity. The baseline is defined based on the assumption that, in the absence of PM's activity, all households in the community would continue to utilize the traditional *fogon.* Their fuel consumption is defined in the KT discussed above, and is applied to the entire population.

The population sampled in quantitative field-testing in the 2010 n=55 Paired Fuelwood Consumption Study showed a mean household size of 3.64 adult equivalent persons. Baseline fuelwood consumption totaled 1.26 kg per adult equivalent person-meal (as opposed to the project scenario of 0.59 kg). Raw data for both baseline and project scenarios are attached in ANNEX 5: "A05_PM Fuel Usage Study Data 2010.xls" and a summary description of the study is attached in ANNEX 6: "A06_PM Fuel Usage Study Summary Report 2010.pdf." The original data collection sheet used in the study is provided as ANNEX 7: "A07_PM Fuel Usage Study Data Sheet SPANISH.pdf" and an English translation of the data collection sheet is attached as ANNEX 8: "A08_PM Fuel Usage Study Data Sheet ENGLISH.pdf." The study was conducted according to guidelines provided to Proyecto Mirador by Prof. Robert Bailis of the Yale School of Forestry & Environmental Studies and those guidelines are attached as ANNEX 9: "A09_PM Fuel Usage Study Guidelines.pdf."

A similar study was carried out in 2011 using the same guidelines and identical data sheets, but conducted for 1-year-old stoves. This Aging Stove KT confirmed a degradation of 6% in the first year (see "ANNEX 2: "A02_Aging Stove KT Report 2011" and ANNEX 3: "A03_Aging Stove KT

2011 Raw Data"). The results are substantiated in Section E.5.

The previous estimate of 2.23 mtCO_2e /year as stated in the PDD was based on prior baseline studies (Yale, 2007, and Aprovecho, 2009), as the 2010 Paired Fuelwood Consumption Study had not yet been undertaken at the time of project submission for Registration to the Gold Standard. Approval of our First Verification confirms that the results of the 2010 Paired Fuelwood Consumption Study should replace all previous data as contained in the PDD, for both baseline and project scenarios, as it confirms accurate fuelwood savings at a greater confidence level than any previously available data due to the large sample size, paired design, and field testing.

The cluster is defined as one cluster for poor, rural households in the hillside communities of the Western Highlands of Honduras defined as traditional Fogon users that rely on woody biomass fuels and the project focuses on this group exclusively.

Since the baseline social, economic, and environmental conditions are not likely to consistently improve during the crediting period, a fixed baseline will be used for the duration of the crediting period.

A.6. Registration date of the project activity:

29 June, 2010

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

The crediting period is stated as May 1, 2009 through April 30, 2019.

A.8. Name of responsible person(s)/entity(ies):

Richard H. Lawrence, Director
rlawrence@overlookinv.com
(415) 464-9590

Dee M. Lawrence, Director
dlawrence@proyectomirador.org
(415) 461-6162

Esther L. Adams, Program Manager
eadams@proyectomirador.org
(415) 464-9590

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

1. The starting date of operation of the project activity. For project activities that consist of more than one site, the report shall clearly describe the status of implementation and starting date of operation for each site. For GS project activities with phased implementation, the report shall indicate the progress of the proposed GS project activity achieved in each phase.

The starting date of operation of the project activity was 1 May, 2009. The geographic scope of the project is limited to the defined project boundary. The project boundary for the distribution of the La Justa stoves is Honduras, and to date the project area has encompassed the following four provinces in the Western highlands of Honduras: Santa Barbara, Copan, Lempira and Intibucá.

2. The information regarding the actual operation of the project activity during this monitoring period, including information on special events, for example overhaul times, downtimes of equipment, exchange of equipment, etc.

The PDD assumes a project build rate of 3,500 stoves during the first year of the crediting period, with the build rate increasing by 8% per year for each subsequent year of the crediting period. The project is ahead of schedule in meeting its objectives as stated in the PDD.

Proyecto Mirador has revised its projections as follows: An actual number of 3,489 stoves were installed during the first year of the crediting period (1 May 2009 – 30 April 2010), and an actual number of 5,524 stoves were installed during the second year of the crediting period (1 May 2010 – 30 April 2011). Subsequent years are adjusted according to current growth projections. The numbers used for emission reduction calculations in this document are based on net stoves in operation (rather than the gross number of stoves built), and adjusted for dropoff and stove degradation rates, increasing appropriately by year.

3. A brief description of: (i) events or situations that occurred during the monitoring period, which may impact the applicability of the methodology, and (ii) how the issues resulting from these events or situations are being addressed.

The project has been and will continue to be subject to typical monthly variability resulting from factors such as: (1) availability of raw materials; (2) weather; (3) holidays; (4) project cycle for building and installation; (5) research activities in line with Gold Standard requirements; and (6) availability of personnel. We consider the above variables to be normal in scope, and none should impact the applicability of the Monitoring Methodology.

B.2. Revision of the monitoring plan

The monitoring plan was revised as of 15 June, 2010 and was approved on 29 June, 2010. The monitoring plan is set forth here with changes from the PDD Version 4. The Gold Standard's final approved Registration Review was posted to the Gold Standard Registry on 29 June, 2010, signifying the official date of project Registration.

Future changes to the monitoring plan involve utilizing an electronically based monitoring system which is currently in the development stage. The overall system will remain unchanged while our recording mechanisms will be streamlined. The new monitoring system will be applicable to the Third Verification Period and thus, is not applicable to this Second Monitoring Report.

B.3. Request for deviation applied to this monitoring period

There are no requests for deviation applicable to this monitoring period.

B.4. Notification or request of approval of changes

There have been no changes in the project activity and thus, no request for approval of changes.

SECTION C. Description of the monitoring system

Proyecto Mirador's Monitoring System includes extensive training of stove beneficiaries at various stages in the process, including Community Meetings staged before and stove construction; training at the time of stove construction; and Followup Visits after stove construction. The Monitoring System also includes a database of all stoves installed; routine inspection of stoves; as well as systematic data collection and reporting of surveys to assess Leakage and Sustainability. Additional studies are carried out to maintain the accuracy of emissions reduction reporting, including an Aging KT Survey to assess quantitative fuelwood consumption and quantify emissions; and a Usage Survey to assess dropoff. The details of the system are described below.

Formerly, and as described in the First Monitoring Report, our Community Organizers conducted Community Meetings before and after stove construction. However, with the expansion of our *Programa de Contratistas* we have divided the responsibility of community preparation and training between our *Contratistas* and Supervisors. Specifically, our *Contratistas* perform the up-front communication, organization and training to prepare the villages for installation, whereas the PM Supervisors are responsible for all followup and training visits to the beneficiaries. We no longer conduct Community Meetings after construction; these have been replaced with Followup Visits to each beneficiary. These changes are reflected appropriately in the description to follow.

Prior to the commencement of stove construction in each community, PM's *Contratistas* (stove construction team foremen) conduct a Community Information Meeting to prepare the beneficiaries for installation. At that meeting stove beneficiaries are introduced to the structural and functional aspects of the Estufa Dos por Tres and provided with an initial overview of stove use and maintenance. At that time beneficiaries are also instructed to obtain the materials they must contribute for stove construction.

Following the Community Information Meeting, Stove Technicians also provide extensive training to individual beneficiaries upon installation of each Estufa Dos por Tres stove, and training materals are left behind with each beneficiary at that time. All training materials are visually oriented to accommodate for the high rate of illiteracy among stove beneficiaries. The photo below shows a new Estufa Dos por Tres owner holding the training brochure provided by PM upon stove installation.

Four to six weeks after construction is completed in each community, PM's Supervisors perform Followup Visits to the home of each stove beneficiary. (These individual visits replace what was formerly accomplished by our Community Organizers at a Community Followup Meeting, and we find that these one-on-one visits have been more effective in ensuring the proper training of the beneficiaries). In these Followup Visits, PM Supervisors review the training initially provided by the Technicians upon installation. PM Supervisors also take this opportunity to ensure that the stoves are functioning properly and to address all individual concerns and issues that may arise.

All Followup Visits are scheduled according to a central calendar that is managed in Proyecto Mirador's operations office and systematically follows Proyecto Mirador's schedule for stove installation to ensure proper timing for followup.

PM Supervisors also carry out a statistically significant number of more extensive surveys in order to assess Leakage and ensure continued compliance with the Gold Standard's Sustainability requirements. These surveys are further elaborated below in the section *Installation Record, Leakage & Sustainability Monitoring.* The current leakage and sustainability survey form is attached as ANNEX 10: "A10_Leakage-Sustainability Survey SPANISH" and in translated form as ANNEX 11: "A11_Leakage-Sustainability Survey ENGLISH." PM's Supervisors also oversee inspections of stoves that have been built in the Gold Standard crediting period to ensure that the quality of operation and handling is of the required standard. When necessary, Supervisors replace defective stove parts or instruct *Contratistas* and Stove Technicians to do so.

Before conducting any meetings or surveys, our Supervisors as well as our *Contratistas* and Stove Technicians are extensively trained. They spend ample time in the field learning to build stoves and learning all aspects of the stove's operation and the management of Proyecto Mirador. This training process generally takes longer than a month to complete. Training Materials have been developed to facilitate the training process, and training procedures are constantly under review for further improvements.

The work of the Supervisors and *Contratistas* is subject to audit by Elder Mendoza, Chief Operating Officer, and Emilia Mendoza, President of Proyecto Mirador LLC. The objective of the reviews is to ensure that the stove construction, training of the beneficiaries, and the collection of monitoring information are being completed in an accurate and timely manner, as well as to support any ongoing third party verification as part of the Gold Standard certification.

Because the number of *Contratistas* and the project build rate expand in direct proportion to each other, we continue to have the capacity to provide Community Information Meetings and Followup Visits in proportion to the needs of the beneficiary communities. We are thus able to expand at a rate sufficient to provide timely followup and monitoring for all beneficiary communities, with Followup Visits conducted four to six weeks following completion of stove construction in each community. At the current stove build rate, five Supervisors are sufficient to sustain the collection of Leakage and Sustainability data at a statistically significant level and to oversee the ongoing inspection of existing stoves. As the capacity of each Supervisor is reached, PM will continue to employ additional personnel to meet operational standards. When necessary, PM will also employ outside resources to assist with research and analysis. Such resources may include the Regional Stove Testing Center at Zamorano University, Aprovecho Research Center and Yale University, to name a few.

Since ongoing research is a vital component of a successful Gold Standard project, having solid "on-the-ground" resources is a critical advantage for PM. Recommendations from the beneficiaries as to functional improvements are explored and researched, then implemented if appropriate.

In December 2011 our monitoring data will be collected on handheld devices and managed using Salesforce.com software custom developed for Proyecto Mirador. The monitoring process will remain unchanged other than the mechanisms for collection and reporting.

Installation Record, Leakage & Sustainability Monitoring:

PM keeps a sales record (installation database) of every stove contructed. PM's sales record is called the Database of Beneficiaries and includes the family name, ID number, location, and date of construction for all the households that receive a stove. This information has been tracked since the inception of the project in 2004. Homes in rural Honduras do not have specific street addresses, and most do not have fixed or mobile telephone lines. Thus the majority of the households are not identified by street as much as by village, neighbourhood, and surname.

Our sales record for the First Monitoring Period is attached as ANNEX 12: "A12_Sales Record 120110-113011.xls" and includes a summary of stoves built each month from 1 December 2010 through 30 November 2011.

The actual number of stoves built during the Second Monitoring Period (1 December 2010 through 30 November 2011) is 10,509.

In the Followup Visits described above, PM's Community Organizers review the training provided by the Technicians upon installation and answer individual questions to ensure that the stoves are functioning properly.

In addition, PM's Supervisors carry out a statistically significant number of more extended Leakage and Sustainability Surveys in order to assess Leakage and Sustainability issues as recorded in the PDD (Sections a, b, d, and e) and Passport Section G (#1, Air Quality; #7, Livelihood of the Poor; and #9, Human and Institutional Capacity).

Examples of questions covered with the Leakage and Sustainability Surveys are as follows:

- Number of People in home
- Estimated wood consumption per day (with the traditional *fogon* and with the new Estufa Dos por Tres)
- Length of time Estufa Dos por Tres stove is in use each day
- Presence of any other alternative type of stove in the house
- Percent of time spent cooking with wood
- Source of wood (bought or collected)
- Effectiveness of maintenance

The Leakage and Sustainability Surveys have been designed with the assistance of Professor Robert Bailis at the Yale School of Forestry and Environmental Studies and Professor Timothy Longwell from Zamorano University in Honduras, and PM, and the results are tabulated in an annual report.

124 monitoring surveys have been conducted during the Second Verification Period that include leakage, sustainability and qualitative fuelwood use data. The results of these 124 surveys have been compiled and reported herewith, and are attached as ANNEX 13: "A13_Leakage and Sustainability Results 2011.xls."

Sustainability Analysis

Since inception Proyecto Mirador has been a clear leader in sustainable development. First, beneficiaries enjoy the health benefits of reducing indoor air pollution as smoke is diminished by cleaner burning stoves and channelled outside the home through effective chimneys. Second, Proyecto Mirador continues to create stable, safe jobs with competitive salaries within communities where opportunities for full-time employment are exceedingly rare and working conditions are generally substandard at best. Third, Proyecto Mirador is passing along sustainable technology to its employees through on-the-job training, as well as to its beneficiaries through rigorous education in the training and maintenance of stoves. Fourth, deforestation is slowed due to the reduction in

fuelwood of the Estufa Dos por Tres. This is particularly important in Honduras, which boasts the fourth largest rainforest in the world, and where deforestation is occurring at an alarming rate. Beneficiaries enjoy a greater amount of time to devote to activities other than collecting wood, and/or are relieved of a corresponding part of the financial burden of purchasing wood.

In addition to the benefits listed above, it should be noted that there is no evidence that Proyecto Mirador has any negative effects on sustainability. All sustainability parameters will be monitored as outlined in Parameters ID 14, ID 15, and ID 16 of this Monitoring Report.

Annually, Proyecto Mirador's Management Team will report on the Passport's Sustainability Monitoring Plan, Section G, including assessment of #6, Quality of Employment, by means of an annual employee survey, and #10, the Quantitative Employment and Income generation of the project, is addressed in an annual report on the quantity and type of jobs created by the project. Income figures are confidential and, as such, are not included in this report; however, all employees are paid at or above the minimum wage, and Proyecto Mirador has provided the Verifier with a complete list of current salaries by employee type.

The results of our October 2011 annual employee survey are attached as ANNEX 14: "A14_Employee Questionnaire Summary 2011.xls" and the survey itself is attached as ANNEX 15: "A15_Employee Questionnaire.doc." Quantitative Employment is reported in ANNEX 16: "A16_Quantitative Employment.pdf."

#12, Technology Transfer, includes training on stove use, technology, and installation. The employees who construct stoves all undergo a paid training period. Stove beneficiaries also receive training and instruction in the new stove technology, up to as many as five times, to ensure proper use and maintenance of the Estufa Dos por Tres. Proof of technology transfer to beneficiaries lies in the fact that they are able to keep stoves working well because they understand how the stoves work. Training is performed on an ongoing basis for all stove recipients as follows:

- The first round of training is conducted by PM's *Contratistas* at the time the community is first introduced to Proyecto Mirador and the Estufa Dos por Tres. This takes place at the Community Information Meeting, at which the major components of maintenance are introduced and beneficiaries are informed of their responsibilities to correctly operate the stove.

- The Technicians carry out the second round of training. The Technicians, who build the stoves, are in charge of providing Beneficiaries with a comprehensive training on the use of the stoves upon installation. Technicians carry notes to assist with following a standard training procedure, and brochures are left behind with full details of the stove's operation and maintenance.

- PM Supervisors carry out the third round of training in a series of house to house Followup Visits, four to six weeks after the completion of construction in each community, to review the training provided by the Technicians and ensure that the stoves are functioning properly. Checklists and surveys are used at this time to address all concerns and issues that may arise and insure the beneficiaries are following continued proper maintenance of the stoves.

- PM Supervisors continue to follow up with stove beneficiaries as needed, up to two additional times beyond the third round of training, in order to insure that stoves are being properly used and maintained.

Project beneficiaries are consistently informed that Proyecto Mirador owns all carbon credits issued as a result of emission reductions from all stoves installed. This is first articulated at the Community Meetings staged before stove construction begins in each area, then reiterated when beneficiaries are individually trained. The PM Training Brochure given to stove beneficiaries also includes a written

statement of Proyecto Mirador's ownership of carbon credits, and the consent of all beneficiaries is required as a precondition to stove installation. The training brochure is attached as ANNEX 17: "A17_Training Brochure.pdf" and the translation of the relevant clause (at bottom of the brochure) is as follows:

> "By accepting a new stove from Proyecto Mirador, you agree that any reductions in CO_2 emissions created by the stove are the property of PM."

Additional Studies:

Aging Stove KT Survey: Quantitative Fuelwood Consumption Study

A quantitative Fuelwood Consumption Study will be conducted biennially in order to determine whether there is a decline in stove efficiency as determined by a change in fuelwood usage. An appropriately sized sample group will be drawn from the same 55 homes surveyed in the original 2010 Paired Fuelwood Consumption Study described above. The biennial follow-up survey will account for any changes in the number and ages of household members. We will ask questions including: "What is your family size?" and "What is the age and gender of each household member?" and will also perform wood weighing over 4 days, similar to the original study, to determine if fuel use patterns have changed. The next such followup survey will be conducted in 2012.

(In fact we completed our first Aging Stove KT in August 2011 and the results are reported herewith.)

Aging Stove KT Survey: Emissions Test

Emission factors for CO2, CH4 and N2O were determined in the Aprovecho lab tests for traditional and La Justa stoves.

Gold Standard Methodology states as follows: "If IPCC defaults are not used, testing of EFs of new stoves is only required if there is evidence that the new stove may give rise to significantly different EFs leading to possible over-estimation of emission." (Methodology for Improved Cook-stoves and Kitchen Regimes V.01, footnotes for pp. 24 & 25)

Thus, further monitoring is not required, as the fixed baseline emission factors remain constant throughout the project period.

Usage (Drop-off) Survey

As per Gold Standard methodology, PM will conduct a biennial Usage Survey of a statistically relevant number of beneficiaries with stoves that were built during the First Verification Period (1 May, 2009, to 30 April, 2010) to determine whether or not they are still using the La Justa stove, and to assess why or why not. The quantification of carbon emissions will systematically account for usage drop-off according to the results of the Usage Survey.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	**ID 1/ $X_{nrb,bl,y}$**
Data unit:	%
Description:	The non-renewable fraction of the woody biomass harvested in the project collection area in year y in the baseline scenario
Source of data used:	Yale 2007 Study and Yale 2009 Study
Value applied:	59%
Indicate what the data are used for (Baseline/Project/ Leakage emission calculations)	Baseline
Justification of the choice of data or description of measurement methods and procedures actually applied:	The Yale 2007 Study relied upon a qualitative study of households and their experience and observations of fuelwood sources, forest conditions and changes over time. Based on anecdotal descriptions of the state of the forests in the area there is evidence that the forest cover in the region is declining. If we take an average of the respondents that primarily rely on forest sources, weighted by household consumption reported in the qualitative survey, we find roughly 59% of fuel consumed is unsustainable. Given the resources and information available to the project this rate of NRB is a reasonable estimate of the renewability of woody biomass in the region
Any comment:	

Data / Parameter:	**ID 2/ $B_{bl,y}$**
Data unit:	T woody biomass/year/household
Description:	The mass of woody biomass consumed during cooking in the baseline scenario
Source of data used:	2010 Paired Fuelwood Consumption Study
Value applied:	3.87 tonnes per household
Indicate what the data are used for (Baseline/Project/ Leakage emission calculations)	Baseline
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data obtained during the 2010 Paired Fuelwood Consumption Study. The number 3.87 was calculated by taking the average fuelwood consumption for the baseline scenario expressed in kg per day, multiplying by 365 days/year and converting to metric tonnes.
Any comment:	Value above (3.87) differs from the value in the PDD (3.97) because the PDD was based on the Yale 2007 Study. Baseline information used in the PDD has been replaced with data obtained in the 2010 Paired Fuelwood Consumption Study as described in

	Section A.5 of the Monitoring Report.

Data / Parameter:	**ID 3/ $EF_{bl,bio,co2}$**
Data unit:	tCO_2/t woody biomass
Description:	The CO_2 emission factor for use of the biomass fuel in the baseline scenario
Source of data used:	Aprovecho Stove Test (28 April 2009)
Value applied:	87.6 g/MJ is the emission factor measured in laboratory testing of traditional fogon stoves.
Indicate what the data are used for (Baseline/Project/Leakage emission calculations)	Baseline
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data is obtained by use of the net calorific value (NCV) of wood 18.6 MJ/kg., the calorific value listed for Red Oak (the common fuel used in Honduras) in Cheremisinoff, N. (1980), *Properties of Wood*; Wood for Energy Production. Ann Arbor, MI, Ann Arbor Science: 31-43 (cited in Aprovecho 2009 Study, p. 2).
Any comment:	

Data / Parameter:	**ID 4/ $EF_{bl,bio\ nonCO2,CH4}$**
Data unit:	tCH_4/t woody biomass
Description:	The CH_4 emission factor for use of the biomass fuel in the baseline scenario
Source of data used:	Aprovecho Stove Test (28 April 2009)
Value applied:	0.47 g/MJ is the emission factor measured in laboratory testing of traditional fogon stoves.
Indicate what the data are used for (Baseline/Project/ Leakage emission calculations)	Baseline
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data is obtained by use of the net calorific value (NCV) of wood 18.6 MJ/kg.
Any comment:	

Data / Parameter:	**ID 5/ $EF_{bl,bio,nonCO2,N2O}$**
Data unit:	t N_2O /t woody biomass
Description:	The N_2O emission factor for use of the biomass fuel in the baseline scenario
Source of data used:	Aprovecho Stove Test (28 April 2009)
Value applied:	0
Indicate what the data are used for (Baseline/Project/ Leakage emission calculations)	Baseline
Justification of the	

choice of data or description of measurement methods and procedures actually applied:	
Any comment:	N_2O emissions are de minimis.

Data / Parameter:	**ID 6/ $EF_{pe,bio,co2}$**
Data unit:	tCO_2/t woody biomass
Description:	The CO_2 emission factor for use of the biomass fuel in the project scenario
Source of data used:	Aprovecho Stove Test (28 April 2009)
Value applied:	98.3 g/MJ is the emission factor measured in laboratory testing of Estufa Dos por Tres model stoves.
Indicate what the data are used for (Baseline/Project/ Leakage emission calculations)	Project
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data is obtained by use of the net calorific value (NCV) of wood 18.6 MJ/kg.
Any comment:	

Data / Parameter:	**ID 7/ $EF_{pe,bio\ nonCO2,CH4}$**
Data unit:	tCH_4/t woody biomass
Description:	The CH_4 emission factor for use of the biomass fuel in the project scenario
Source of data used:	Aprovecho Stove Test (28 April 2009)
Value applied:	0.05 g/MJ is the emission factor measured in laboratory testing of traditional fogon stoves.
Indicate what the data are used for (Baseline/Project/ Leakage emission calculations)	Project
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data is obtained by use of the net calorific value (NCV) of wood 18.6 MJ/kg
Any comment:	

D.2. Data and parameters monitored

Data / Parameter:	**ID 8 / Stove Sales**
Data unit:	Number of stoves
Description:	Identification of household that has received an Estufa Dos por Tres stove.
Measured/Calculated/ Default:	Measured
Source of data to be used:	Installation record database ("Database of Beneficiaries")
Value(s) of monitored parameter:	**17,390** total stoves, as follows: • 6,621 stoves installed in the First Verification Period (1 May 2009 – 11 November 2010) • 10,509 stoves installed in the Second Verification Period (1 December 2010 – 30 November 2011)
Description of measurement methods and procedures to be applied:	The electronic database will hold the following information for each household: - Installation record - Date of installation - Location of installation - Name of beneficiary - Note presence of old stove in the household if applicable.
QA/QC procedures to be applied:	PM Supervisors shall provide complete stove installation records by month to PM's Honduras office, where the records will be compiled, computerized, and in turn reported monthly to the California office where the Master Sales Database will be maintained.
Any comment:	Parameter ID 8 in the PDD reported as the Value of monitored parameter: "3,500 stoves installed in year one and an installation rate that increases 8% annually." In the First Monitoring Report this value was modified under "Value of Monitored Parameter" above to 6,621 to reflect the actual number of stoves that were installed during the First Verification Period. In this Second Monitoring Report we have added 10,509 as the total number of stoves built during the Second Verification Period. All stoves installed will be the "Estufa Dos por Tres" (formerly named the "La Justa Model Dos por Tres") and all will replace a traditional *fogon*. Therefore, the items "Model/type of stove installed" and "Model of use prior to installation of the Estufa Dos por Tres" will not specifically be tracked on the Master Sales Database as was reported in Parameter ID 8 on the PDD.

Data / Parameter:	**ID 9 / $B_{,pj,y}$**
Data unit:	Tonne
Description:	Fuelwood consumed per household per year (This is the mass of woody biomass consumed during cooking in the project in year y in tonnes per year per household by users of the Estufa Dos por Tres stove aged one year or less.)
Measured/Calculated/	Measured

Default:	
Source of data to be used:	Biennial Fuelwood Consumption Study (Aging Stove KT).
Value(s) of monitored parameter:	2,126.47 kg
Description of measurement methods and procedures to be applied:	Biennial survey of tonnes of woody biomass per year per household consumed by beneficiaries, to determine whether there is a decline in stove efficiency as determined by a change in fuel wood usage. An appropriately sized sample group will be drawn from the same 55 homes as surveyed in the 2010 Paired Fuelwood Consumption Study.
QA/QC procedures to be applied:	We will ask questions including: "What is your family size" and "What is the age and gender of each household member?" and will also perform wood weighing over 4 days, similar to the original study, to determine if fuel use patterns have changed.
Any comment:	We acknowledge an error in the PDD, in which 2.73 mtCO2e/yr was reported as the Value of the Monitored Parameter for ID 9. This error was pointed out by SGS and we have adjusted the above value accordingly. 2.73 mtCO2e/yr was calculated on the basis of 2.126.47 kg; therefore, the monitored parameter of 2,126.47 kg was moved to the "Value of Monitored Parameter" section above for the First Monitoring Report.

Data / Parameter:	**ID 10/ $EF_{pj,bio,co2}$**
Data unit:	tCO_2/tonne woody biomass
Description:	The CO_2 emission factor for use of the biomass fuel in the project scenario in tonnes CO_2 per tonne of woody biomass fuel.
Measured/Calculated/ Default:	Calculated
Source of data to be used:	If the Verifier deems it necessary (as indicated by the Verifier's belief that there has been a significant change in this parameter), a laboratory study will be conducted biennially to measure the CO_2 emission factor of woody biomass consumption in the project boundary.
Value(s) of monitored parameter:	98.3 g/MJ is the emission factor measured in laboratory testing of Estufa Dos por Tres model stoves.
Description of measurement methods and procedures to be applied:	Data is obtained by use of the net calorific value (NCV) of wood 18.6 MJ/kg. Value will be measured by same method biennially only if Verifier determines it necessary.
QA/QC procedures to be applied:	N/A
Any comment:	Per Gold Standard Methodology: "If IPCC defaults are not used, testing of EFs of new stoves is only required if there is evidence that the new stove may give rise to significantly different EFs leading to possible over-estimation of emission."

Data / Parameter:	**ID 11/ Continued use of stoves over time**
Data unit:	Households
Description:	Drop off rate
Measured/Calculated/	Measured

Default:	
Source of data to be used:	Survey and visual observation
Value(s) of monitored parameter:	7.5%
Description of measurement methods and procedures to be applied:	Going forward, Proyecto Mirador will determine dropoff by conducting usage surveys for each Verification Period on a sample group of at least 30 households for each age category of stove by year.
QA/QC procedures to be applied:	Questionnaire to include the questions: "Is your Estufa Dos por Tres still in use?" and "why or why not?"
Any comment:	For the First Verification Period, a 7.5% dropoff rate was approved by SGS based on surveys taken by SGS during onsite verification with the assistance of Zamorano University during onsite verification. For the Second Verification Period, Proyecto Mirador the following *cumulative* dropoff rates by stove age (see attached ANNEX 1: "A01_Dropoff Summary 2011"): 1-2 month old stoves: 1.9% (sample size: 5802) 6 month old stoves: 1.5% (sample size: 1817) 1 year old stoves: 6.2% (sample size: 418) 2 year old stoves: 8.3% (sample size: 48) Thus we are reporting the following dropoff rates for the Second Monitoring Report: First year: 3% Second year: 4% Third year: 5% The above dropoff figures amount to a 12% cumulative dropoff over 3 years. As the 2011 surveys showed cumulative dropoff for 2-year-old stoves to be 8.3%, our figures can confidently be viewed as conservative.

Data / Parameter:	**ID 12 / Leakage**
Data unit:	Households
Description:	Assess agreement with statements regarding possible leakage effects, including: a. Rebound Effect b. Stimulation of increased use of a high emission fuel c. Promotion of new stove type stimulates substitution of a cooking fuel or stove type with relatively high emissions d. Loss of space heating causes users to use alternative sources of (and thus, a greater amount of) fuel e. Traditional stoves are reused f. Other types of stoves are present in the household g. Length of time auxiliary stoves are used each day
Measured/Calculated/ Default:	Measured
Source of data to be used:	Ongoing questionnaires.

Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Survey, on an ongoing basis, a statistically significant number of La Estufa Dos por Tres stove owners. (Randomness of the sample will be maintained by surveying every *n*th beneficiary.) Questionnaires to be administered by Proyecto Mirador's Supervisors and Community Organizers.
QA/QC procedures to be applied:	Questionnaires include questions to assess agreement with statements a-g under "Description" above.
Any comment:	Comments on the "Description" field above: a. PM's approach values training the beneficiaries on conservation practices. To remain conservative, however, our emission reduction calculations are based on relative wood savings between the *fogon* and the Estufa Dos por Tres. We do not assume an increase in emission reductions based on improvements in conservation practices among the beneficiaries. Furthermore, as we have carefully measured absolute fuelwood consumption before and after the introduction of the Estufa Dos por Tres, any possible rebound effect would have been captured in absolute terms and reported in the 2010 Fuelwood Consumption Study. Therefore, we do not anticipate any effect on leakage. b-c: Though some people have reported using paper, corn or cardboard as supplementary materials with their stoves, these were used minimally, primarily as fire starters, and used exactly as before the installation of the Estufa Dos por Tres. Further, the method of starting the fire is exactly the same for the Estufa Dos por Tres and the *fogon.* Thus, these auxiliary materials have no effect on leakage. d-g: 122 homes were surveyed to see if auxiliary cookstoves were present. Survey results are reported in ANNEX 13: "A13_Leakage and Sustainability Results 2011.xls." 28% of the homes surveyed about auxiliary cookstoves (49 out of 174 homes) reported having a gas or electric stove in the home (see Columns BK-BM, Row 183). Among those 49 homes, the auxiliary stoves were only in use an average of 14.27 minutes per day (see Cell BN-183), whereas the Estufa Dos por Tres was in use an average of 6.5 hours per day (see Cell BJ-183). This indicates that homes with the new Estufa Dos por Tres are still using wood as their primary fuel, with gas and electric only used occasionally as a supplement. Stoves are not used to heat the home in 99% of households according to the surveys. As the auxiliary stoves were also present before the *fogon* was replaced with the Estufa Dos por Tres in each of these households, their existence has no effect on leakage.

Data / Parameter:	**ID 13 / Leakage due to Transportation**
Data unit:	Kilometers
Description:	Assess agreement with statement regarding possible leakage effects described in the PDD: "f. Significant emissions from

	transportation or other suggest more impact than if project did not exist."
Measured/Calculated/ Default:	Measured
Source of data to be used:	Mileage records; Sales Database (for total # of stoves built per year).
Value of data applied for the purpose of calculating expected emission reductions in section B.5	43,088 km driven within the First Verification Period. 122,259 km driven within the Second Verification Period.
Description of measurement methods and procedures to be applied:	Annual report to assess changes in mileage from year to year. Reported annual mileage (reported in km) is to be compared with the number of stoves built within the same year to see if mileage is increasing significantly beyond the relative increase in project activity.
QA/QC procedures to be applied:	Mileage records track kilometers driven on an ongoing basis for each vehicle, and the results are tabulated annually.
Any comment:	Transportation results for the First Monitoring Period are reported in ANNEX 18: "A18_Transportation Summary 2011.xls." For the First Verification Period a ratio of 15.61% was determined using the total number of stoves constructed / total miles driven. It was approved that this 15.61% ratio would serve as the baseline for further monitoring of leakage due to transportation. For the Second Verification Period this ratio has decreased to 8.81% signifying an even more insignificant impact on leakage. Hence 122,259 km represents <1% of total ER and is hence *de minimis* per Gold Standard methodology. The Gold Standard approved PDD and the First Monitoring Report were both approved assuming 0 leakage due to transportation. Based on the reduced ratio of 8.81% as described above, PM is also reporting 0 for the Second Monitoring Report. PM will continue to assume 0 leakage from transportation going forward if the transportation does not increase significantly beyond the relative increase in project activity. Thus, it is the ratio of stoves constructed : km driven that is primarily relevant to our assessment of leakage, rather than raw annual mileage. The PDD stated the Data Unit as "Miles" for Parameter ID 13, but it was since determined that original mileage records are tracked in kilometres. In order to avoid any possibility of error due to unit conversion, we have modified the data unit to "kilometres" to agree with the original data we are provided.

Data and Parameters used to assess Sustainability.	
Data / Parameter:	**ID 14 / Number and percentage of individuals**
Data unit:	**Individuals**
Description:	Assess agreement with statements in Sustainability Monitoring Plan Sections, Passport Issues 1, 7, & 9. Air Quality, Livelihood of Poor, Human & Institutional Capacity.

Monitored /Calculated /Default:	Responses to questionnaire.
Value (s) of monitored parameter:	Number of positive responses to questionnaires.
Monitoring equipment (type, accuracy class, Calibration frequency, date of last calibration, validity)	Questionnaire administered by PM Supervisors.
Measuring/Recording frequency:	Survey, on an ongoing basis, a statistically significant number of Estufa Dos por Tres stove owners. (Randomness of the sample will be maintained by surveying every *n*th beneficiary.) Questionnaires to be administered by PM Supervisors.
Source of data:	Survey.
Calculation method (if applicable):	Data tabulation and report issued on an annual basis.
QA/QC procedures applied:	Sufficient sample size. Questionnaires administered by both local community organizers and PM.
Any comment:	175 Leakage and Sustainability Surveys collected in 2011 returned the following results (see ANNEX 13: "A13_Leakage and Sustainability Results 2011.xls"): • 100% of respondents reported the air is cleaner in their homes with the new Dos por Tres cookstove. • 100% of respondents reported their homes are cleaner with the new Dos por Tres cookstove. • 100% of respondents who collect their own wood reported that they have more free time since having the Dos por Tres. Repondents reported saving an average of 2.64 hours per week, representing a reduction of 47% in time spent collecting wood. • 52% of these respondents reported that they invest the time saved from collecting fuelwood to work in the fields. Other reported uses of extra time include caring for children (8%); working in business (11%); going to school (1%); helping a spouse (4%); and resting (7%). • 98% of respondents reported they cook faster with the Dos por Tres, indicating that women have more time to participate in the activities previously listed. • Respondents who purchase their fuelwood reported an average cost savings of 62% after installation of the Dos por Tres. 81% of those respondents reported using the saved funds to purchase food.

Data and Parameters used to assess Sustainability.	
Data / Parameter:	**ID 15 / Number of individuals**
Data unit:	**Individuals**
Description:	Assess agreement with statements in Passport Sustainability Monitoring Plan sections regarding wider social and economic impact of the project including 6. Quality of Employment, 10. Quantitative employment and income generation, 12. Technology Transfer (to stove builders.)
Monitored /Calculated /Default:	Responses to questionnaire.
Value (s) of monitored parameter:	*Quality of Employment:* % of employees over the age of 16: 100%

	% of employees who receive 1 or more day of rest per week: 100% % of full-time employees who receive paid vacation: 100% % of complaints about sleeping/eating conditions when traveling: 0% % of employees reporting they are required to carry >50 kg.: 20% % of employees reporting better working conditions than other people in their communities: 100% % of employees reporting that their work with PM has contributed to improving their quality of life: 100% *Quantitative Employment and Income Generation:* # of direct employees of PM at 1 May 2009 (start date of Gold Standard Crediting Period): 16 # of direct employees of PM at end of first year of creding period: 29 # of direct employees of PM at end of Second Verification Period: 38 % of employees that earn minimum salary or more: 100% Total # of full time employees (both direct and indirect): >50 *Technology Transfer (to stove builders)* % of employees who report familiarity with work procedures: 100%
Monitoring equipment (type, accuracy class, Calibration frequency, date of last calibration, validity)	Questionnaire
Measuring/Recording frequency:	Annual
Source of data:	Surveys of employees, management report on number of employees, and copies of training materials used by employees.
Calculation method (if applicable):	Annual written report of number of employees and record of employee surveys. No calculation needed.
QA/QC procedures applied:	Results for Quality of Employment are tabulated in the attached ANNEX 14: "A14_Employee Questionnaire Summary 2011.xls" which has now been translated into English. Results for Quantitative Employment are tabulated in the attached ANNEX 16: "A16_Quantitative Employment 2011.pdf." Though income figures are confidential, ANNEX 14: "A14_Employee Questionnaire Summary 2011.xls" reflects that all employees of Proyecto Mirador are compensated with minimum wage or greater.

Data and Parameters used to assess Sustainability.	
Data / Parameter:	**ID 16 / Number and percentages of individuals**
Data unit:	**Individuals**
Description:	Assess agreement with statements in Passport Sustainability, PDD Leakage, and Emissions Monitoring Plans. Sustainability: social and economic impact of the project including, 7. Livelihood of the poor (wood is collected or bought), 12. Technology Transfer to users (do they know how to maintain and use their stove properly)
Monitored /Calculated /Default:	Responses to Leakage & Sustainability Surveys.

Value (s) of monitored parameter:	Positive score
Monitoring equipment (type, accuracy class, Calibration frequency, date of last calibration, validity)	Survey, on an ongoing basis, a statistically significant number of La Estufa Dos por Tres stove owners. (Randomness of the sample will be maintained by surveying every *n*th beneficiary.) Questionnaires to be administered by Proyecto Mirador's Supervisors and Community Organizers.
Measuring/Recording frequency:	Ongoing
Source of data:	Survey
Calculation method (if applicable):	Data tabulation and annual report.
QA/QC procedures applied:	100% of beneficiaries reported that the air in the homes is cleaner since installing the La Justa 2x3. The results are included in ANNEX 13: "A13_Leakage and Sustainability Results 2011.xls" and are further articulated under Parameter ID 14 above. Technology Transfer is evident in the Community Meetings prior to stove construction as well as the Followup Visits conducted after stove installation.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

Shall include the formulae used and description to calculate the baseline emissions.

Emissions reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \qquad (10)$$

ER_y	Emission reductions in year y in tCO_2/year
PE_y	Project emissions in year y in tCO_2/year
BE_y	Baseline emissions in year y in tCO_2/year
LE_y	Leakage emissions in year y in tCO_2/year

E.2. Project emissions calculation

As described in Section **A.5** above, an estimated emissions reduction of 2.23 $mtCO_2e$/year was reported in the PDD, which was completed prior to the 2010 Paired Fuelwood Consumption Study. As the 2010 study provides data at a much higher confidence level than any data previously available, we have modified our ER Calculations accordingly and arrived at an adjusted estimate of 2.73 $mtCO_2e$/year.

For the calculation of 2.73 $mtCO_2e$/year, we refer you to ANNEX 19: "A19_REVISED ER Calculations 2011.xls."

E.3. Leakage calculation

The emissions reductions calculation assumes an estimated leakage of zero (0) tCO2/year. This value will be substantiated by qualitative surveys referenced and articulated in the table "**ID 12 / Leakage**" above. Accordingly, the surveys (which will be conducted in a statistically significant number of households receiving the Estufa Dos por Tres, with randomness of the sample maintained by surveying every *n*th beneficiary) will assess agreement with statements regarding possible leakage effects, including:

a. Rebound Effect
b. Stimulation of increased use of a high emission fuel
c. Promotion of new stove type stimulates substitution of a cooking fuel or stove type with relatively high emissions
d. Loss of space heating causes users to use alternative sources of (and thus, a greater amount of) fuel
e. Traditional stoves are reused

E.4. Emission reductions calculation / table

Table 2 below is based on an initial emissions reduction of 2.73 $mtCO_2e$/year per stove in the first year, multiplied by the average number of stoves in operation on a monthly basis (adjusted for aging and dropoff) as set forth in ANNEX 4: "A04_REVISED Financing Plan 2011.xls" for the Second Monitoring Period (1 December 2010 – 30 November 2011). Further explanation is provided below the following chart.

Crediting Month	Average Number of Net Stoves in Operation	Estimation of leakage (tCO2/year)	Monthly estimation of emission reductions ($mtCO_2e$)
Dec-10	6,672	0	1,495
Jan-11	7,036	0	1,573
Feb-11	7,395	0	1,652
Mar-11	7,966	0	1,773
Apr-11	8,565	0	1,904
May-11	9,290	0	2,061
Jun-11	10,315	0	2,288
Jul-11	11,608	0	2,572
Aug-11	12,860	0	2,847
Sep-11	14,083	0	3,115
Oct-11	15,114	0	3,343
Nov-11	16,285	0	3,604
Total (tCO_2)		**0**	**28,229**

Table 2

Total emission reductions achieved during the Second Monitoring Period: **28,229** tCO_2
(Note that the final column in Table 2 above adds up to 28,227 and this is due to rounding error. The correct number is 28,229 as displayed in ANNEX 4: "A04_REVISED Financing Plan 2011.xls," in the "Monthly Results" spreadsheet, Cell AG86.)

We have arrived at the above calculation of total emission reductions based on the final total of 10,509 stoves built in the Second Monitoring Period. The value of 28,229 tCO_2 is calculated on a monthly basis, not an annual average. The stoves in operation by month are reduced by the dropoff rates of 3%, 4% and 5% for stoves in their first, second and third years, respectively, a conservative estimate according to our 2011 dropoff surveys. The emissions reductions are further reduced to account for a reduction of 6% in the efficiency of the stoves that are in their second year of operation ("degradation rate"). Correspondingly, the calculation of the emission reductions for stoves in operation for 12 months or less utilizes 2.73$mtCO_2e$/year as set forth in ANNEX 19: "A19_REVISED ER Calculations 2011.xls." Stoves in operation for more than 12 months reflect a decrease in efficiency of 6%. The calculations are attached in ANNEX 4 "A04_REVISED Financing Plan 2011.xls" (see "Monthly Results" worksheet, Cells D19-D24).

For formulae used to calculate the emission factor of 2.73 $mtCO_2e$/year, we refer you to ANNEX 19: "A19_REVISED ER Calculations 2011.xls." For the calculation of the average number of net stoves in operation by month, as well as the monthly estimation of emission reductions, we refer you to the "Monthly Results" worksheet in ANNEX 4: "A04_REVISED Financing Plan 2011.xls." The

numbers for net stoves in operation by month are shown in Row 65; the emission reduction totals by month are stated in Row 82.

The aging factor of 6% was calculated by Professor Rob Bailis of Yale University and his analysis is attached as "ANNEX 2: "A02_Aging Stove KT Report 2011.docx." All raw data and calculations are reflected in ANNEX 3: "A03_Aging Stove KT 2011 Raw Data.xls." Professor Bailis concluded that his calculations represent the most accurate comparison between fuelwood consumption for aged cookstoves tested in 2011 against the results for the sames stoves reported in the 2010 Fuelwood Consumption Study.

In the 2011 Aging Stove KT 39 households were paired to gauge fuelwood consumption in 1-year-old cookstoves against fuelwood consumption of the same 39 stoves at one month old (as reported in the 2010 Fuelwood Consumption Study).

The 6% degradation rate reported in the Aging Stove KT Report 2011 reflects the mean difference in net fuelwood consumption of -0.377 kg per household per day (see ANNEX 3: "A03_Aging Stove KT 2011 Raw Data.xls," in the "Paired Sample" worksheet, Cell S43). The same 0.377 is rounded off to 0.4 kg in Table 2 of ANNEX 2: "A02_Aging Stove KT Report 2011.docx." Divided against the mean fuelwood consumption in the 2010 Fuelwood Consumption Study for the 39 paired households of 5.938 kg/day (Cell N43), this gives us an overall degradation rate of 6.35% (Cell P43).

A similar calculation for lower bound of the 90% CI gives us a result of 7.81% (Cell P46). However, note that it reflects roughly the same difference in fuelwood consumption of 0.418 kg/day. (Both 0.377 and 0.418 can be rounded off to 0.4, so the difference is inconsequential.)

The degradation rate is higher in the case of the lower bound comparison simply because a similar reduction of 0.4 kg/day is being compared against lower confidence interval figures (which are by definition lower numbers) rather than the mean.

To understand the significance of the difference between degradation rates of 7.81% and 6.35%, consider that a 6.35% degradation rate results in 30,492 credits issued during the Second Verification Period, whereas a 7.81% degradation rate results in 30,680 credits. This is a difference of 188 credits, or less than 1% (*de minimis*). This calculation was done using ANNEX 4: "A04_Financing Plan 2011," by altering the degradation rate on the "CO2 Projections" worksheet, (Cells D19 and D20) and viewing the result in the same file on the "Monthly Results" worksheet, Cell AG86.

E.5. Comparison of actual emission reductions with estimates in the GS-PDD

A quantitative Fuel Consumption Study, requested by the Gold Standard, was completed in 2010 to confirm actual fuelwood consumption rates of the Estufa Dos por Tres.

The estimated savings of 2.23 $mtCO_2e$ /year as stated in the PDD was based on a prior baseline study (Yale, 2007 and Aprovecho, 2009), as the 2010 Paired Fuelwood Consumption Study had not yet been undertaken at the time of project submission for Registration to the Gold Standard. The results of the 2010 Paired Fuelwood Consumption Study indicate emissions reduction of 2.73 $mtCO_2e$ /year and will replace the estimate in the PDD.

E.6. Remarks on difference from estimated value in the PDD

The Gold Standard, subsequent to issuance of its Round 2 Response above, agreed to proceed with Registration based on emissions reductions of 2.23 $mtCO_2e$/year, and to calculate actual savings for the purposes of issuance of VERs based on the 2010 Paired Fuelwood Consumption Study. The Gold Standard's directive is summarized in an e-mail from Meinrad Bürer to Richard Lawrence dated 3 June 2010, which reads as follows:

> *Discussion has now taken place within the TAC with regards to the Kitchen Test issue. We still need to review your responses to the other issues that had been raised, but provided these will be addressed and closed, we are willing to register the project activity with a temporary figure of 2.23 tCO2 per stove per year for the wood savings in the PDD, under the condition that a new Kitchen Test comparing Fogon and La Justa 2x3 wood consumptions will indeed be performed prior to request for issuance to cross-check this value with results from the field. This means the Validation DOE does not have to look into this issue anymore.*
>
> *Delivery of the VERs will be as per the actual savings, i.e. based on the results obtained with the new Kitchen Test. The savings will have to consider the lower bound and not the mean savings, as there is no basis for granting such a deviation from the methodology to this project activity solely. This topic needs to be discussed in the context of the revised version of the methodology. Only if and when approved will the 'mean approach' be applicable within project activities.*
>
> *... This approach above will be formulated as a Forward Action Request (FAR) within our formal registration review feedback once we will have received the complete version of your responses. The FAR will have to be taken care of by the contracted verifier at the time of verification.*

Subsequently, as part of its Final Registration Review, the Gold Standard issued a FAR as described above. The FAR reads as follows:

> *PP shall conduct a new Kitchen Test prior to first request for issuance in order to confirm the assumed annual emission savings per stove. This study will be a paired-sample test. The goal is to measure daily fuel consumption over a 4-day period in 50 households. First, stoves will be monitored before adoption of the La Justa 2x3, while the family uses a traditional fogon, and several weeks after the adoption of the La Justa 2x3, when the family is accustomed to its use.*

It should be understood that not only did the 2010 Paired Fuelwood Consumption Study meet the parameters of the Forward Action Request in detail, but the study even exceeded the Gold Standard's specifications in two areas: first, the sample size was larger (reaching n=55); and second, wood was weighed over a 5-day period (not just a 4-day period as requested by the Gold Standard), resulting in four 24-hour periods of fuelwood consumption data rather than 3.

The revised figure of 2.73 $mtCO_2e$ /year, and all baseline and project scenario data confirmed in the 2010 Paired Fuelwood Consumption Study, supercedes the previous projection of 2.23 $mtCO_2e$ /year as contained in the PDD as the 2010 Paired Fuelwood Consumption Study confirms accurate fuelwood savings at a much greater confidence level than any previously available data due to the large sample size and paired design.

LIST OF ANNEXES
Second Monitoring Report

Annex #	*File Name*	*Page Ref.*	**Description**
1	A01_Dropoff Summary 2011.xlsx		Summary of 2011 dropoff survey results, for stoves in four different age categories
2	A02_Aging Stove KT Report 2011.docx		Summary and analysis of 2011 Aging Stove KT, reported by Rob Bailis (Yale)
3	A03_Aging Stove KT 2011 Raw Data.xls		2011 Aging Stove KT - raw data
4	A04_REVISED Financing Plan 2011.xls		Carbon credits calculated based on net stoves in operation over the crediting period
5	A05_PM Fuel Usage Study Data 2010.xls		2010 Fuelwood Consumption Study - Raw Data
6	A06_PM Fuel Usage Study Summary Report 2010.pdf		2010 Fuelwood Consumption Study - Summary Report
7	A07_PM Fuel Usage Study Data Sheet SPANISH.pdf		2010 Fuelwood Consumption Study - data collection sheet in Spanish
8	A08_PM Fuel Usage Study Data Sheet ENGLISH.pdf		2010 Fuelwood Consumption Study - data collection sheet in English translation
9	A09_PM Fuel Usage Study Guidelines.pdf		2010 Fuelwood Consumption Study - Guidelines provided by Prof. Robert Bailis
10	A10_Leakage-Sustainability Survey SPANISH		Updated survey to assess leakage and sustainability (Spanish form)
11	A11_Leakage-Sustainability Survey ENGLISH		Updated survey to assess leakage and sustainability (English translation)
12	A12_Sales Record 120110-113011.xls		Stove installation database for the First Monitoring Period
13	A13_Leakage and Sustainability Results 2011.xls		Results and summary totals for monitoring surveys conducted from 12/10-10/11
14	A14_Employee Questionnaire Summary 2011.xls		Summary of Year 1 employee questionnaires
15	A15_Employee Questionnaire.doc		Sample employee questionnaire (in Spanish & in English translation)
16	A16_Quantitative Employment.xls		Report on number of employees and salaries by employee type (as of November 1, 2011)
17	A17_Training Brochure.pdf		Brochure given to beneficiaries upon training in stove use and maintenance
18	A18_Transportation Summary 2011.xls		Report on mileage for all vehicles driving during the Second Verification Period
19	A19_REVISED ER Calculations 2011.xls		Calculations for emission reductions per stove

- - - - -

History of the document

Version	Date	Nature of revision
01	1 November 2011	Initial adoption
01	6 October 2010	SGS review of basic format and underlying assumptions of monitoring plan
01	1 November 2010	Integration of results of 2010 Fuelwood Consumption Study; modification to emissions reduction of 2.73 mtCO_2e/yr.; insertion of monitoring data
01	30 November 2010	Integration of various parameter values as requested by SGS; addition of leakage and sustainability monitoring results as supporting data. Integration of final emission calculations for the First Monitoring Period as calculated by month.
02	21 December 2011	Final document verified by DNV.
03	12 March 2012	Integrates all changes relevant to our Reply to the Gold Standard's 3-week Review.

Decision Class: Regulatory
Document Type: Guideline, Form
Business Function: Issuance