CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

SECTION A. General description of project activity

A.1. Title of the project activity:

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Enhanced distribution of efficient wood stoves in Honduras
Version 3 – January 14, 2010

A.2. Description of the project activity:

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The objective of this application to The Gold Standard Foundation is to create a fuel-efficient stove building project that 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 in rural Honduras. If successful in securing The Gold Standard certification, this project can serve as a model for other stove projects by monetizing certified carbon savings, as well as greatly accelerate the dissemination of fuel-efficient stoves in rural Central America where degraded conditions of forests, indoor air pollution and rural poverty exceed acceptable levels.

In 2004, Overlook International Foundation (OIF), a U.S.-based 501(c)3 corporation, and Proyecto Mirador LLC (PM), its registered Honduran Affiliate managed by Doña Emilia Giron de Mendoza, initiated a program to reduce indoor air pollution by disseminating improved wood stoves called "La Justa" (see **Figure 1** below) in and around the town of Atima, in the highlands of Western Honduras in Santa Barbara Province. The La Justa 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 (see **Figure 2** below), thus reducing the time devoted to wood collection and/or money spent on wood. The La Justa efficiently vents smoke outside of the house, helping to prevent respiratory and other illnesses caused by exposure to toxic gases and excessive particulate matter emitted by burning wood. Since inception in early 2004 PM has installed over 5,500 stoves for individual families, built an efficient organization, and overcome the challenges of executing a successful stove project.

Figure 1: New La Justa stove

Figure 2: Traditional *fogon* stove

Honduras is one of the poorest countries in the world, with over half the population living below the poverty level and 65% considered impoverished by USAID standards. About 74% of Honduras' poor and 86% of the extremely poor live in rural areas. Rural population densities are high (~100 people per km2). There are numerous small-scale farms and a fairly high number of officially landless tenant farmers. These farmers tend to cut wood on less efficient land for household fuel use. Honduras also contains the second-largest rainforest in the Americas next to the Amazon, and the widespread deforestation of rural Honduras is a significant contributor to global climate change. The area in which PM operates falls within the Western Honduran highland region: upland areas fall within the Central American Pine Forest ecoregion and lowland areas are composed of tropical dry forests. Very limited tropical dry forest remains; it is a threatened tropical ecosystem. Woodcutting for private use, primarily cooking, contributes significantly to deforestation as well as the problem of indoor air pollution.

In rural Honduras the traditional *fogon* cookstove is a significant cause of respiratory illness such as asthma, emphysema and lung cancer. According to Daniel Kammen, Professor of Energy and Resources at the University of California at Berkeley and Director of the Renewable and Appropriate Energy Laboratory, "One-third of the world's population -- almost two billion people -- use wood, charcoal, dung or crop residue as cooking fuel, which is an important cause of respiratory illness, one of the most common diseases worldwide." The World Health Organization's *World Health Report 2002* indicates that over 1.6 million people die annually as a direct result of indoor air pollution, mainly caused by cooking fires in their homes (WHO, 2002).

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 processed or manufactured locally in Santa Barbara Province. Beneficiaries contribute the remaining components, including cement, rebar, bricks, adobe blocks, 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.

The stoves are so successful from the perspective of health improvement and wood savings that PM seeks to build even more stoves in Santa Barbara Province and surrounding provinces in 2009 and beyond. The current model of charity underwriting the organization is not sustainable. Long-term and stable funding does not exist for the significant expansion of stove distribution. In the current economic climate, seeking additional donors is not a viable long-term option. In the long run, the utilization of carbon finance is a realistic source of sustainable funding that will enable the enhanced distribution of La Justa stoves to proceed. PM is planning to market Gold Standard carbon credits from verified reductions of unsustainably harvested fuel wood in order to provide long-term, sustainable funding.

PM will use proceeds from the sale of Gold Standard premium carbon credits from stoves installed from 1 May 2009 forward to supplement the limited charitable contributions it currently has available to fund the stoves. With the help of carbon finance PM will accelerate distribution of La Justa stoves by installing 3,500 stoves in 2009 and even more in following years. The use of carbon finance will enable the business model to transform itself from a system of distribution based on charitable donations to one that is self-sustaining and market driven.

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 Rob 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 "2007 Yale Study," showed that the replacement of one traditional *fogon* stove with one La Justa stove reduces greenhouse gas (GHG) emissions by between 1.2 and 1.7 $mtCO_2e$/year.

Since the 2007 Yale Study, PM has 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 that is made from vernacular (locally available) low cost materials that can be found easily in the towns and villages where improved stoves are needed.

The improved model of La Justa stove is called the "La Justa Model 2x3" and is the model covered in this PDD. The La Justa Model 2x3 includes a few important structural modifications: 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. In addition, the *plancha* has been lowered closer to the level of the wood ash insulation in order to use the fire power of the stove more efficiently. Also, a maintenance tool called the *Cinco* has been introduced to help stove users carry out the basic cleaning and maintenance of the stove. From the user's point of view the La Justa Model 2x3 is functionally the same stove and PM staff have observed that it has been positively received by the beneficiaries.

Figure 3 below shows the original La Justa stove; **Figure 4** shows the La Justa Model 2x3 which PM has adapted to maximize emissions reductions and support broader dissemination of the stoves.

Figure 3: Original La Justa stove

Figure 4: La Justa Model 2x3 stove

A study completed by Nordica MacCarty of Aprovecho Research Lab on April 28, 2009 has shown that the La Justa Model 2x3 generates even greater wood savings than the original La Justa. Using the La Justa Model 2x3, CO_2 emissions are reduced by 2.65 tCO_2e/year.

A second Yale study was conducted in 2009 (hereinafter referred to as the "2009 Yale Study") in order to analyze the fuel mix affecting the project area and specifically determine the rate of Non-Renewable Biomass (NRB) affecting the project area. The 2009 Yale Study was supervised by Rob Bailis of FES, with field research conducted by Ian Cummings of FES. Adjusting the April 28, 2009 Aprovecho findings to account for the NRB fraction determined in the Yale 2009 Study, the total CO2 emissions reduction is adjusted to 2.23 $mtCO_2e$/year per stove. The results of the Yale 2009 study are discussed later in this PDD under section B.4.

A recent New York Times article stated that black carbon (soot) is "emerging as a major and previously unappreciated source of global climate change" (Rosenthal, April 16, 2009), and household cookstoves are a major source of this soot. Rosenthal goes on to report, "Replacing primitive cookstoves with modern versions that emit far less soot could provide a much needed stopgap while nations struggle with the more difficult task of enacting programs and developing technologies to curb carbon dioxide from fossil fuels."

The New York Times is not alone in identifying soot as a major environmental issue. In her research paper "A Laboratory Comparison of the Global Warming Impact of Five Major Types of Biomass Cookstoves" (*Journal of Energy for Sustainable Development,* June, 2008), Nordica McCarty wrote:

> An August 2007 headline in the online *BBC News* stated, "Clouds of pollution over the Indian Ocean appear to cause as much warming as greenhouse gases released by human activity (BBC, 2007)." These clouds are composed primarily of soot, or black carbon particles. A similar article found in *Scientific American* stated, "The dominant source for all this black carbon is cooking fires" (Biello, 2007). Further, studies are showing that the soot particles that enhance solar absorption by snow and ice are contributing to the ice melt in the Himalayas and the retreat of Arctic sea ice (Flanner et al., 2007).

When wood burns it releases a number of compounds into the atmosphere, including CO_2, methane, nitrous oxides, and particulate matter consisting of both elemental carbon (or soot) produced in flaming fires and organic carbon produced in smouldering fires. Elemental carbon (EC) has a global warming potential 680 times that of CO_2 *(Ibid.)*. By burning fuel efficiently and completely, the La Justa reduces the amount of soot or black carbon found in Particulate Matter (PM) and Products of Incomplete Combustion (PICs) as well as reducing the amount of PM and PICs produced overall.

Globally, indoor air pollution kills more people each year than malaria and causes almost as many deaths as unsafe water and sanitation (*Smoke, the Killer in the Kitchen,* WHO 2004). In traditional wood burning stoves, wood fuel emits substantial amounts of 26 hazardous air pollutants. Fine respirable particles less than 2.5 microns are able to penetrate deep into the lungs. These compromise the body's defense systems and its ability to filter and remove toxic particles. Women and children are the most harmed by inefficient stoves because they do most of the cooking. Because women also care for the children, the children also suffer a high level of exposure. Indoor air pollution also has an effect on unborn children similar to smoking during pregnancy.

Laboratory tests show that the La Justa Model 2x3 reduced Carbon Monoxide emissions particulate matter by 79%, CO_2 by 43%, and CH_4 by 94% compared to traditional stoves.(McCarty, N., April, 2009).

Beyond the global atmospheric and family health benefits of efficient cookstoves, the project's innovative technology contributes positively in several other important ways to sound, sustainable economic, environmental and social development in Santa Barbara Province and surrounding provinces of the Western Highlands of Honduras. Project participants[1] report that the project actively increases the efficiency of both renewable and non-renewable wood resources. This and other indirect benefits are addressed in depth in the Local Stakeholder Consultation Report (LSCR).

The aim of our project is to serve as a model for other organizations that wish to initiate similar stove projects, thus bringing the numerous benefits of fuel-efficient cookstoves to potentially millions of people.

A.3. Project participants:

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[1] See also SECTION E: Stakeholders' Comments

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
This is not applicable. The project is located in Honduras, but it is a voluntary Gold Standard VER project stream and not a CDM project.	Proyecto Mirador LLC, Santa Barbara, Honduras (with administrative offices in Kentfield, California, USA)	No
	Overlook International Foundation, Kentfield, California, USA	No

Project Representative: 3Degrees Group, Inc., San Francisco, California, USA

With technical assistance from:
Aprovecho Research Lab, Cottage Grove, Oregon, USA
Yale School of Forestry and Environmental Studies (FES), New Haven, Connecticut, USA

Complete contact details of the project participants and representatives can be found in Annex 1.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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Honduras.

A.4.1.1. Host Party(ies):

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Any country can host a Gold Standard voluntary carbon market project, but there is no formal "Host Party" since this is not a CDM project and there is no DNA approval required. There is no cap on Greenhouse Gas emissions in Honduras. Proyecto Mirador LLC, a company incorporated in the U.S. and headquartered in Santa Barbara, Honduras, will carry out the project with financial assistance from Overlook International Foundation, a 501(c)3 corporation based in Kentfield, California, USA, and funded by Richard and Dee Lawrence and family. OIF is seeking carbon finance to support and expand the project activity in order to achieve a greater scale and establish a self-sustaining revenue support channel.

A.4.1.2. Region/State/Province etc.:

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Region: Western Highlands
Provinces:
Santa Barbara (SBA)
Capital – Santa Barbara
Population 342,054
Copan (COP)

Capital – Santa Rosa de Copán
Population 288,766

Lempira (LEM)
Capital – Gracias
Population 250,067

Intibucá (INT)
Capital – La Esperanza
Population 179,862

The statistics reflect census figures from July 28, 2001 as quoted from:
http://www.citypopulation.de/Honduras.html

A.4.1.3. City/Town/Community etc:

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

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity:

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Stoves will be distributed to the Western Highlands of Honduras in Santa Barbara, Copan, Lempira, and Intibucá provinces (see **Figures 5 and 6** on the following page).

Figure 5: Map of Honduras

Figure 6: project location in Honduras

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

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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 activity fits into the Gold Standard approved methodology:
Methodology for Improved Cook-stoves and Kitchen Regimes V.01

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

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

This project involves the switch from domestic cookstoves, called *fogons*, which rely on primarily non-renewable woody biomass fuel, to more efficient domestic cook-stoves that use significantly less non-renewable woody biomass fuel and thus achieve emission savings at the household level.

The La Justa fuel-efficient stove was invented by Dr. Larry Winiarski of the Aprovecho organization, in association with Trees, Water and People, a non-profit headquartered at Fort Collins, Colorado. The La Justa stove was specifically designed for Honduran cooking habits and optimizes cooking temperatures by placing a reinforced steel rectangle on the cooktop (plancha) at the hottest point above the fire thus spreading the heat evenly. Compared with other stove alternatives, the La Justa stove is both the most 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 or clay that acts as the combustion chamber. The efficient firebox sits in an adobe or brick container and the space around the elbow is filled-in with wood ash or other lightweight insulation.

The key advantages of the La Justa stove technology are:[2]

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.

The La Justa Model 2x3 uses all the principles of Larry Winiarski's technology, with design and structural improvements that maximize the reduction of GHG emissions reduction.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Table 1: Estimated emission reductions

[2] See (Bryden et al., 2005) for a detailed description of the technology.

Years	Annual estimation of emission reductions in tCO_2e
2009	5,213
2010	7,819
2011	16,264
2012	25,384
2013	35,234
2014	45,872
2015	49,542
2016	53,505
2017	57,785
2018	62,408
2019	22,467
Total estimated reductions for the crediting period	**381,492**
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	38,149

Table 1 shows the total estimated tCO_2e reductions of the project activity in the 10-year crediting period (1 May 2009 to 1 May 2019). This calculation is based on an estimate of the reduction in GHG emissions of 2.23 $mtCO_2e$/year per stove, which takes the baseline wood consumption of the 2007 Yale Study, factors in the stove efficiency improvements of model 2x3, applies emission factors measured in laboratory tests (Aprovecho, April 28, 2009), and adjusts for an NRB fraction explored and quantified within the 2007 Yale Study as well as the 2009 Yale Study.

A.4.4. Public funding of the small-scale project activity:

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There is no public funding utilitized by the project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

The project activity is not a debundled component of a large scale project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

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

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The methodology is applicable to the project since low-emission cook-stoves and regimes replace relatively high-emission baseline scenarios. Under the project, traditional Honduran *fogon* stoves are replaced by more efficient La Justa Model 2x3 Stoves (see **Figures 7 and 8** below).

Figure 7: Traditional *fogon* stove

Figure 8: La Justa Model 2x3 stove

Furthermore:

- The project boundary is Honduras; the stoves are distributed in the Western Highlands. Only stoves distributed by PM are included under the project.
- The project is located in one single country, Honduras.
- The improved cook-stoves are distributed only to households and do not number more than one per kitchen. The continuous useful energy output of the 2x3 model is between 4 and 7 kW[3]; this is below the threshold of 50kW.

[3] Aprovecho 2x3 Study 2009

- Because fuel wood gathering in Honduras is a highly localized and unregulated activity, reductions in fuel wood consumption will engender local benefits for forest health, soil erosion prevention and carbon sequestration.

B.3. Description of the sources and gases included in the project boundary:

Table 2: Emissions sources included in or excluded from the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	Emissions resulting from the combustion of fuels in the traditional Honduran Stoves	CO_2	Yes	Main emission source
		CH_4	Yes	Relevant emission source
		N_2O	No	N2O measurements were found to be negligible; emission levels were below the measurement threshold of the gas chromatograph
Project Activity	Emissions resulting from the combustion of fuels in the distributed La Justa Stoves	CO_2	Yes	Main emission source
		CH_4	Yes	Relevant emission source
		N_2O	No	N2O measurements were found to be negligible; emission levels were below the measurement threshold of the gas chromatograph

The project boundary for the distribution of the La Justa stoves encompasses the following four provinces of the Western Honduras Highlands: Santa Barbara (SBA), Copan (COP), Lempira (LEM) and Intibucá (INT).

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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, 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 had a mean household size of 3.75 adult equivalent persons (Yale 2007 Study).

The stoves are not all installed at the start of the project, but are installed progressively during the crediting period at the estimated rate of 3,500 stoves in year 1, and an annual installation rate that accelerates 8% each year. The 8% growth rate was agreed upon by the Board of Directors of PM, after a complete review of PM's internal capabilities and the size of the market demand. An 8% growth rate is substantially below PM's historic growth. In fact the annual growth rate has exceeded 8% in every year since inception. To move forward with an 8% growth rate PM will need only to hire additional stove technicians, and is counting on proceeds from the sale of Gold Standard certified Carbon Credits as a source of funding for more employees.

Changes in the baseline scenario during the crediting period are not expected by the project participants, for the following reasons:

- Per capita income in Honduras has increased only marginally since 1997.
- The project beneficiaries are typical, poor rural families that are very dependent on coffee growing for their income. Coffee prices are virtually flat since 1997 in Honduras.
- The 1998 Hurricane Mitch devastated much of Honduras destroying 70% of crops, 70% of transportation infrastructure, and 60% of the country's potable water supply. The following decade has seen very slow recovery, and conditions in the rural sector are not much better now than they were 10 years ago.

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.

On behalf of the project proponent, researchers from FES conducted a qualitative Kitchen Survey (KS) in June and July 2007 (Yale Study 2007). At that time over 3,500 stoves had been constructed by OIF. Professor Rob Bailis presided over the study which was performed by two students from FES. The KS was performed before the GS methodology, "Methodology for Improved Cook-stoves and Kitchen Regimes," Version 01, was approved. Therefore the approach used does not always follow the steps as defined in the methodology, however due to the rigorous scientific approach used by the Yale researchers all requirements for the KS are met.

Step 1.1. Establish a pilot sales record

As of March 31, 2009, the project participants have already installed more than 5,500 stoves. Of those the largest number have been installed in the in the Municipality of Atima, where the project started. The stoves were primarily distributed to the more than 35 poor rural villages that surround the town of Atima. The KS included 113 households, principally in Atima. Of those 113 households, 53 were cooking on the traditional *fogon* stove and were to receive a La Justa stove in the near future, and 60 had already received a La Justa stove.

Step 1.2 Provisionally assess fuel types, fuel mix and kitchen regimes

The Project Proponents have specified the fuels and energy sources used through the year, for both baseline and project scenarios. During the year no seasonal change in the used fuel mixture was found.

Fuel types

Table 3 presents the mix of fuels that were found in the households.

Table 3: type of fuels used in the households

	Type of Fuel	**Fuel used**
A	Renewable and Non Renewable Woody Biomass	Woody Biomass
B	Renewable Energy Fuels	- none
C	Alternative Fuels	LPG, electricity

Fuel mix

Households in the areas served by PM use woody biomass as the primary cooking fuel. few households use additional energy sources. The Qualitative Survey, conducted as part of the 2007 Yale Study, found that a small portion of households have gas or electric stoves. It should be noted that the 2007 Yale Study was conducted in the town of Atima, which has income levels higher then those typically found in the rural areas of the project area where the vast majority of project beneficiaries reside. Typical rural village conditions are far poorer than towns like Atima, and PM estimates that no more then 2% of households in the rural village areas use alternative fuels such as gas and electricity. Most villages are not connected to the electrical grid.

The usage of alternative kinds of stoves in Honduras varies with location and the wealth of the town. In the rural areas where our stoves are being built, it is estimated that at the very most 2% of homes would have an alternative to a wood burning stove. It is estimated that families would need a monthly income of 4,000 Lempiras (local currency) per month (US$ 210) in order to afford an electric stove, compared with the average monthly wage (if fully employed) of a rural Honduran worker of 800 Lempiras (US$ 42) per month. The type of alternative stove would be electric as gas is very difficult to get to rural village areas.

Electricity costs are approximately double the cost of wood for a fuel-efficient stove, so even those who have electric stoves in rural areas tend to continue to use wood. An electric stove costs approximately 300-500 Lempiras per month depending on usage while wood costs are about 180 Lempiras. The vast majority of stove recipients collect their wood for consumption. In addition the electrical stove has a capital cost which is substantially higher than wood burning stoves.

Gas cookers show similar numbers. For a modest-sized family the monthly gas cost is about 400 Lempiras, with a capital cost of up to 4,000 Lempiras, although it can be lower depending on the model.

Kitchen regimes
Typically the households in rural Honduras where PM operates do not use the stoves for commercial cooking. The stoves are only used to prepare the daily meals as there is limited need for household heat.

The town of Atima, where the KS was conducted, has better infrastructure and higher income than the surrounding villages, particularly in terms of access to electricity, clean drinking water, goods and services, and alternatives to wood fuelled cookstoves. The households in Atima make limited use of Alternative Fuels; however, in the poor rural villages where the vast majority of the stoves are distributed, there is minimal or no availability of alternative fuels such as Liquid Petroleum Gas (LPG), and often no access to electricity.

Step 1.3 Analyse renewability status of wood fuels

The 2007 Yale Study relied upon a qualitative study of households and their experience and observations of fuel wood sources, forest conditions and changes over time. Based on local residents' descriptions of the state of the forests in the area there is evidence that the forest cover in the region is declining. This is supported by the 2007 qualitative survey in which a little over half of all respondents (63/109) said that it is worse than a few years ago. The study estimated that that the typical household relies on unsustainable wood sources from the forest for 59% of its fuel needs and wood from sustainably managed private land for the remaining 41%. Thus the analysis concludes that roughly 59% of fuel consumed is unsustainable."

Between 2000 and 2005 Honduras had an annualized deforestation rate of -3.1%; this is the highest rate in the Western Hemisphere and 7th in the world[4].

In 2009 FES sent its team to Honduras to conduct further assessments of NRB. The Yale team reports in 2009:

> *We estimate NRB fraction in two ways. First, we use remote sensing images to identify existing areas of pine-oak forest, secondary forest, farmlands and settled land, together with biomass growth rates (MAI) for each type of land cover to determine the potential supply. Of this, we assume roughly 30% of standing oak woodlands is inaccessible because of distance from settled populations and topographic gradients. We then use the wood-dependent population of the area, based on census data, and fuel consumption data from our own 2007 survey, to determine current demand. The difference between supply and demand defines the total quantity of NRB and the ratio of NRB to supply defines the fraction of NRB. Based on our estimates, this fraction is ~59%, which closely agrees with our assessment of NRB based on the study conducted in 2007.*

Given the resources and information available to the project, the figures presented in this PDD are based on a 59% rate of NRB, the number originally estimated in the 2007 Yale Study and a number that accurately reflects the actual overall mix of wood used in the area. The 2009 study further supports this assessment of the NRB fraction as it found almost an identical NRB fraction.

NRB model				
Key assumptions				
1. Land cover around Atima [5]	**Ag/pasture**	**Secondary**	**Pine-Oak forests**	**Settlement**
Areas (%)	32%	26%	24%	18%
Areas (ha)	47,648	38,714	35,736	26,802
2. Population[6]				
Population of Santa Barbara Province (2005)	395,441			
Area of Santa Barbara Province (sq km)	5,024			
Population density (people/sq km) (2005)	78.7			
Population of area covered by remote sensing image based on population density of Santa Barbara Province and area of image (1489 sq km)	117,200			
3. Findings from Quantitative Surveys[7]	**Fogon**	**La Justa**	**% difference**	
Fuel use per person meal (kg-dry wood)	1.0	0.53	-47%	
Number of meals per day	2.9	2.9	0%	

[4] Food and Agricultural Organization of the United Nations, “Global Forest Resources Assessment 2005,” www.fao.org/forestry/fra2005/en/

[5] Yale School of Forestry & Environmental Studies, “The Patterns and Processes of Land Use Change in Honduras” (May 2007) p. 18

[6] Demographic & Health Surveys (DHS) Survey, 2005 (adjusted for World Bank population growth rates)

[7] Based on raw data from Kitchen Surveys taken in data collection phase of the Yale 2007 Study.

Adult equivalent people per household	3.75	3.75	0%	
Daily fuel use per household (assuming each household cooks exclusively with *fogon* or La Justa)	10.875	5.76	-47%	
Annual fuel use per household	3,969	2,104	-47%	

NRB Model, Continued

4. Firewood availability (based on Ghilardi, et. al., from empirical work in Mexico)	**Ag/pasture**	**Secondary**	**Pine-Oak forests**	**Settlement**
Mean Annual Increment (t/ha-y)[8]	0.5	7.3	4.6	-
Mean Annual Increment-firewood (t/ha-y)[9]	0.1	3.5	2.2	-
Wood available (t/y)	23,824	282,612	164,386	-
Firewood available (t/y) *see note	4,765	135,499	55,033	-
Total wood available from all land cover types (t/y)	470,822			
Total firewood available from all land cover types (t/y)	195,297			
5. Harvest and NRB fraction[10]				
Total harvest with 100% *fogons* (t/y)	465,210			
Total harvest with 100% La Justa (t/y)	246,561			
NRB with 100% *fogons* (t/y)	269,913			
fNRB with 100% fogons (%) *baseline scenario*	**58%**			

* *Assumes 30% of Pine Oak inaccessible due to extreme slope*

[8] Ghilardi, et. al., "A GIS-based Methodology for Highlighting Fuelwood Supply/Demand Imbalances at the Local Level: A case study for Central America," page 6.

[9] This coefficient integrates two ratios: 1) woody biomass to total biomass; and 2) fuelwood to woody biomass (Brown, 1997; 20 Brown et al., 1989; Brown and Lugo, 1982; Cannell, 1984, 1985).

[10] The NRB Fraction is estimated in two ways. First, remote sensing images are used to identify existing areas of pine-oak forest, secondary forest, farmlands and settled land, together with biomass growth rates (MAI) for each type of land cover to determine the potential supply. Of this, it is assumed that 30% of standing woodlands is inaccessible because of distance from settled populations and topographic gradients. Then, based on census data as well as fuel consumption data from the Yale 2007 Study, the wood-dependent population of the area is used to determine current demand. The difference between supply and demand defines the total quantity of NRB and the ratio of NRB to supply defines the fraction of NRB. Based on Yale's calculations, this fraction is ~58%.

Step 1.4 Divide pilot Sales Record into customer groups or clusters

In January 2009, PM began distribution of the improved La Justa Model 2x3. The La Justa Model 2x3 is the sole model of La Justa stove distributed as of May 1, 2009, when the project crediting period began. All distributed stoves thus have the same properties and subsequent performance. Therefore, the parameter "type of stoves distributed" does not allow for a distinction in emission reductions. Functionally and culturally the new model is identical to previous versions, but the new La Justa Model 2x3 is the most efficient version to date, with GHG emissions reductions increasing from previous models of the La Justa, to a total reduction of 2.23 mtCO_2e / year.

The households in the project boundary can be considered to have generally the same economic and social conditions. The households all have a uniform kitchen regime; therefore, the households in the Western Highlands can be considered a homogeneous group.

Since no obvious major distinctions exist between the households included in the pilot sales records, these are not sub-divided into different clusters.

Step 1.5 Carry out a qualitative Survey (Kitchen Survey)

The KS was performed in June and July, 2007, and took into account the best practices for execution of a research survey. The results from the KS are available to the DOE. The survey group included 113 households. 60 of the households had a La Justa stove and 53 did not.

The duration of the KS for each household was approximately 45 minutes. Participants were not paid monetarily for their participation; however, many potential benefits existed. One of them was that the project participant could address any problems that households found with the utilisation of the La Justa stoves.

The households participating in the KS were personally visited by the survey team; no interviews were conducted by telephone. The data for the KS was obtained from the households by verbal consent forms. Many of the households identified for the KS were illiterate so the consent statement was read to the participants in Spanish, the local language.

Information collected in the KS includes basic socioeconomic data as well as data specifically about stoves, fuels, and cooking habits. The survey included information about frequency of use; likes and dislikes about the stove; fuel procurement; as well as the household's own estimations of their fuel consumption.

Based on the KS the following cluster options were identified:

a) One cluster for households in the Western Honduran Highlands defined as traditional *fogon* users that rely on woody biomass fuels as this represents approximately 98% of households and the project focuses on this cluster exclusively.

The KS indicated that no changes in fuel use, fuel mixing and regimes are anticipated for the typical households of the Western Honduran Highlands. This is supported by additional observations made by project staff and officials based on their deep experience and years spent working in these communities.

Step 1.6 Refine demarcation of clusters and populate Project Database.

The 53 survey respondents in the KS who did not have a La Justa used the *fogon* stove or some other type of traditional stove such as LPG, electric, or bread oven. When comparing *fogon* users to La Justa users, the possession of other stoves appeared at a nearly identical rate; this is shown in Table 4.

Table 4: overview of stoves found in the KS households

	***Fogon* User (n=53)**	**La Justa user (n = 60)**
LPG	8%	7%
Electric	26%	27%
Bread oven	6%	3%
Three-stone or other traditional woodstove	6%	5%

Therefore, it can be concluded that despite the presence of other fuels in the homes, the La Justa stove only has an impact on the primary fuel (woody biomass).

As stated earlier, gas stoves are economically out of reach to the vast majority of the population, and it is very difficult to distribute gas in the remote rural areas. Also, electric stoves are not affordable to the vast majority of the population and many of the villages lack electricity altogether.

Accordingly, one cluster has been identified for the project activity: households that rely on woody biomass as their dominant source of cooking fuel. This cluster determination allows for individual sales in the Sales Record to be sorted properly in the Project Database.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

The "Tool for the Demonstration and Assessment of Additionality," version 05, EB39, is applied to the project activity.

The development and expansion of our stove project is dependent on the extra income from the sale of carbon credits that will be generated once carbon certification from the Gold Standard is secured. Without an external revenue stream from selling carbon credits, the entire enterprise is deeply cash flow negative and would eventually halt due to lack of funds.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity

There are two realistic and credible alternatives to the proposed project activity:

Table 5. Alternatives for the distribution of the La Justa stoves

Alternative A	Continue cooking on the *fogon* stove. No investments needed.
Alternative B	Implementation of the project without GS VER revenues.

Sub-step 1b. Consistency with mandatory laws and regulations

In Honduras there is no law or regulation that applies to the efficiency of cooking stoves. There is no legislation in Honduras that requires the use of efficient stoves, and none is expected to be introduced during the project period.

Step 2. Financial analysis

Sub-step 2b: Option 1. Apply simple cost analysis.

For a project activity that produces no revenue other then carbon credits, "simple cost analysis" is the appropriate analysis to perform. Therefore, we will briefly document below the costs associated with the project activity and the alternatives identified in Step 1, and demonstrate that there is at least one alternative – "traditional fogon stove cooking" – which is less costly than the project activity. We can clearly meet the test that the **proposed project activity is more costly than at least one alternative.**

It has been shown that despite the availability of the new stove technology and building materials, Hondurans on their own do not invest in the installation of the La Justa efficient stove or other similar wood saving stoves in the absence of external funding. The promotion of the La Justa stove in these communities relies primarily on charitable donations.

Proyecto Mirador's current cost per stove has risen sharply due to rises in the price of steel and labor, to about US$ 57.85/stove. PM also asks households to contribute to the stove, to create a sense of "ownership." To that end, stove beneficiaries add limited inputs of cash, labor, and materials, which are estimated at a current value of US$ 16.51 per stove. OIF considers that this sharing of the investment has been a critical component to the success of the project.

Assuming an 8.0% annual growth rate, excluding any carbon financing, and assuming a base year construction of 3,500 stoves at US$ 57.85 per stove, over 10 years the cumulative funding requirement for nearly 50,000 stoves would be US$ 2,933,166. These figures represent the hard costs associated with stove construction and the administrative costs incurred in Honduras.

In the same scenario, but taken with carbon financing (assuming carbon revenue of US$ 14.00 per ton), the project would actually generate a surplus of US$ 1,597,059 over 10 years. Even after accounting for administrative overhead associated with carbon finance, there would be a surplus sufficient to expand the project at a rate of 8% per year or higher.

For example: The limited charitable support of Overlook International Foundation helped to develop the proof of concept and supported the installation of 5500 stoves over 6 years. These early stoves are not included in the Gold Standard project activity. To dramatically expand distribution of La Justa Model 2x3 stoves as the project now intends, additional and sustainable funding is required.

Clearly, at US$ 57.85 per stove, **the proposed project activity is more costly than the alternative of "traditional fogon stove cooking"** which assumes that households continue to use existing stoves.

Step 3. Barrier analysis

For the demonstration of additionality, barriers are identified which demonstrate that the project activity would not have occurred anyway due to at least one barrier. The most common barriers are: investment barrier; technological barrier; barriers due to prevailing practice. We discuss how the availability of GS VER revenue helps the project overcome these barriers that would otherwise prevent the project activity from occurring.

Sub-step 3a. Identify barriers that would prevent the implementation of the proposed GS VER project activity

Potential sources for such funding from individual household beneficiaries, government institutions, or private non-governmental or business organizations are as follows:

- The households which receive a La Justa Stove
- Donations from non-governmental organizations (NGOs)
- A financing institution (bank) in the form of a bank loan against the collateral of expected sales of carbon credits
- International donations from individuals
- The Honduran local, provincial or federal governments
- Creating a business that sells stoves

The identified possibilities are all non-viable. The chart below analyzes the three possible sources of funding (equity investment, loan financing, and donations) and assesses their viability from the perspective of individual households, governmental institutions and private organizations (whether businesses or NGO's). The conclusion is that without an external source of funding from the sale GS VERs the expansion of distribution of La Just 2x3 stoves will not occur.

Source of funding	Project developer		
	Individual households	**Governmental Institutions**	**Private organization (business oriented or non-profitable)**
Equity investment upon expectation of certain returns (i.e. tangible or intangible)	Hondurans on their own do not invest in the installation of new efficient stoves. Honduran household income doesn't support purchase of the stove, particularly among the poorest of the poor. The unlikeliness of individual households making an equity investment is best evidenced by the lack of people who have approached us to buy the La Justa 2x3. This reflects a lack of understanding of the savings involved, as well as a lack of interest in getting rid of indoor air pollution, which in turn reflects a lack of knowledge about the danger it poses to their health. This also illustrates the fact that individuals cannot allocate funds to slow deforestation and forest degradation or make an impact on slowing global warming. This is particularly true in the villages where we operate, which are far from urban centers and represent the poorest of the poor. AHDESA is an example of a project that depends on equity investment from its beneficiaries; it sells stoves for US$ 78 apiece. This cost would be prohibitive for the poor, rural households that PM serves and PM has seen no evidence that Hondurans are willing to buy an improved cook stove; all of AHDESA's stoves have been purchased by outside organizations on their	It is demonstrated that local authorities (not to mention central government) do not have designated budget for this type of programs. The scarce funds they managed to invest is assigned to other priorities such as improving roads, electrification, and providing water. Local municipal governments in limited cases have support our work. For example, they have provided warehousing for our materials for free, and in one case they have contributed part of the distribution costs that generally comprise 13% of our contribution. (cash or in kind?) But in no case has a local municipal government been in a position to fund the total cost of the dissemination of the stoves. In no case has a local, provincial or national government program given PM any financial support besides non-cash services. Our nearly 6 years experience has shown that municipal governments do not have budgets for this type of work. Furthermore, even where funds are specifically allocated, the execution of the funds can be unreliable. (can give an example? Or delete)_	In many countries, businesses have been created to sell stoves. The problem is that in the poorest areas, people do not have hard cash with which to buy them, or income levels to support purchase, or access to the cities where the stoves are distributed. Therefore this becomes an unattractive course of action for entrepreneurs who might be interested to sell stoves to the rural poor of Honduras. The feasibility of attracting private businesses into the stove business in Honduras is hindered by the lack of cash resources of customers, the lack of awareness of customers of the cost of indoor air pollution and the lack of awareness of the dangers of either deforestation or global warming. It is also hurt by the requirement to fund the bulk of the US$ 57.85 per stove without any real willingness on the part of its customer base to pay an amount in excess of US$ 16.51, the approximate value of the beneficiaries' contribution of raw materials. These facts make the business a very unprofitable operation. Attracting private businesses that could fund the losses with carbon credits might someday be possible, but the direct upfront cost of certification makes the business untenable. With local salaries in rural Honduras of US$ 5.00/day, customers and potential

	behalf. To further illustrate, PM installed La Justa stoves in approximately one-half of the homes in the village of Atima, which although poor, is certainly richer in resources than other rural villages nearby. When PM moved to the outlying villages and began replacing stoves in poorer, rural homes, the citizens of Atima did not purchase and install La Justa stoves on their own despite the high level of satisfaction among La Justa stove owners and PM's willingness to sell La Justa stoves at cost. Even the wealthy in Atima have not purchased the improved stoves without OIF's assistance.		entrepreneurs do not have sufficient resources.
Financing institution (bank) in the form of a bank loan	The rural poor of Honduras do not have access to bank credit and there is no banking institution that makes credit available to the project beneficiaries. Active loan rates for June 2009 were reported by the Central Bank of Honduras as 19.6%. Interest Rates are currently between 10% and 45% for commercial banks which makes the cost of borrowing prohibitive. Furthermore, in PM's experience, we have encountered no bank willing to lend money to the village people. The lack of fixed full time employment also detracts from the individuals' ability to borrow money to fund the purchase of a fuel-efficient cook stove. The vast majority	We know of no government loan program that would lend funds to beneficiaries for the purchase of the stoves. The Honduran governmental bureaucracy lacks the capacity to request and successfully manage a loan for these type of projects from international mutitlateral lending institutions. There is one World Bank loan that attempted to fund efficient stoves and ended in failure. The World Bank funded the provincial government of Santa Barbara to build stoves in 2008 which they called the La Marena. This was an abject failure. The government did not have a stove design, did not build the stoves in the homes but rather just gave the raw materials to selected families, and there was no follow-up training. This was a one-time program.	A bank loan is only possible if there exists a sustainable and proven business model. This model requires that income is generated to pay for the repayment of the loan. Since fuel wood is normally collected as a non-cash item, there are no cash savings to repay the bank. This would be particularly true given the lack of collateral that the stove business would be able to provide. The current PM business model is not sustainable due to the lack of secure funding over the long term.

	of people in the areas where PM operates have seasonal jobs related to agriculture.	PM offered to build the stoves for the Government and they refused our services. The La Marena stove project was funded by the World Bank, and closed down after a few months after funding came to a close. This project exemplifies the lack of sustainability inherent in a project without self-sustaining resources. Furthermore, the La Justa 2x3 is superior to the La Marena stove in several aspects of its design, which can be attributed to PM's investment in research and development mostly conducted by Aprovecho Research Center. The differences between the two stoves illustrate the importance of continued investment in research and development.	
Donations	There is virtually no history of individual donations at the local level to fund the installation of fuel efficient stoves. There have been cases of direct donations to households (see Step 4 on common practice analysis). However, their traditional way of implementation lacks of technical support in the long term, which results in very low performance or failure (refer to technical barriers for more details). Donations would be very much a "start and stop" option. International donations are heavily reliant on the fundraising efforts of the	Government aid, whether domestic, bilateral or multilateral, is not a viable source of funding. Such resources do not provide the consistency and predictability needed to sustain a project such as PM, the integrity of which depends on having consistently employed directors and technicians to oversee its operations. Government aid is generally short term and can even end unpredictably because it varies with the political and economic climates, neither of which are predictable in Honduras. PM can only sustain its operations over the long term given a steady and predictable source of funding.	Additional fund raising in the USA and Europe is not a sustainable long-term solution for the La Justa distribution. In the current economic crisis the challenge of securing steady funding is even more acute. OIF has received some donations over the years from family and friends, but outside donations amount to less than 10% of the full cost of this ambitious program. Other than PM, AHDESA is currently the only entity in Honduras building stoves. AHDESA is located in Tegucigalpa and is funded by Trees, Water & People of Fort Collins, Colorado. AHDESA sold us our first stoves and provided PM with initial training.

	Overlook International Foundation, and success of such efforts to date has been minimal.		At the current time, AHDESA sells its version of the La Justa for $1500 Lempira per stove (about US$ 79.00). This figure was based on AHDESA's minimum sale quantity of 40 stoves. The stoves are purchased by overseas groups such as Rotary Clubs. Since inception 7 years ago AHDESA has built around 12,000 stoves, a small fraction of the homes that need the stoves. Plan International, an NGO that operates in Santa Barbara Province, understands the project and supported our efforts to build stoves with a quantity order which was fulfilled on a one-time basis. But at US$ 57.85 per stove, their resources do not provide a steady source of funding that can allow PM to develop as an organization. PM relies on having consistently employed directors and technicians to oversee its operations, and both the integrity of the product and the execution of the project would suffer if it were to rely on the sporadic demands of organizations such as Plan International.

Conclusion of Investment Barrier Analysis:

Households, local village governments and provincial governments do not have funds at their disposal which can be adapted to PM's purposes, and are not willing to switch to the La Justa stove without OIF's financial support and technical support provided by project staff. There have been limited attempts at making efficient stove selling a profitable business, but they have failed to be sustainable. Other sources of ongoing charity have been explored, but are not available. Therefore, the current mode of La Justa stove distribution cannot be a sustainable business model without external sustainable funding. Absent funding from carbon revenues OIF cannot sustain the long-term expansion of the project.

Technological barrier

External funds are needed to help the project overcome numerous technical barriers, including: stove design, stove testing, access to remote areas; transportation of materials; need of qualified personnel; adaptation to different conditions on site like positioning of the stove, chimney, etc; inadequate operation of stoves; lack of maintenance by beneficiaries and so forth. All of the above require human, financial and technological resources that are not consistently available to local beneficiaries without a sustainable source of funding.

The La Justa Model 2x3 stove was specifically designed for Honduran cooking habits, with input from local users and stove builders. Its design is one of the most effective and easily assimilated replacements of the type of stove already prevalent in Honduras. Furthermore, the stove design was optimised in 2008 and 2009 by laboratory testing[11] at Aprovecho Research Lab, which was funded by OIF. This testing enabled design improvements that increased the GHG emission savings. This subsequently increased the amount of VERs that can be earned per stove and increase the feasibility of the project. The La Justa Model 2x3 stove was developed, tested, adapted and improved entirely financed through OIF which subsidized the pilot phase.

Since inception PM has modelled the consistency and integrity necessary to achieve success. To demonstrate, PM has carried out the technical research surrounding carbon credits. It has attracted some leading institutions like the Yale School of Forestry & Environmental Studies, Zamorano University, The Grantham Foundation, and Aprovecho Research Center. PM has invested funds to constantly improve the design of the stove, and committed time and funds to manage all aspects of the project. It has operated with core principles such as *"No Cuesta, No Cuida,"* maintained a commitment to operate in areas inhabited by the "poorest of the poor," and demonstrated an active commitment to improving the stove with functional developments such as the *"Cinco"* maintenance tool, and upgrading to the improved "La Justa 2x3."

PM's thorough approach to training stove beneficiaries could also produce a side benefit of increased carbon savings due to changes in cultural practice. Beneficiaries are taught to operate the stove efficiently, and many will improve upon existing practice. For some households this may ultimately result in a savings in firewood used, as well as cleaner combustion. (The additional savings are not accounted for in our emissions reduction calculations at this time, as an established protocol for quantifying the savings does not currently exist.)

However, problematic areas include inflation of costs, such as the dramatic rise of 55% in the minimum wage in January 2010. This point also highlights the volatile tendencies of the government and the

[11] Aprovecho 2009 Study.

potential for legislative shifts to produce dramatic and unpredictable effects on local businesses. Corruption and crime are also major constraints to business, and avoidance of local corruption is difficult at best. Poor infrastructure can also present a barrier to the project; for example, the roads leading to the areas we serve are still unpaved and hard to reach.

Carbon credit financing is a necessary element to overcoming technical barriers, so that PM can sustain the level of commitment and grow the project with a sustainable commitment to the level of quality it has already established.

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)

Alternative A 'Continue cooking on the *fogon* stove' does not face a barrier.

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity

In general efficient stove distribution in Honduras is far from a common practice. What few attempts have been made in Honduras to distribute efficient stoves are marked by small scale and a lack of sustained effort to establish a sustainable revenue base and operational capacity on the ground.

In Honduras several initiatives involving the distribution of efficient wood stoves have been performed. These include Asociación Hondureña para el Desarrollo (AHDESA*),* Plan International, William & Mary College (100 stoves), Students Helping Honduras (300 stoves), and the government of Santa Barbara. These initiatives were based on donor funding and limited in size relative to the need. Furthermore, the approach taken is reliant upon third party financing.

We are aware that only AHDESA is building fuel-efficient stoves in Honduras, so we will base our comparison on their organization. AHDESA is in turn funded by Trees, Water and People (TWP) of Fort Collins. The vast majority of TWP's income was raised in donations from private parties and foundations. TWP's level of support is on a much different scale than donations received by OIF. In the case of AHDESA, Trees, Water and People raises funds from groups and individuals, and these funds are in turn transferred project by project to AHDESA. We are not experts on the details of AHDESA's operation; however, it is clear that the biggest difference in funding OIF via Proyecto Mirador has been the majority provider of funds to support the project, and as a result, the scale of the funding.

The number of stoves installed by AHDESA is an insubstantial number as compared to the total population of Honduras. AHDESA is completely driven by outside organizations; if they were not funded from outside Honduras, their business would not exist. Therefore, it is clear that the operations of AHDESA do not qualify as common practice.

In contrast, Proyecto Mirador has been run under commercial disciplines. We operate as the low cost provider and have followed an attempt to secure Gold Standard certification that will allow us to create a self-sustaining revenue model based on growth and expansion to reach ever great numbers of beneficiaries.

Sub-step 4b. Discuss any similar options that are occurring
As mentioned above, several organizations have funded a small number of efficient stoves. These efforts have had limited impact due to both limited size and lack of long-term funding.

Conclusion
Without some source of external funding Hondurans do not switch to fuel-efficient stoves, distribution agencies do not provide stoves to families, and laboratories do not conduct research on how to improve the performance of stoves. The additional income from VERs help to overcome these barriers by providing funding that can be used to develop a sustainable business model for rapid expansion of efficient stove distribution.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The methodology, "*Methodology for Improved Cook-stoves and Kitchen Regimes,"* Version 01, allows for three possibilities for the calculation of emission reductions. The choice for an option is driven by the data output of the KT. The following options are presented:

- Primary and secondary fuel mass are each measured directly.
- All cooking during the test is done with one primary fuel and stove, but it is known that other fuels and/or stoves replace a portion of the cooking energy throughout a year;
- The KT measures fuel consumption of the primary fuel only, while the households involved are carrying on a degree of typical fuel and stove-type mixing and/or typical use of RE forms during the KT itself (subsumed-fuel KT).

The KT involved taking physical measurements of daily wood consumption and required return visits over a four-day period. During the KT it was found that households have a degree of typical fuel and stove-type mixing; however, during the KT only the primary fuel—woody biomass—was measured by measuring the amount of wood not used, from a previously measured pile. The effect of fuel mixing reduces the savings made in primary fuel between the baseline and project scenarios. The quantity of secondary fuel is treated as zero.

Based on the above Approach 3: "measured fuel consumption of the primary fuel only" is selected for the calculation of the emission reductions.

B.6.2. Data and parameters that are available at validation:

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:	2007 and 2009 Yale Study
Value applied:	59%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The 2007 Yale Study relied upon a qualitative study of households and their experience and observations of fuel wood 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:	KT
Value applied:	3.97 tonnes per household
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data obtained during the KT (Yale 2007 Study). Subsequently there were typographical errors found in the report, but the original source data was confirmed the value recalculated.
Any comment:	

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:	Stove testing report (Aprovecho, April 28, 2009)
Value applied:	87.6 g/MJ is the emission factor measured in laboratory testing of traditional fogon stoves.
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 2x3 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:	Stove testing report (Aprovecho, April 28, 2009)
Value applied:	0.47 g/MJ is the emission factor measured in laboratory testing of traditional fogon stoves.
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 /twoodybiomass
Description:	The N_2O emission factor for use of the biomass fuel in the baseline scenario
Source of data used:	Stove testing report (Aprovecho April 28, 2009)
Value applied:	0
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:	Stove testing report (Aprovecho, April 28, 2009)
Value applied:	98.3 g/MJ is the emission factor measured in laboratory testing of La Justa 2x3 model stoves.
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:	Stove testing report (Aprovecho, April 28, 2009)
Value applied:	0.05 g/MJ is the emission factor measured in laboratory testing of traditional fogon stoves.
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:	

B.6.3. Ex-ante calculation of emission reductions:

Baseline emissions

Baseline emissions are calculated according to the steps as described in the methodology.

Step 2.1 Estimate expected variation and improvement in emission reductions

The KT has been designed to reach a 95% confidence. In the analysis of the KT it was confirmed that the confidence of the result was over 95%.

Table 6: Results of the Kitchen Test

	Fogon		**La Justa**		**Comparison of means**	
	Mean	**St. Err**	**Mean**	**St. Err**	**% difference**	**P**
Household daily wood consumption (kg)	10.875	0.8	6.6	0.5	-27%	0.02
Wood consumption per person-meal (kg)	1.0	0.1	0.67	0.1	-33%	0.03

Following the KT, Aprovecho's April 28, 2009 stove test found that wood consumption per person-meal is reduced 47% when using the new and improved La Justa Model 2x3 stove introduced in 2009.

Step 2.2 Specify the Units of emission reduction or fuel consumption

The KT identified the wood consumption for one household (and hence one stove) for cooking over one year (t wood/year). This is used for the estimation of the emission reductions. Then the unit of wood consumption was computed per person meal and found to be 0.53 kg of wood per person meal when using the new and improved La Justa Model 2x3 stove introduced in 2009.

Step 2.3 Make quantitative measurements (Kitchen Test)

Quantitative KTs were conducted in a subset of the households visited from the qualitative surveys described above. The tests used three consecutive days of measurements to estimate daily fuel consumption defined both per household and per capita. Independent, but demographically similar, samples of *fogon*-users and La Justa-users were sampled.

The KT involved taking physical measurements of daily wood consumption and required return visits over a four-day period. The KT involved 20 households with La Justa stoves and 20 households with traditional *fogon* stoves[12]. The used wood per household was determined by measuring the amount of wood not used, from a previously measured pile.

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 and applicable to the entire population. The population sampled in the KT had a mean household size of 3.75 adult equivalent persons. The average *fogon* household used 1.0 kg of fuel per person-meal and ate 2.9 meals per day (Yale 2007 Study).

Step 2.4 Calculate baseline

For the calculation of the baseline emissions Approach 3, "measured fuel consumption of the primary fuel only" is selected. The baseline emissions are calculated as follows:

$$BE_y = X_{nrb,bl,y} \cdot B_{bl} \cdot EF_{bl,bio,CO2} + \sum (AF_{bl,i,y} \cdot EF_{af,CO2,i})$$
$$\sum Non-CO2emissionsduringcooking_{bl} +$$
$$\sum GHGemissionsduringprodcutionofthefuels_{bl} \quad \textbf{(1)}$$

Where:

BEy	Baseline emissions in year y (in tonnes of CO_2/year) specific to the cluster and Unit chosen.
$X_{nrb,bl,y}$	The non-renewable fraction of the woody biomass harvested in the project collection area in year y in the baseline scenario
$B_{bl,y}$	The mass of woody biomass consumed during cooking in the baseline in year y (in tonnes per year)
$EF_{bl,bio,co2}$	The CO_2 emission factor for use of the biomass fuel in the baseline scenario in tonnes CO_2 per tonne fuel
$AF_{bl,i,y}$	The mass of alternative fuels in the baseline in year y in accordance with trends projected throughout the project period, in tonnes. This mass can be set to zero in cases where the KT is appropriately designed to subsume alternative fuels (approach 3)
$EF_{af,CO2,i}$	The CO_2 emission factor for use of alternative fuel in the baseline in tonnes of CO_2 per tonne of fuel

Non CO_2 emission during cooking in the baseline scenario are calculated as follows:

$$non_{CO2} = \sum \left(B_{bl,y} \cdot EF_{bl,bio,non-CO2,i}\right) + \sum \left(AF_{bl,i,y} \cdot EF_{af,i,non-CO2-gas,i}\right) \quad \textbf{(2)}$$

[12] This number was selected since it would still yield statistically significant results (analysis available to DOE)

Where:

non_{CO2}	Non CO_2 emissions during cooking in the baseline situation
Bbl,y	The mass of woody biomass consumed during cooking in the baseline in year y (tonnes/year)
$EF_{bl,bio,non\text{-}CO2,i}$	The emission factor for GHG gas in the baseline scenario in units of tonnes of gas per tonne wood-fuel
$AF_{bl,i,y}$	The mass of alternative fuel in the baseline in year y in accordance with trends projected throughout the project period, in tonnes. This mass can be set to zero in cases where the KT is appropriately designed to subsume alternative fuels (approach 3)
$EF_{af,i,non\text{-}CO2\text{-}gas,i}$	Non-CO_2 emission factor during cooking for alternative fuel in for GHG gas in tonnes gas per tonnes of fuel

The GHG emissions during production of the fuels in the baseline situation are not applicable since no GHG emissions occur during the production of the woody biomass.

Project emissions

The improved stoves are installed progressively over time. The PDD calculates project emissions based on the number of stoves installed and assumed lifetime for each installation.

The project emissions are calculated using the same approach as the calculation of the baseline emissions.

$$PE_y = X_{nrb,pj,y} \cdot B_{pj} \cdot EF_{pj,bio,CO2} + \sum (AF_{pj,i,y} \cdot EF_{af,CO2,i}) \\ \sum Non-CO2emissionsduringcooking_{pj} + \\ \sum GHGemissionsduringprodcutionofthefuels_{pj} \quad \textbf{(3)}$$

Where:

PEy	Project emissions in year y (in tonnes of CO_2/year) specific to the cluster and Unit chosen
$X_{nrb,pj,y}$	The non-renewable fraction of the woody biomass harvested in the project collection area in year y in the project scenario
$B_{,pj,y}$	The mass of woody biomass consumed during cooking in the project in year y (in tonnes per year)
$EF_{pj,bio,co2}$	The CO_2 emission factor for use of the biomass fuel in the project scenario in tonnes CO_2 per tonne fuel
$AF_{pj,i,y}$	The mass of alternative fuels in the project in year y in accordance with trends projected throughout the project period, in tonnes. This mass can be set to zero in cases where the KT is appropriately designed to subsume alternative fuels (approach 3)
$EF_{af,CO2,i}$	The CO_2 emission factor for use of alternative fuel in the baseline in tonnes of CO_2 per tonne of fuel

Non CO_2 emission during cooking in the project scenario are calculated as follows:

$$non_{CO2} = \sum \left(B_{pj,y} \cdot EF_{pj,bio,non-CO2,i}\right) + \sum \left(AF_{pj,i,y} \cdot EF_{af,i,non-CO2-gas,i}\right) \qquad \textbf{(4)}$$

Where:

non_{CO2}	Non CO_2 emissions during cooking in the project situation
Bpj,y	The mass of woody biomass consumed during cooking in the project situation in year y (tonnes/year)
$EFpj_{,bio,non\text{-}CO2,i}$	The emission factor for GHG gas in the project scenario in units of tonnes of gas per tonne wood-fuel
$AF_{pj,i,y}$	The mass of alternative fuel in the project in year y in accordance with trends projected throughout the project period, in tonnes. This mass can be set to zero in cases where the KT is appropriately designed to subsume alternative fuels (approach 3)
$EF_{af,i,non\text{-}CO2\text{-}gas,i}$	Non-CO_2 emission factor during cooking for alternative fuel in for GHG gas in tonnes gas per tonnes of fuel

The GHG emissions during production of the fuels in the project situation are not applicable since no GHG emissions occur during the production of the woody biomass.

Leakage

As per the methodology the project proponent has assessed the occurrence of the following forms of leakage:

Table 7: Assessment of occurrence of leakage

No	Type of Leakage	Outcome Leakage assessment
a)	Some users of the efficient stoves respond to the fuel savings associated with higher efficiency stoves by increasing consumption of fuels with GHG emission characteristics, to the extent that project emissions are higher than those calculated from the assumption that cooking energy is constant. This is sometimes referred to as the 'rebound' effect.	The rebound effect was not found during the KS. Further the project staff reports based on their direct observations and conversations with recipients of La Justa stoves: "We have not seen increased fuel use among La Justa users. La Justa stoves save users time in collecting wood. People report spending less time collecting wood as one of the primary benefits and it frees up time for taking care of other important family needs."
b)	The project activity stimulates increased use of a high emission fuel either for cooking or for other purposes outside the project boundary (as would be the case for example if efficient cooking stimulated an increase in NRB consumption - possibly because the NRB fuel becomes cheaper due to the project activity).	The project does not result in the increased use of high emission fuel. The project staff reports based on their direct observations and conversations with recipients of La Justa stoves: "The wood savings are real and significant to the families that adopt La Justa stoves. We have seen no evidence that it causes other people to increase their use of wood. Fuel wood remains a valuable and declining resource and our project has not yet reversed that trend."

c)	By virtue of promotion and marketing of a new model and type of stove with high efficiency, the project stimulates substitution of a cooking fuel or stove type with relatively high emissions by households which commonly use a cooking fuel or stove type with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.	The project does not stimulate a shift in cooking fuels. The predominant stove in use in this area of Honduras is the traditional *fogon* which emits more GHG than the more efficient and cleaner La Justa Model 2x3. The project targets the households that use *fogon*s and helps them switch to La Justa. The project activity focuses on the saving of wood biomass among families that depend on wood fuel predominantly. Therefore this type of leakage does not occur. There is no shift from a low-emission stove to a high-emission stove. The shift is only in the direction of reducing emissions.
d)	The project population compensates for the loss of the space heating effect of inefficient cook-stoves by adopting some other form of heating or by retaining some use of inefficient stoves	The *fogon* stove is disassembled so no leakage can occur as a result of use of the inefficient stove. The stove is not used for space heating.
e)	The traditional stoves displaced are re-used outside the boundary in a manner suggesting more usage than would have occurred in the absence of the project.	A disassembled traditional *fogon* is not reusable. The *fogon* stoves are made of adobe, and disassembling involves chopping the stove apart into dirt. The traditional stove is chopped apart by machete and tossed into the backyard. It is not portable, it is not moveable, and the new fuel-efficient stove goes into the same location in almost every case.
f)	Significant emissions from transportation or construction involved in the project activity, including emissions associated with production/transport of the efficient stoves themselves, or production/ transport of project fuels (for example, briquette manufacture and supply may be energy-intensive).	The La Justa stove is assembled from local materials. All the materials are locally sourced and manufactured which contributes to promoting sustainable economic development and local employment in the area. Project emissions would include transportation of stove materials and electricity used to power tools for producing some of the parts such cutting the metal used for the "planchas." The project emissions are very minor in comparison to the project emission savings.

Based on the above Leakage is not a factor.

Emission reductions
Emissions reductions are calculated following:

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

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

B.6.4 Summary of the ex-ante estimation of emission reductions:

>

Year	Estimation of project activity emissions (tCO2/year)	Estimation of baseline emissions (tCO2/year)	Estimation of leakage (tCO2/year)	Estimation of overall emission reductions (tCO2/year)
2009	5,391	10,604	0	5,213
2010	8,087	15,906	0	7,819
2011	16,821	33,084	0	16,264
2012	26,253	51,637	0	25,384
2013	36,440	71,674	0	35,234
2014	47,442	93,314	0	45,872
2015	51,237	100,779	0	49,542
2016	55,336	108,841	0	53,505
2017	59,763	117,549	0	57,785
2018	64,544	126,952	0	62,408
2019	23,236	45,703	0	22,467
Total (tCO2)	**394,551**	**776,043**	**0**	**381,492**

The above summary is further articulated through the spreadsheets on the following page.

Input Data

Stoves	Number of stoves distributed in the first year	3,500	number of stoves
	annual increase in distribution	8%	%/year

Fuel	% of non-renewable biomass BE	59%	
	% of non-renewable biomass PJ	59%	
	Energy content biomass Aprovecho	18.6	MJ/kg
	Energy content biomass IPCC	15.6	MJ/kg

Baseline	Fogon		
	Adult equivalent per household	3.75	person
	Fuel per person meal	1.0	kg
	Meals per day	2.9	meals per day
		10.875	kg/household/day
		3.97	t/household/year
		73,830	MJ/household/year

Baseline	IPCC	61,922	MJ/household/year
Project	IPCC		
	number of stoves distributed in the first year	3,500	number of stoves
	increase in distribution of stoves	8%	%/year
	Adult equivalent per household	3.75	person
	Fuel per person meal	0.67	kg
	Meals per day	2.9	meals per day
		7.29	kg/household/day
		2.66	t/household/year
		41,488	MJ/household/year

Project	La Justa 1		
	number of stoves distributed in the first year	3,500	number of stoves
	increase in distribution of stoves	8%	%/year
	Adult equivalent per household	3.75	person
	Fuel per person meal	0.67	kg
	Meals per day	2.9	meals per day
		7.29	kg/household/day
		2.66	t/household/year
		49,466	MJ/household/year

Project	La Justa improved		
	number of stoves distributed in the first year	3,500	number of stoves
	increase in distribution of stoves	8%	%/year
	Stove Lifespan	5	year
	Adult equivalent per household	3.75	person
	Fuel per person meal	0.53	kg
	Meals per day	2.9	meals per day
		5.76	kg/household/day
		2.10	t/household/year
		39,130	MJ/household/year

IPCC						
Baseline	EFCO2 Baseline	112 g/MJ				Source: IPPC sited in Aprovecho 4/28/09 report
	EFCH4 Baseline	0.3 g/MJ	GWPCH4	21		
	EFN2O Baseline	0.004 g/MJ	GWPN2O	310		
Project	EFCO2 Baseline	112 g/MJ				
	EFCH4 Baseline	0.3 g/MJ				
	EFN2O Baseline	0.004 g/MJ				

La Justa 1					
Baseline	EFCO2 Baseline	87.6 g/MJ			Avg measured emissions Aprovecho 4/28/09
	EFCH4 Baseline	0.47 g/MJ	GWPCH4 (IPCC default)	21	
	EFN2O Baseline	0 g/MJ	GWPN2O (IPCC default)	310	
Project	EFCO2 Project	93.2 g/MJ			Avg measured emissions Aprovecho 4/28/09
	EFCH4 Project	0.26 g/MJ			
	EFN2O Project	0 g/MJ			

La Justa improved					
Baseline	EFCO2 Baseline	87.6 g/MJ			Avg measured emissions Aprovecho 4/28/09
	EFCH4 Baseline	0.47 g/MJ	GWPCH4 (IPCC default)	21	
	EFN2O Baseline	0 g/MJ	GWPN2O (IPCC default)	310	
Project	EFCO2 Project	98.3 g/MJ			Avg measured emissions Aprovecho 4/28/09
	EFCH4 Project	0.05 g/MJ			
	EFN2O Project	0 g/MJ			

Emissions Reductions of the La Justa 2x3 Stove

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Unit	Description
Emission Reductions												
ERtotal	7,819	16,264	25,384	35,234	45,872	49,542	53,505	57,785	62,408	67,401	tCO2/year	Emission redcutions per year for all distributed stoves
ERhousehold	2.23										tCO2/year	Emission redcutions per houshold with a La Justa Stove
Baseline emissions												
BEtotal	15,906	33,084	51,637	71,674	93,314	100,779	108,841	117,549	126,952	137,109	tCO2/year	Baseline emissions per year for all distributed stoves
# Stoves	3,500	7,280	11,362	15,771	20,533	22,176	23,950	25,866	27,935	30,170		
BEhousehold	4.5										tCO2/household/year	Baseline emissions per houshold with a La Justa Stove
Bbl,y	73,830										MJwoodybiomass/year	Energy used for cooking, based on used woody biomass/year and energy content of biomass: 18.6 MJ/kg
AFbl,i,y	0											
CO2 emissions	3.8										tCO2/year	CO2 emissions related with the combustion of woody biomass
Xnrb,bl,y	59%											Non-renewability fraction of the woody biomass
EFbl,bio,CO2	0.0000876										tCO2/MJ	CO2 emission factor for the woody biomass used in the baseline scenario
EFaf,CO2i	0											
non-CO2 emissions	0.7											non-CO2 emisssions related with the combustion of woody biomass
EFbl,bio,CH4	0.00000987										tCO2/MJ	CH4 emission factor for the woody biomass used in the baseline scenario
EFbl,bio,N2O	0										kgCO2/MJ	N2O emission factor for the woody biomass used in the baseline scenario
Project emissions												
PEtotal	8,087	16,821	26,253	36,440	47,442	51,237	55,336	59,763	64,544	69,708	tCO2/year	Project emissions per year for all distributed stoves
# Stoves	3,500	7,280	11,362	15,771	20,533	22,176	23,950	25,866	27,935	30,170		
PEhousehold	2.3										tCO2/household/year	Project emissions per houshold with a La Justa Stove
Bpj,y	39,130										MJwoodybiomass/year	Energy used for cooking, based on used woody biomass/year and energy content of biomass: 18.6 MJ/kg
AFpj,i,y	0											
CO2 emissions	2.3										tCO2/year	CO2 emissions related with the combustion of woody biomass
Xnrb,pj,y	59%											Non-renewability fraction of the woody biomass
EFpj,bio,CO2	0.0000983										tCO2/MJ	CO2 emission factor for the woody biomass used in the project scenario
EFaf,CO2i	0											
non-CO2 emissions	0.0											non-CO2 emisssions related with the combustion of woody biomass
EFpj,bio,CH4,i	0.00000105										tCO2/MJ	CH4 emission factor for the woody biomass used in the project scenario
EFpj,bio,N2O,i	0										kgCO2/MJ	N2O emission factor for the woody biomass used in the project scenario
Leakage												
LEtotal	0										tCO2/year	Leakage per year for all distributed stoves
LEhousehold	0										tCO2/year	Leakage per year for each household

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored

Data / Parameter:	**ID 8 / Stove Sales**
Data unit:	No.
Description:	Identification of household that has received a La Justa stove
Source of data to be used:	Installation record database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	3,500 stoves installed in year one and an installation rate that increases 8% annually.
Description of measurement methods and procedures to be applied:	The electronic database will hold the following information per household Installation record Date of installation Location of installation Model of use (prior to installation of La Justa Model 2x3) Model/type of stove installed Name of buyer
QA/QC procedures to be applied:	The database will be maintained by the inspection and monitoring specialist.
Any comment:	

Data / Parameter:	**ID 9 / $X_{nrb,pj,y}$**
Data unit:	%
Description:	The non-renewable fraction of the woody biomass harvested in the project collection area in year y in the project scenario
Source of data to be used:	Bi-annual study
Value of data applied for the purpose of calculating expected emission reductions in section B.5	59%
Description of measurement methods and procedures to be applied:	Yale 2007 and 2009 Reports.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	**ID 10 / $B_{,pj,y}$**
Data unit:	Tonne
Description:	The mass of woody biomass consumed during cooking in the project in year y in tonnes per year per household by users of La Justa 2x3 model stove.
Source of data to be used:	Bi-annual KT study
Value of data applied for the purpose of calculating expected emission reductions in section B.5	2.1 tonnes woody biomass. To be measured bi-annually in the KT.
Description of measurement methods and procedures to be applied:	3rd party study and report: Yale 2007, and Aprovecho 2009.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	**ID 11/ $EF_{pj,bio,co2}$**
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.
Source of data to be used:	Bi-annual laboratory study will measure the CO2 emission factor of woody biomass consumption in the project boundary.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	98.3 g/MJ is the emission factor measured in laboratory testing of La Justa 2x3 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 biannually.
QA/QC procedures to be applied:	
Any comment:	

B.7.2. Description of the monitoring plan:

>>

PM maintains a file-based database with the names and addresses of all the households which have received 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 village, neighbourhood, and the last name.

Stoves constructed prior to 1 May 2009 are not included in the Gold Standard project. Therefore this data will be segregated from the Gold Standard project households. For the Gold Standard project crediting period an electronic database will be established.

PM currently employs one full time Inspection and Monitoring Specialist who performs routine inspection (sampling) of all stoves that have been built in the Gold Standard crediting period to insure that the quality of operation and handling is of the required standard. When necessary, the Inspection and Monitoring Specialist replaces defective stove parts.

The Inspection and Monitoring Specialist carries out ongoing training to stove beneficiaries on the proper use and maintenance of stoves. The training activities apply to all stove recipients and are performed as follows:

- The first round of training occurs at the time when the community is first introduced to Proyecto Mirador and the La Justa 2x3. This takes place at a community 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. Technicians carry notes to assist with following a standard training procedure, and brochures are left behind with full details of the operation of the stove.

- Proyecto Mirador's Inspection and Monitoring Specialist carries out the third round of training. The Inspection and Monitoring Specialist will visit each stove Beneficiary following the Technicians by two to four weeks to review the training provided by the Technicians and ensure that the stove is functioning properly. The Inspection and Monitoring Specialist will also carry out surveys on the functioning of the stoves at that time which will assist PM in the monitoring process.

The Inspection and Monitoring Specialist will also be responsible for carrying out a variety of surveys with households. The aim of these surveys is to collect specific data on stove usage, fuel usage, type of fuel usage, sources of fuel, frequency of cooking, size of homes, alternative fuel usage and the like. The surveys will be designed with the assistance of Professor Rob Bailis at the Yale School of Forestry and Environmental Services and Professor Timothy Longwell from Zamorano University in Honduras.

Before conducting any surveys, our full time Inspection and Monitoring Specialists 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.

The work of the Inspection and Monitoring Specialists will be subject to periodic audit by the Chief Operating Officer and the President of Proyecto Mirador LLC. The objective of the reviews will be to ensure that the stove construction, the training of the beneficiaries, and the collection of monitoring information is being completed in an accurate and timely manner.

Monitoring Surveys will take place at various levels:

First, Proyecto Mirador's Inspection and Monitoring Specialist will carry out household surveys to collect data on the critical elements of the project. Data will include such information as:

- Number of People in home
- Location of Home
- Wood consumption per day
- Type of Wood Consumed
- Age of Stove
- Effectiveness of Maintenance

Proyecto Mirador will also undertake studies on the functioning of the stove in conjunction with our strategic partners. These will include Kitchen Performance Tests, periodic emission tests in the lab and in the field, and studies on the NRB of our target areas as required in order to confirm emission reductions.

In addition, the Inspection and Monitoring Specialist will work with the PM Leadership Team, Doña Emilia Giron de Mendoza and Elder Mendoza (no familial relation), to support any ongoing third party verification as part of the Gold Standard certification. This employee will also be involved with organizing on-going Kitchen Performance Tests as required for the Gold Standard methodologies.

One Inspection and Monitoring Specialist with sufficient support can inspect in excess of 20 homes per day. At the project build rate the first Inspection and Monitoring Specialist would serve to support for the project for nearly 2 years. As his capacity is reached, PM will employ additional personnel to meet the operational standards.

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

Usage Rates and Aging of Stoves:

The project developers are encouraging the adoption of improved fuel efficient stoves that accomplish the same amount of cooking (2.9 meals per day) with less fuel wood. What makes the La Justa 2x3 stove so successful is the fact that it is culturally and socially compatible with rural Honduran cooking patterns. The benefits are obvious to the recipients: they see that the stoves use less wood to perform the typical amount of cooking. No additional savings are assumed from encouraging participants to use the stoves less. As a health and conservation oriented development organization, Proyecto Mirador does encourage conservation practices, but our calculations assume that no change in standard cooking practices will take place.

The methodology does require a Usage Survey biannually; accordingly we will include a Usage Survey in our overall monitoring plan.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

>>

The baseline study and monitoring methodology has been prepared by 3Degrees Group, Inc. With support from Ecofys Netherlands BV.

Company name:	3Degrees Group, Inc.
Visiting Address:	6 Funston Ave. San Francisco, CA 94129 USA
Contact Person:	Gabe Petlin
Telephone number:	+(415) 595-1679
Fax number:	+(415) 680-1581
e-mail:	gpetlin@3degreesinc.com

Company name:	Ecofys Netherlands BV
Visiting Address:	Kanaalweg 16-G 3526 KL Utrecht The Netherlands
Contact Person:	Mr. Edwin Dalenoord
Telephone number:	+31 (0)30 6623368
Fax number:	+31 (0)30 6623001
e-mail:	e.dalenoord@ecofys.com

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
The project start date is 1 May, 2009, the day the project became "listed" on the Gold Standard Registry as an "applicant."

C.1.2. Expected operational lifetime of the project activity:

>>
The project activity will last 10 years. Each La Justa Model 2x3 efficient stove has an operation lifetime of 5-8 years; we assume a 5-year operational lifetime for the purposes of this PDD. Stoves that require repairs or replacement will be repaired or replaced during the 10-year crediting period.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>
NA. Using a fixed crediting period.

C.2.1.2. Length of the first crediting period:

>>
NA. Using a fixed crediting period.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
The project start date is 1 May, 2009, the day the project became "listed" on the Gold Standard Registry as an "applicant."

C.2.2.2. Length:

>>
10 years.

SECTION D. Environmental impacts

>>

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

Not required.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

In the view of the project participants and the affected stakeholders who attended the Local Stakeholder Consultation Meeting in Atima, Santa Barbara on December 18, 2008, there are no significant environmental impacts of the project activity.

SECTION E. Stakeholders' comments

>>

For a complete discussion on Stakeholders' comments see the Local Stakeholder Consultation Report (LSCR).

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

The December 18, 2008 Stakeholder Meeting attracted a diverse range of participants including: local inhabitants, local mayors, academics, NGO officials, government officials, religious representatives, and local employees of the PM organization. In total 37 people attended the meeting which lasted over two and a half hours. The project proponents presented an overview of the project and solicited stakeholders' views and concerns.

E.2. Summary of the comments received:

>>

As the extensive evaluation forms demonstrate, the overwhelming sentiment of the Stakeholder Meeting participants was enthusiastic support for the PM efficient cookstove project. The 31 evaluation forms collected from participants indicated a very positive impression of the meeting, a diverse set of positive comments for the project, and almost no negative comments.

Please refer to the complete Local Stakeholder Consultation Report for full details on the comments received.

E.3. Report on how due account was taken of any comments received:

>>

PM will keep the sustainability matrix as written prior to the Stakeholder Meeting and no consolidation is needed. As discussed earlier, the stakeholders scored 11 of 12 indicators positive and one neutral while PM scored 5 of 12 indicators positive and 7 neutral. All 5 categories that PM scored positive were also scored positive by the meeting participants. We're pleased with the positive reaction the project received. We're not inclined to increase our positive scores, because we focused on the positive indicators which are core to the project activity and which can be measured and monitored relative to the baseline situation of reliance on traditional *fogon* stoves. Many of categories that we rated “neutral” could plausibly be rated positive, but based on our thorough study of the Gold Standard methodology we feel the approach we are taking is appropriately conservative and realistic.

The purpose of the stakeholder feedback round is to demonstrate how due account was taken of the comments of the stakeholders who attended the meeting. To accomplish this the project took the following steps:

1) The Local Stakeholder Consultation Report was uploaded to the PM website. The LSCR was open for comments for 2 months from the date of posting. No additional comments were received.
2) Printed hard copies of the LSCR were made available at a several public locations accessible to local stakeholders.

No major project design changes are planned compared to the project design that was presented in the meeting and nothing in the meeting suggested that project design changes are warranted. We believe that this LSCR demonstrates that the project has taken due account of local stakeholder feed-back. The stakeholder feedback round confirmed that stakeholders are satisfied that due account of their feedback was taken.

In distributing the LSCR we called stakeholders’ attention to the two sustainability matrices and ask them to consider whether they have any concerns with the how the sustainability matrices are scored.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Project Financier:	**Overlook International Foundation, Kentfield, California, USA**
Project Representative:	**3Degrees Group, Inc., San Francisco, California, USA**

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding utilitized by the project. Please refer to the Official Development Assistance Declarations (submitted with the Gold Standard Passport). Part A is for the Project Proponent: Proyecto Mirador. Part B is for the sole Project Financier: Overlook International Foundation.

Annex 3

BASELINE INFORMATION

See Yale 2007 Study.

Annex 4

MONITORING PLAN

See "Description of the Monitoring Plan" (Section B.7.2) herein.