Monitoring report form for CDM project activity

(Version 06.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT		
Title of the project activity	GS 1220 Ecological Stoves for Better Living – Microscale PoA – VPA1 Bolivia	
UNFCCC reference number of the project activity	-	
Version number of the PDD applicable to this monitoring report	1.0	
Version number of this monitoring report	1.0	
Completion date of this monitoring report	16/05/2019	
Monitoring period number	Third Monitoring period	
Duration of this monitoring period	01/01/2017 – 31/12/2018 (including both day)	
Monitoring report number for this monitoring report	-	
Project participants	Fundación CEDESOL Foundation myclimate – The Climate Protection Partnership	
Host Party	Bolivia	
Sectoral scopes	Sectoral Scope 1, Energy industries Sectoral Scope 3, Energy demand Sectoral Scope 13, Waste handling and disposal	
Applied methodologies and standardized baselines	Technologies and Practices to Displace Decentralized Thermal Energy Consumption version 1	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Not applicable	Amount achieved from 1 January 2013
		5,648 t CO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	19,508 t CO_2e	

SECTION A. Description of project activity

A.1. General description of project activity

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This micro-scale VPA 1 (GS 1221) in Bolivia is the first activity of the 'Ecological Stoves for Better Living – Micro Scale PoA' (GS 1220) in Bolivia and Paraguay. The main objective of the program is *holistic environmental well-being*[1]*.* In keeping with that concept*;* this VPA concerns the distribution of high efficient rocket stoves in Bolivia. This activity is designed to generate GS VERs during a fixed 10-year Gold Standard (GS) crediting life cycle by installing and monitoring **814 domestic rocket stoves and 18 institutional/commercial rocket stoves** in two Departments of Bolivia, areas designated as qualified[2] populations in the country of Bolivia by the Coordination Managing Entity (CME) CEDESOL. Without carbon finance obtained in association with Foundation *myclimate* our beneficiaries would not be able to access the program and receive the education and cooking devices.

Due to the current practices, almost negligible voluntary uptake of improved cooking devices[3] and high number of households, institutions and business using inefficient technology[4] (almost all wood cook stoves currently in use in Bolivia are highly inefficient) the scale of change will be significant.

The project replaces traditional inefficient stoves with efficient designs, in the areas of the population most in need, e.g. communities with wood as a primary fuel. The activity includes the use of the stoves for domestic, commercial and institutional purposes. This means that all of CEDESOLs' rocket stove sizes described in the PoA-DD and first VPA-DD can be delivered according to the needs identified by the beneficiary, along with their participation in the Environmental Well Being Squads (EWBS).

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[1] Our program of holistic well being meets the "first of its kind" guideline, as described in EB 69 REPORT annex 7, GUIDELINES ON ADDITIONALITY OF FIRST-OF-ITS-KIND PROJECT ACTIVITIES (Version 02.0) for project activities and is actually a first of its kind in concept as well since we will work to equally give our beneficiaries educational as well as technological tools that they can use to make continually better decisions about their lives. We incorporate empowerment of women as part of our value chain and support that, by attitude change in conjunction with technological interventions we can achieve a "lasting impact", especially considering propagation of the better attitudes and knowledge through the "kitchen classroom" most children unconsciously learn in.

[2] Beneficiaries are qualified through a participative group diagnostic where it is established that wood fuel is their primary fuel, that the potential beneficiaries believe the intervention will improve their living standards, that the beneficiaries will become active members of the Environmental Well-being Squads (EWBS), will provide usage information, allow monitoring and will assign their rights to emissions reduction credits to CEDESOL in exchange for participation in the subsidized program and acquiring the improved cooking devices via subsidized prices. They must also accept paying a % of the cost of the devices (usually around 50%) and cannot receive the devices for free.

[3] According to the Global Alliance for Clean Cookstoves' (GACC) Adoption Indicators, the % of Population using improved biomass cookstoves in Bolivia (0.687) is less than 1%, which demonstrates that without this intervention improved cookstoves are NOT being taken up voluntarily by the population. https://web.archive.org/web/20140511024315/http://www.cleancookstoves.org:80/countries/america/bolivia.html

[4] In rural areas the supply of hydrocarbons is very low. The main energy source in these scattered and remote areas is biomass (especially wood), which on average covers 80% of the total rural energy demand (there are some areas where this resource covers up to 97% of this demand, a situation that has not changed in recent years).
Instead, the use of Liquefied Petroleum Gas (LPG), widespread in urban, is only present in major rural centers. In the rest of the country there simply is no availability of the fuel, said the report. http://plataformaenergetica.org/content/3308

CEDESOL Rocket stove for domestic application

CEDESOL Rocket stove for institutional and commercial application.

The use of ecological cookers and improved practices will directly reduce the amount of fuel (wood fire or LPG) that is being burned therefore avoiding the release of *GHG* that are being emitted due to current practices[5]. It is expected that during the first 3 years of the life of the VPA the projected number of stoves will be installed and a significant impact from the educational component as a behavioral change agent will be apparent. During the 10 year crediting period, the educational component shall achieve lasting behavior change in use, especially through incorporation of the retained heat practices and peer monitored stove maintenance which will assist in more stoves staying on line longer, proved by biannual monitoring.
There is a noted lack of national/local policies being instituted to promote a shift to other fuels. Additionally, there is limited economical and technical capacity to change the common practice as evidenced by:

Table 1-A.1[6]

INDICATOR	BOLIVIA
Population size	**10,496,285**
Number of people affected by HAP*	**2,624,071**
Number of households affected by HAP	**624,779**
% of population using solid fuels for cooking	**25%**
% of Rural population using solid fuels	**75.4 %**
% of Urban population using solid fuels	**6%**

**HAP is the new designation for Indoor Air pollution (IAP), meaning Household Air Pollution as defined by the Global alliance for Clean Cookstoves.*

Table 1-A.1 documents the existing common practice scenario as well as reveals how extremely important this VPA activity is to our project, where fully more than 600,000 ***households*** use solid fuels for cooking. In Bolivia, 25% of the population (2,624,071 people) still use solid fuels for cooking.

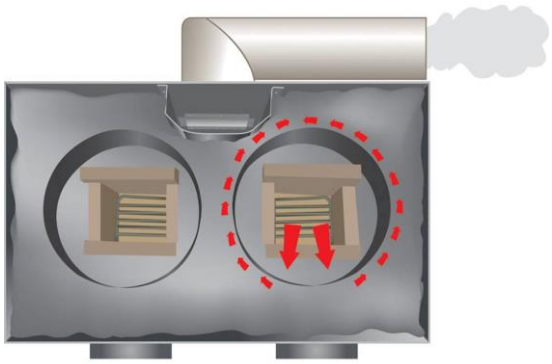
[5] Bolivia, with a population of approximately 10.4 million inhabitants, is considered one of the poorest countries in Latin America. While urban areas such as La Paz and Santa Cruz are modern cities with a relatively good supply of modern energy services, the majority of Bolivia's rural areas are still experiencing a lack of most basic services, including reliable and affordable access to electricity and improved biomass cooking stoves. https://energypedia.info/wiki/Bolivia_Country_Situation

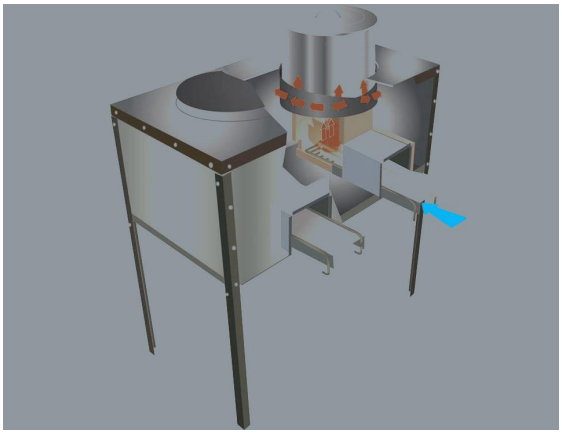
[6] This table was developed from information obtained from the Global Alliance for Clean Cookstoves, in which they cited as their Source: Food and Agriculture Organization, United Nations Development Programme, World Bank World Economic Forum, and World Health Organization - http://cleancookstoves.org/country-profiles/92-bolivia-plurinational-state-of.html

Brief description of the installed technology and equipment:

Rocket Stove

The rocket stove is a variety of biomass cooking stoves. This design provides for efficient combustion coupled with efficient heat transfer to the pot. Wood, carbon, sticks, or dung can be used with this cooker. Rocket stoves operate roughly twice as efficiently, and substantially more cleanly, than the open fire cooking methods still used in many areas of the world.





Rocket stove

A detailed technical description is available as a separate confidential document.

Institutional Rocket Stove

Within the rocket stoves technology a model was designed for the institutional use. This stove is called Institutional Rocket stove and it can be used with 60, 80 or 100 liters pots. It works under the same principle as the standard rocket stove described above and it is made out of a metal barrel as shown in the next picture.

Improved Institutional Rocket Stove

A detailed technical description is available as a separate confidential document.

Relevant dates for the project activity:

The starting date of operation:	03/11/2011 – First rocket stove installed
Registration date of the project activity:	19/06/2014
1st GS Crediting Period:	19/06/2012 – 19/06/2022
2nd GS Monitoring Period:	01/01/2016 – 31/12/2016
3rd GS Monitoring Period:	01/01/2017 – 31/12/2018

Actual GHG emission reductions in this monitoring period: 5,648 t CO_2e

A.2. Location of project activity

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This VPA 1 is developed inside the country of Bolivia, in the departments of Chuquisaca and Cochabamba.

Map of Bolivia with its departments.

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Bolivia	**Private entity:** Fundación CEDESOL	No
Switzerland	**Private entity:** myclimate – The Climate Protection Partnership	No

A.4. Reference to applied methodologies and standardized baselines

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Technologies and Practices to Displace Decentralized Thermal Energy Consumption version 1 (GS TPDDTEC).

http://www.goldstandard.org/sites/default/files/documents/gs_tpddtec_meth_110411.pdf

A.5. Crediting period type and duration

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The project has a renewable crediting period.

1st GS Crediting Period: 19/06/2012 – 19/06/2022

The starting date of operation: 03/11/2011 – First rocket stove installed

Registration date of the project activity: 19/06/2014

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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Project implementation methodology

1. Project request or dialogue with the municipal authority. The project is requested through the respected Municipality by letter or verbally with the pertinent authority.
2. Local Stakeholder Consultation (LSC) Diagnosis and Demonstration of the technology, and explanation of the project. Once a meeting is held with the interested community, CEDESOL conducts demonstrations on the ecological cookers based on a previous agreement and on a proposed schedule that needs to be followed. After the demonstration is finished, the following steps are performed in order to cover all the needs of the beneficiaries.
3. Schedule to follow:

   3.1. List of participants. A list of the participants is made to keep in CEDESOL's database.

   3.2. Formation of the Environmental Well- being Brigades (EWB).This is one of the principle aspects of the Educational Component, which deals with a co-participatory training process of group learning and teaching along with the housewives within the Environmental Well-being Brigades.

   The EWB's will be guided by the "Innovative Leaders (IL's)", women who are chosen for their Brigade to be trained by experts from CEDESOL with the Modular Environmental Training Program (MET).

   This training program includes several modules of instruction. Within each module there are 4 sessions. Each session with the IL's will last approximately 3 hours, reaching a total of twelve hours of intensive training per module.

Once trained, they will in turn train their EWB, if they successfully learned the material in the module, they will be able to replicate this knowledge with their EWB in 2 days. Therefore, each module conducted by a IL with her respective EWB will be carried out once a month for 1 day at a time.

Following this structure, each module will be completed after 2 months. During each term, CEDESOL will also identify the needs of the community. This training aims to equip the beneficiaries with the necessary tools for self-development, a sustainable community and achieving a better quality of life and social equity through the holistic use of the acquired cookers.

3.3. Delivery of equipment / rrc general training

3.3.1. Formation of the brigades. As mentioned above, the brigades are formed once the community decides to participate in the project and the beneficiaries are identified. CEDESOL establishes a meeting with the Community and the steps to follow are stated.

3.3.2. Formation of lines of communication. These lines are formed with the objective of keeping in contact and strengthen ties with the communities.

3.3.3. Set a specific work schedule. Depending on the needs and limitations of the beneficiary community, a list of activities and responsibilities will be established.

3.3.4. Sales record and surveys. This list is made into the baseline, which will be used later in all the documents that are evaluated.

4. First Innovative Leader (IL) Training (within 45 days of the general training). This training integrates different learning modules, which will guide and teach the best practices for taking care of one's health and the environment. This project has two main components which are the provision of clean ecological cookers and a program that will teach, monitor and evaluate the use of the cookers. The duration of the Project Activities (PoA) is 28 years, with a period of evaluation through surveys every 2 years within a fixed 10 year period that is determined in this VPA.

4.1. Session 1. Thermal Cooker (in accordance with an agreed upon schedule with the community). This training session focuses on, among other things, teaching how the cookers works, their assembly, use and maintenance.

4.2. Module 2. Rocket Stove (in accordance with an agreed upon schedule with the community). This training focuses on, among other things, teaching how the Rocket Stoves work, their assembly, use and maintenance.

5. Follow up. The follow up on the use of the Ecological Cookers is done by the Innovative Leaders after they have received their training and are then able to transmit this knowledge to their Brigades. In this follow up, the leaders monitor and receive information on how they are cooking and problems that could have come up during their use. The follow ups are conducted between training sessions every 30 days, in which the Brigade makes a report of monitoring performed to CEDESOL.

6. Monitoring. Monitoring the development of the MET Program will be assessed within 30 days after the ILs have completed their community based modules, at 3 months and annually so as to learn their observations both early and later on in the process.

Through this monitoring, CEDESOL will receive comments and reactions from the EWB's, then providing this valuable information to the trainers and the overall design of the MET.

It should be noted that the beneficiaries will learn to use and maintain themselves the ecological stoves that have been acquired by the Program. The purpose of the educational program is to ensure that the beneficiaries learn how to better handle their resources, both economically and naturally, so that in the future there is an exponential reduction of CO_2 emissions. All this is described in further detail in the POA attached.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines

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Not applicable.

B.2.2. Corrections

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Not applicable.

B.2.3. Changes to the start date of the crediting period

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Not applicable.

B.2.4. Inclusion of monitoring plan

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Not applicable.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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Not applicable.

B.2.6. Changes to project design

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Not applicable.

SECTION C. Description of monitoring system

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The monitoring plan for this VPA follows the guidelines of the Monitoring Methodology in Section III of the applied GS TPDDTEC Meth. as described in the PoA-DD in section D.7.2.1.

Sales record

A sales form is filled out for every delivered ecological stove. Besides required personal data as explained in the TPDDTEC Meth. on page 22 further data in terms of fuel consumption is collected already at this stage to get a first impression of the specific behaviour.
A total sales record and project database are maintained continuously. The project database is derived from the total sales record with project technologies differentiated by different project scenarios (rocket domestic, rocket institutional/commercial) leading to the two parameters project technology days $\mathbf{N_{r\text{-}d,y}}$ and $\mathbf{N_{r\text{-}ic,y}}$.

Prior to first Verification – Field Tests - $P_{r\text{-}ic,ic,y}$

Prior to first Verification a project Field Survey for the domestic and institutional-commercial scenario was performed.
Afterwards a Baseline Field Test and a Project Field Test were conducted for Rocket Domestic stoves to define the average fuel savings for every distributed stove based on real field measurements. Paired sampling was applied for the first verification.
For institutional rocket stoves, no kitchen tests have been conducted so far, due to too low implementation rates. As a very conservative assumption the KT values of the domestic stoves are

taken. This is proved with Field surveys and lab tests (Centro de Pruebas de Cocinas, CPC, La Paz 2013).

Ongoing Monitoring Studies

The following on-going monitoring studies are conducted for the project scenario of this VPA (rocket stoves) following first verification of the associated initial ex-ante project studies. These monitoring studies investigate and define parameters that could not be determined at the time of the initial project studies or that change with time.

1a) Monitoring Survey (including Usage Survey) –

Completed annually, beginning after first verification

The monitoring survey investigates changes over time in every project scenario (and in a baseline scenario in case renewal of crediting period), by surveying end users with improved stoves on an annual basis. It provides critical information on year-to-year trends in end user characteristics such as technology use, fuel consumption and seasonal variations.

Monitoring Survey Representativeness:
End users from a given project scenario are selected using representative sampling techniques to ensure adequate representation of users with technologies of different ages. Common sampling approaches such as clustered random sampling are allowed and geographic distribution should be factored into selection criteria. End users can be surveyed at any time throughout the year with care taken to collect information pertaining to seasonal variations in technology and fuel use patterns.

Monitoring Survey sample sizing:

- Project Scenario Rocket Domestic:
  Minimum sample size 100 if more than 1000 stoves are distributed in total, else 10% of group size.
- Project Scenario Rocket Institutional/Commercial:
  Minimum sample size 30 or population size, whichever is smaller.

A monitoring survey has been conducted to families who has rocket domestic stove, 106 surveys were performed in Chuquisaca.

1b) Usage Survey (part of Monitoring Survey) – **Ur-d,y, Ur-ic,y**

Completed annually, beginning after first verification

The usage survey provides a single usage parameter $U_{r\text{-}d,y}$ and $U_{r\text{-}ic,y}$ for the two project scenarios of this VPA that is weighted based on drop off rates that are representative of the age distribution for project technologies in the total sales record.

A usage parameter must be established to account for drop off rates as project technologies age and are replaced. Prior to a verification, a usage parameter is required that is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario. For example, if only technologies in the first year of use (age0-1) are being credited, a usage parameter must be established through a usage survey for technologies age0-1. If an equal number of technologies in the first year of use (age0-1) and second year of use (age1-2) are credited, a usage parameter is required that is weighted to be equally representative of drop off rates for technologies age0-1 and age1-2.

The minimum total sample size is 100 (or population size, whichever is smaller), with at least 30 samples for project technologies of each age being credited. The majority of interviews are conducted in person and include expert observation by the interviewer within the kitchen in question in combination with the Monitoring Survey, while some remainder may be conducted via telephone by the same interviewers on condition that in kitchen observational interviews are first concluded and analyzed such that typical circumstances are well understood by the telephone interviewers.

A usage survey has been conducted (at the same time with the monitoring survey) to families who has rocket domestic stove, 105 surveys were performed in Chuquisaca, 94 were done in families with stoves age$_{5-6}$ and 11 to stove age$_{4-5}$. These two stoves ages represent the 96% of the domestic rocket stove installed, despite that stoves exists from ages $_{1-2}$, $_{2-3}$ and $_{3-4}$ these were not surveyed because of the reduced number of stoves installed.

2) Project Field Test (PFT) Update –

Completed every other year, or more frequently after first verification.

The PFT update is an extension of the project PFT and provides a fuel consumption assessment representative of project technologies currently in use every two years. Hence the PFT update accounts for changes in the project scenario over time as project technologies age and new customers are added, also as new models and designs are introduced. It is legitimate to apply an Age Test instead of a PFT, to project technologies, which remain materially the same year after year.

It was conducted Project Field Test to 35 Rocket Domestic stoves in June 2017 to define the fuel consumption of this scenario.

For institutional rocket stoves, no kitchen tests have been conducted so far, due to too low implementation rates. As a very conservative assumption the PFT update values of the domestic stoves are taken. This is proved with Field surveys and lab tests (Centro de Pruebas de Cocinas, CPC, La Paz 2013).

3) Baseline FT Update –

In this VPA a fixed baseline is adopted. Baseline Field Test do not have to be updated because it's a fixed ten years crediting period.

4) Leakage Re-Assessment –

Leakage is assessed on VPA Level. Leakage will be reassessed every two years.

5) Non-Renewable Biomass Assessment Update

Completed annually, if new CDM default values are published.

Sustainable Development Monitoring Plan

The SD monitoring is discussed inside the Validation Appraisal Report of the VPA1. More details of the parameters and its indicators in appendix 2.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

Data/Parameter	**$f_{NRB, Bolivia}$**
Unit	
Description	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass.
Source of data	CDM Small Scale Working group, meeting 37 annex 14, ssc_37_an14.pdf
Value(s) applied	84%
Choice of data or measurement methods and procedures	To justify this value a national governmental proof (by DNA) is needed according Gold Standard rules. CEDESOL tried to get this confirmation. However, for Bolivia the chance for governmental approval is very low, since the country does not accept the CDM and does not have an operating DNA. Thus, Gold Standard proposed to have the value revised by stakeholders: CEDESOL discussed this issue during Stakeholder Consultation Feedback round on PoA Design Level. This includes a renewed contacting of both DNA.
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	

Data/Parameter	**$NCV_{b,wood}$**
Unit	TJ/ton
Description	Net calorific value of woody biomass
Source of data	GS TPDDTEC Meth.
Value(s) applied	0.015
Choice of data or measurement methods and procedures	Value from applied Methodology.
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	

Data/Parameter	**$EF_{b,wood,CO2}$**
Unit	tCO2/TJ
Description	CO2 emission factor for Wood
Source of data	GS TPDDTEC Meth.
Value(s) applied	112
Choice of data or measurement methods and procedures	Value from applied Methodology.
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	

Data/Parameter	**$EF_{b,wood,nonCO2}$**
Unit	tCO2/TJ
Description	Non_CO2 emission factor of the fuel that is reduced.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol.2 Energy, Chapter 2, Stationary Combustion, Table 2.5
Value(s) applied	9.592

Choice of data or measurement methods and procedures	Default IPCC values for CH_4 and N_20 emissions for wood / wood waste, are applied. The following GWP100 are applied: 25 for CH_4, 298 for N_20 EF_wood_CH_4= 0.3tCH4/TJ EF_wood_N_2O = 0.004tN2O/TJ
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	$N_{r\text{-}d,y}$
Unit	Days
Description	Cumulative number of project technology-days included in the project database for project scenario r-d (rocket domestic) in year y
Measured/calculated/ default	Calculate
Source of data	Sales record
Value(s) of monitored parameter	See relevant ER calculation spread sheet For y = 2017: 297,110 2018: 297,110
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Continuously
Calculation method (if applicable)	Not applicable
QA/QC procedures	CEDESOL performs the data collection and puts the data into the sales record. myclimate revises and analyses this data
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	See excel files “GS1221_MR3_Sales record_CEDESOL.xls” and “GS1221_MR3_ER Calc_CEDESOL.xls”

Data/Parameter	**$N_{r\text{-}ic,y}$**
Unit	Days
Description	Cumulative number of project technology-days included in the project database for project scenario r-ic (rocket institutional/commercial) in year y.
Measured/calculated/ default	Calculate
Source of data	2012 figures from sales record and planning for future years.
Value(s) of monitored parameter	See relevant ER calculation spread sheet. For y = 2017: 6570 2018: 6570
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Continuously
Calculation method (if applicable)	Not applicable
QA/QC procedures	CEDESOL performs the data collection and puts the data into the sales record. myclimate revises and analyses this data

Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	See excel files “GS1221_MR3_Sales record_CEDESOL.xls” and “GS1221_MR3_ER Calc_CEDESOL.xls”

Data/Parameter	**$U_{r-d,y}$**
Unit	Fraction
Description	Cumulative usage rate for technologies in project scenario r-d (rocket domestic) in year y, based on first linear assumption.
Measured/calculated/ default	Calculated
Source of data	First assumption based on CMEs experience.
Value(s) of monitored parameter	See relevant ER calculation spread sheet. For y = 2017: 0.90 2018: 0.90
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices - Level B Good Practice Monitoring Requirements
QA/QC procedures	CEDESOL performs the data collection and puts the data into the project database. myclimate revises and analyses this data.
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	See excel files “GS1221_MR3_Monitoring Usage Surveys_CEDESOL.xls” See Appendix 4 FAR Internal Verification: GS 2nd Monitoring Period: 01/01/2016 to 31/12/2016

Data/Parameter	**$U_{r-ic,y}$**
Unit	Fraction
Description	Cumulative usage rate for technologies in project scenario r-ic (rocket institutional/commercial) in year y, based on first linear assumption.
Measured/calculated/ default	Calculated
Source of data	First assumption based on CMEs experience.
Value(s) of monitored parameter	See relevant ER calculation spread sheet. For y = 2017: 0.90 2018: 0.90
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices - Level B Good Practice Monitoring Requirements
QA/QC procedures	CEDESOL performs the data collection and puts the data into the project database. myclimate revises and analyses this data.
Purpose of data/parameter	Project emission calculation Baseline emission calculation

Additional comments	See excel files “GS1221_MR3_Monitoring & Usage Surveys_CEDESOL.xls” See Appendix 4 FAR Internal Verification: GS 2nd Monitoring Period: 01/01/2016 to 31/12/2016

Data/Parameter	$P_{r\text{-}d,d,y}$
Unit	tons/day
Description	Specific fuel savings for domestic rocket stoves in Bolivia of project scenario r-d (rocket domestic) against the baseline scenario d (domestic) in year y, as derived from the statistical analysis of the data collected from the field test. Verified with Lab test results.
Measured/calculated/ default	Calculate
Source of data	Relevant Field Test, verified with Lab test results (Centro de Pruebas de Cocinas, CPC, La Paz 2013) See relevant FT spread sheet.
Value(s) of monitored parameter	0.0054
Monitoring equipment	Hand help portable electronic scale. This compact, accurate, and highly functional scale has features such as automatic shut-down, tare weight, display lock and audible feedback. The scale weighs in units of kilograms, pounds or ounces, and can convert between units. It is accurate to 1% for loads above 1kg (2.2 lb). Accuracy drops to 4% for loads between 0.25kg (0.55 lb) and 1kg (2.2 lb). Holds a maximum of 40kg (88 lb). It is resettable to 0 after every use or during use via the TARE feature and is accurate to 1% for our purposes.
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	See Description of measurement methods for the parameter.
QA/QC procedures	CEDESOL performs the data collection and puts the data into the project database. myclimate revises and analyses this data.
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	See excel file ” GS1221_MR3_Domestic-Rocket Stove_Field test_CEDESOL”

Data/Parameter	$P_{r\text{-}ic,ic,y}$
Unit	tons/day
Description	Specific fuel savings for institutional/commercial rocket stoves in Bolivia of project scenario r-ic (rocket institutional/commercial) against the baseline ic (institutional/commercial) in year y, as derived from the statistical analysis of the data collected from the baseline field survey and the lab test.
Measured/calculated/ default	Calculate
Source of data	No kitchen tests available due to too low implementation rate. As a very conservative assumption the KT values of the domestic stoves are taken, proved with baseline survey and thermal efficiency of project stove from lab test (Centro de Pruebas de Cocinas, CPC, La Paz 2013). See relevant KT spread sheet (Domestic rocket stove scenario)
Value(s) of monitored parameter	0.0054

Monitoring equipment	Hand help portable electronic scale. This compact, accurate, and highly functional scale has features such as automatic shut-down, tare weight, display lock and audible feedback. The scale weighs in units of kilograms, pounds or ounces, and can convert between units. It is accurate to 1% for loads above 1kg (2.2 lb). Accuracy drops to 4% for loads between 0.25kg (0.55 lb) and 1kg (2.2 lb). Holds a maximum of 40kg (88 lb). It is resettable to 0 after every use or during use via the TARE feature and is accurate to 1% for our purposes.
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	See Description of measurement methods for the parameter.
QA/QC procedures	CEDESOL performs the data collection and puts the data into the project database. myclimate revises and analyses this data.
Purpose of data/parameter	Project emission calculation Baseline emission calculation
Additional comments	Field tests (in baseline and project scenario) were not performed for institutional/commercial rocket stoves, for conservatism purpose is used the value obtained in domestic rocket stoves.

Data/Parameter	**$LE_{p,y}$**
Unit	tCO_{2e}/yr
Description	Leakage for project scenario p in year y
Measured/calculated/ default	Measured
Source of data	Leakage assessment on VPA-DD under B.5.2.
Value(s) of monitored parameter	0
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Not applicable
Calculation method (if applicable)	Not applicable
QA/QC procedures	Not applicable
Purpose of data/parameter	Calculation of leakage
Additional comments	

Leakage Assessment LE

As defined on PoA Level and as described in the TPDDTEC methodology every VPA must discuss the following potential sources of leakage:

L1) The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project.

→ Not possible: the base line kitchen equipment needs to be destroyed before it can be removed (fixed installation of adobe bricks or three stone fire).

L1 = 0

L2) The non-renewable biomass or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources.

→ Not reasonable: Similar baseline for neighboring families, so no fuel switch is possible due to the project.

L2 = 0

L3) The project significantly impacts the NRB fraction within an area, where other CDM or VER project activities account for NRB fraction in their baseline scenario.

→ Not realistic: The project boundary is too big to have influence on the NRB fraction on a national scale. However, locally some variations are expected.

L3 = 0

L4) The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology.

→ Negligible. In the project region, stoves are mainly integrated in the kitchen and not in the living room. Based on CEDESOL experience beneficiaries don't use stoves as a heating device. Furthermore as an outcome of the first Kitchen Survey for VPA1 it could be demonstrated that only 2.2% of the beneficiaries used their old stove for heating purposes.

L4 = 0

L5) By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline

→ Not possible: The existing Baseline Scenario is inefficient kitchen equipment. There is currently almost no technology used that is more efficient than the stoves distributed by the project.

L5 = 0

The result of the leakage assessment is that no potential source of leakage could be found at PoA Level that would lead to significant emissions. Therefore:

$L = \sum L_i = 0$

D.3. Implementation of sampling plan

>>

Monitoring and Usage surveys

The monitoring and usage survey was carried out for Domestic rocket stoves for Project scenario using representative and random sampling, following the guidelines of the methodology the sample sizes:

- Minimum sample size 100 if more than 1000 stoves are distributed in total, else 10% of group size. In the case of monitoring survey.
- The minimum total sample size is 100 (or population size, whichever is smaller), with at least 30 samples for project technologies of each age being credited. In the case of usage survey.

The VPA includes domestic and institutional rocket stove.

- Domestic rocket stove group size : 814

Department	Number of stoves
Chuquisaca	702
Cochabamba	112

- Institutional rocket stove group size :18

Department	Number of stoves
Chuquisaca	11
Cochabamba	7

Domestic Scenario:
105 monitoring and usage surveys were performed in the department of Chuquisaca as almost 88% of the domestic rocket stoves were installed in this department; 94 surveys in families with the project technologies for 5-6 years (85% of the total stoves installed has 5-6 ages) and 11 surveys in families with 4-5 years with the project technology (11% of the total stoves installed has 4-5 ages) and. It was only consider these two ages because stove with 2, 3 or 4 years does not represent a significant amount (only 4% of the total stoves installed).

The families selected were beneficiaries that received the rocket stoves.

A summary of the main findings are included in the annex 3 and the excel file "GS1221_MR3_Monitoring & Usage Surveys_CEDESOL.xls".

Project Field Test Update

As stated in the PoA-DD section D.6.1 for every scenario CEDESOL performs a performance field tests update for a representative sample of the group as an extension of the previous project PFT and provides a fuel consumption assessment representative of project technologies currently in use.

In this VPA, 35 surveys were conducted for domestic rocket stoves in the Department of Chuquisaca because almost 88% of the domestic rocket stoves were installed in this department.
The project field test update has been conducted in June of 2017.

The field tests for institutional/commercial rocket stoves were not performed because the small number of installed stoves. But according to the results of the Baseline Survey and the thermal efficiency of project stove from lab test (Centro de Pruebas de Cocinas, CPC, La Paz 2013), the wood consumption in baseline scenario is 37.2 kg wood/unit/day and the laboratory thermal efficiency is 27%, therefore the wood consumption in project scenario is 13.8 kg wood/unit/day, this results in a fuel savings of 23.4 kg wood/unit/day.

According to the field tests the domestic rocket stoves have a fuel savings of 6.41 kg wood/unit/day, therefore the option to use the results from domestic rocket stoves to estimate the emission reduction in institutional or commercial stoves are conservative.

The baseline test for domestic stoves was done in this first monitoring report and it will be used for this or different VPAs e.g. same baseline for rocket and solar stoves.

Statistical analysis following the guidelines of the methodology of the test results lead to the specific fuel consumption per family. More detail in annex 4.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>
Not applicable.

E.2. Calculation of project emissions or actual net removals

>>
Not applicable.

E.3. Calculation of leakage emissions

>>
In the specific micro VPA-DD is analysed and concluded that there is no leakage due to the project activity.

E.4. Calculation of emission reductions or net anthropogenic removals

Following the methodology, since the baseline fuel and the project fuel are the same for every baseline-project couple under this PoA the following equation is applied to calculate the emission reduction:

For the emission Reduction Calculation we apply the relevant formula from the applied methodology explained in the PoA-DD in section D 6.2.

$$ER_y = N_{r\text{-}d,y} * U_{r\text{-}d\text{-},y} * P_{r\text{-}d,d,y} * NCV_{b,wood} * (f_{NRB,\ Bolivia} * EF_{wood,\ CO2} + EF_{wood,\ nonCO2}) + N_{r\text{-}ic,y} * U_{r\text{-}ic,y} * P_{r\text{-}ic,ic,y} * NCV_{b,wood} * (f_{NRB,\ Bolivia} * EF_{wood,\ CO2} + EF_{wood,\ nonCO2})$$

Applied values for the Ex-ante Emission Reduction Calculation are listed above in the parameter sections D.1 and D.2. See also detailed calculation in relevant ER calculation spread sheet.

$N_{r\text{-}d,y}$: Cumulative number of project technology-days included in the project database for project scenario r-d (rocket domestic) in year y
$U_{r\text{-}d\text{-},y}$: Cumulative usage rate for technologies in project scenario r-d (rocket domestic) in year y, based on first linear assumption.
$P_{r\text{-}d,d,y}$: Specific fuel savings for domestic rocket stoves in Bolivia of project scenario r-d (rocket domestic) against the baseline scenario d (domestic) in year y.
$NCV_{b,wood}$: Net calorific value of woody biomass
$f_{NRB,\ Bolivia}$: Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass.
$EF_{wood,\ CO2}$: CO2 emission factor for Wood
$EF_{wood,\ nonCO2}$: Non_CO2 emission factor of the fuel that is reduced.
$N_{r\text{-}ic,y}$: Cumulative number of project technology-days included in the project database for project scenario r-ic (rocket institutional/commercial) in year y.
$U_{r\text{-}ic,y}$: Cumulative usage rate for technologies in project scenario r-ic (rocket institutional/commercial) in year y, based on first linear assumption.
$P_{r\text{-}ic,ic,y}$: Specific fuel savings for institutional/commercial rocket stoves in Bolivia of project scenario r-ic (rocket institutional/commercial) against the baseline ic (institutional/commercial) in year y.

In conclusion, the total of the emission reductions achieved during the monitoring period are:

Baseline emissions from domestic rocket stoves:	9,980	tCO_2e
Baseline emissions from domestic institutional/commercial rocket:	220	tCO_2e
Total baseline emissions:	10,2000	tCO_2e

Project emissions from domestic rocket stoves:	4,450	tCO_2e
Project emissions from domestic institutional/commercial rocket:	98	tCO_2e
Total project emissions:	4,552	tCO_2e
Total leakage:	0	tCO_2e
Total emission reductions:	**5,648**	**tCO_2e**

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	10,200	4,552	0		5,648	5,648

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante (t CO_2e)
5,648	19,508

E.6. Remarks on increase in achieved emission reductions

>>

The main difference between the emission reduction estimated in the VPA-DD and the calculated in the second monitoring report was the reduction of the number of stoves installed. In the VPA-DD the project considered the implementation of 2500 domestic rocket stoves between 2011-2018 and 200 institutional/commercial rocket stoves in the same period, but because some delays in the project implementation, until December of 2018, 814 domestic rocket stoves and 18 institutional/commercial rocket stoves were installed.

Appendix 1. Sustainability Monitoring conform sustainability monitoring plan in Appraisal Micro-Scale Validation Report

No		1
Indicator		Air quality – score positive
Mitigation measure		None needed
Chosen parameter		Number of beneficiaries who notice the improvement in air quality
Current situation of parameter		100% beneficiaries noticed the improvement in air quality (Rocket stove scenario)
Estimation of Baseline situation of parameter		Noticeable smoke exposure conditions
Way of monitoring	How	Surveys containing questions about status of indoor air quality according to their perceptions before and during the use of ecological stoves. Beneficiaries noticing an improvement in air quality are counted. Monitoring survey excel file – Survey Responses (Column HU – Question #30)
	When	Annually after first verification
	By who	CEDESOL forms a team of professionals, interns and/or organizations.

No		7
Indicator		Livelihood of the poor – score positive
Mitigation measure		None needed
Chosen parameter		Number of beneficiaries who notice savings in time, firewood and/or money
Current situation of parameter		100% of beneficiaries noticed savings in time, firewood and/or money
Estimation of Baseline situation of parameter		An average household will consume between 5 and 15 kg. firewood per day (depending on region). According to The World Bank the Bolivian rural population spends approximately 7 million working days a year to collect firewood. Families who purchase dung and wood as fuel spend from 2 to 3 times as much money that a households using LPG.
Way of monitoring	How	Surveys with questions about the amount fuel, money and time saved. Monitoring survey excel file – Survey Responses (Columns HV, HW,HX – Question #31)
	When	Annually
	By who	CEDESOL forms a team of professionals, interns and/or organizations.
Chosen parameter		Amount of Wood saved
Current situation of parameter		55.39% of wood savings
Estimation of Baseline situation of parameter		An average household will consume between 5 and 15 kg. firewood per day (depending on region).
Way of monitoring	How	Weighings of firewood are going to be made in the Field Test.

		Domestic-Rocket Stove Field Test excel file.
	When	Every 2 years after first verification for a period of 3-4 days.
	By who	A leader of each community will be trained in the educational program to help with the weighing.

No		8
Indicator		Access to affordable and clean energy services
Mitigation measure		None needed
Chosen parameter		Number of households with access to this technology
Current situation of parameter		814 domestic rocket stoves installed 18 commercial/institutional rocket stoves installed
Estimation of Baseline situation of parameter		The World Bank estimates that more than 70% of the rural population in Bolivia meet its energy demands with biomass.
Way of monitoring	How	A sales record (excel file) of all installed stoves.
	When	Upon delivery of the stoves
	By who	CEDESOL

No		9
Indicator		Human and institutional capacity
Mitigation measure		None needed
Chosen parameter		Number of people who are trained in our educational program
Current situation of parameter		41 of Innovative Leaders trained overall and 832 of folks completing the Modular Environmental Training (MET)
Estimation of baseline situation of parameter		0
Way of monitoring	How	The project will have a strong educational component through a Modular Environmental Training (MET). The trained people will be counted.
	When	A module every two months for 12 months (6 modules). The modules were 2 days long.
	By who	CEDESOL

No		11
Indicator		Technology transfer and technological self-reliance
Mitigation measure		None needed – the Project itself and the above justifications support this indicator as “positive”
Chosen parameter		The number of beneficiaries who can use and maintain their stoves.
Current situation of parameter		814 families that are trained about the use and maintenance of their stoves. 18 institutions that are trained about the use and maintenance of their stoves.
Estimation of baseline situation of parameter		0
Way of monitoring	How	Training will be made to all beneficiaries
	When	Upon delivery of the stoves
	By who	CEDESOL
Chosen parameter		The number of beneficiaries who will receive training for the assembly of rocket stoves.
Current situation of parameter		814 families received training for the assembly of rocket

		stoves 18 institutions received training for the assembly of rocket stoves
Estimation of baseline situation of parameter		0
Way of monitoring	How	The training program ensures the training of a leader who is capable of assembling rocket stoves (Sales Record excel file).
	When	As part of the first module of the training program.
	By who	CEDESOL

Appendix 2. Monitoring and Usage Survey Results

Municipality:	Yamparaez

Survey's period	4/3/2018	to	4/10/2018

Number of surveys	105

	Solar	**Roquet**	**Retención de Calor**
Type of ecological stove:	0	105	0

Details of Old Stove

1. Material of Old Stove	
Three Stone	8
Clay (Barro o k'oncha)	97
Gas	9
Kerosene (Anafre)	0
Lorena	0
Malena	0
Otra	0

2. Does your stove have a chimney?	
Yes	1
No	104

3. How many windows and openings does your kitchen have?	
0	0
1	22

2	7
3	5
Open Air	51
Other	0

4. Use of the stove	
Domestic	105
Commercial	0
Institutional	0

Fuel Use

Total Number of People Living in the Homes?	
< 10 Years	87
10 - 64 Years	317
> 65 Years	13
Total	417
Animals	55
Total People y Animals	472
Average Number of People and Animals per Household	4.50

7. Times in which more people eat	
Total Days	49
Total Workers	98
Average Number of Days per Household	1.90

8. Type and Quantity of Fuel	Firewood (Collected)	Firewood (Bought)	Gas	Other
Total Number of Homes	105	0	19	0
Time to Collect (Hours/Week)	574	0	1	0
Distance to Collect (km)	359	0	110	0

Frequency of Collection (Times/Week)	216	0	5.55	0
Frequency of Collection (Hours/Day)	0	0	18	0
Price per unit (Bs)	N/A	0	612	0

Question 8. Fuel Usage for Old Stove	**Firewood (Collected)**	**Firewood (Bought)**	**Gas**	**Other**
Average Time to Collect (Hours/Week)	5.47	N/A	0.05	N/A
Average Distance to Collect (km)	3.42	N/A	5.79	N/A
Average Frequency of Collection (Times/Week)	2.06	N/A	0.29	N/A
Average Frequency of Collection (Hours/Day)	0.71	N/A	0.95	N/A
Average Price per unit (Bs)	N/A	N/A	32.21	N/A

Use of Fuel if Bought				
Daily	N/A	0	16	0
Emergencies	N/A	0	4	0
Certain time of year	N/A	0	1	0
(See BT,CE,CO on Survey Responses worksheet for specific times)				

Data from New Stove

10. What has been done with the old stove?	
La vendí o la regalé	0
La destruí o la boté	96
Está en la casa y está siendo usada a veces.	8
Nunca está siendo usada	0

How many times is the old stove used per month per household	0.30

11. When was the last time that you used your ecological stove?	
Today	94
Yesterday	11
One week ago	0

One month ago	0
Other	0

12. How many times a day do you use the ecological stove?	
1	0
2	0
3	105
4	0
5	0
6	0

Who prepares the meals?	Man	Woman
Gender	14	95
Average Age	50.26	

Present for the Survey?	
Yes	105
No	0

14. The family cooks more meals a day with the ecological stove than with the traditional stove?	
Yes	0
No	105

14. How many extra plates in one day?	
< 2	0
2 to 5	0
5 to 10	0
> 10	0

15. Has anything changed in the use of the fuel (with the old cooker)?	
Yes	104
No	1

16. Fuel Usage with New Stove	Firewood (Collected)	Firewood (Bought)	Gas	Other
Total Number of Homes	105	1	0	0
Frequency of Collection (Times/Week)	105	0	0	0
Frequency of Collection (Hours/Day)	173	0	0	0
Price per unit (Bs)	N/A	0	0	0

16. Fuel Usage with New Stove	Firewood (Collected)	Firewood (Bought)	Gas	Other
Average Frequency of Collection (Times/Week)	1.00	0.00	N/A	N/A
Average Frequency of Collection (Hours/Day)	1.65	0.00	N/A	N/A
Average Price per unit (Bs)	N/A	0.00	N/A	N/A

17. Have the form of aquiring the fuel changed?	No Cambio	Mejor	Peor
The collection of firewood	1	104	0
The price	2	103	0
The time to collect	1	104	0

18. When do you use more fuel? (Firewood)	Little	Double	Triple	Maximum
In the morning	35	70	0	0
Midday	4	0	0	0
In the afternoon	62	41	0	1
In the night	0	1	0	0

18. When do you use more fuel? (Gas)	Little	Double	Triple	Maximum
In the morning	0	0	0	0
Midday	0	0	0	0
In the afternoon	0	0	0	0
In the night	0	0	0	0

18. When do you use more fuel? (Otro)	Little	Double	Triple	Maximum
In the morning	0	0	0	0

Midday	0	0	0	0
In the afternoon	0	0	0	0
In the night	0	0	0	0

18.Times of Year in Which More Fuel Used	**Less Fuel**	**Normal**	**More Fuel**
Spring(Sept. – Dic)	0	104	1
Summer (Dic. Mar)	0	103	2
Autumn (Mar – Jun)	0	105	0
Winter (Jun – Sept)	0	91	0

20. Is there a day in which you do not cook?	0
Average Number of Days per Household	0

21. Five years ago, was it easier to obain fuel than now?	
Yes	105
No	0

21b. Why?	
Less distance to collect	37
High quantity of fuel	53
Easier to Collect	53
Other	0

22. Is fuel now more expensive than 5 years ago?	
Yes	9
No	0
Don't buy	96

22b. Why?	
Economy at a national level	0
Shortage of fuel	98
Other	11

Average price 5 years ago	20
Average price now	35
Difference:	64%

23. In what state do you find the ecological stove?	
Excelent	0
Good	67
Regular	38
Bad	0

24. What do you like about your ecological stove?	
Tradition	0
Taste of the food	0
Cheap	1
Easy to use	85
Best cooker available	10
Lights easily	70
Serves many pots	66
Don't know other cookers	0
Cooks very quickly	0
It is easy to control the flames	0
Other	0

25. What problems do you have with your ecological stove?	
It has rusted	0
Problems with the chimney	1
Parts of the stove are broken	18

Problems with the rack	3
None	82
Other	5

USAGE

27. Use of the ecological stove	
Domestic	105
Commercial	0
Insititutional	0

28. Use of New Stove:	
The stove is used	105
The stove is not used	0

28. Use of the ecological stove (Interviewer Observation):	
The stove is used	105
The stove is not used	0

29. In the last two weeks, how many times have you used the traditional stove?	
Never	97
Once a day	0
Twice a day	0
Three times a day	0
Once every two days	0
Once a week	8
Twice a week	0

29. Use of the tradicional stove (Interviewer Observation):	
The stove is used	8
The stove is not used	97

30. Have you noticed a difference in the quality of the air in your home since aquiring the ecological stove?	
Yes	105
No	0

31. As part of having the ecological stove, have you noticed?	
Saved time	91
Saved money	26

Appendix 3. Project Field Test Update Results and Analysis

	Domestic Rocket Stove
	Savings per day per unit
	Wood (kg / unit / day)
Requested number of measurements	**>=20**
Number of measurements	**35**
Mean	**5.400**
Standard Deviation	1.92
Standard Error	0.32
t Value	*1.690*
Precision	10.1%
90% Conf. Int. High	5.95
90% Conf. Int. Low	4.85
Mean +30%	7.02
Mean - 30%	3.78
Conf. Int. inside +-30%	**yes**
Relevant Value	**mean**
Fuel Savings	**55.39%**
Consumption of wood - kg / unit / day Baseline Field Test (Sep 2014)	**12.106**

Appendix 4. FAR Internal Verification: GS 2nd Monitoring Period: 01/01/2016 to 31/12/2016

FAR#1 in future monitoring survey, the PP shall follow the rule update: requirements and guidelines for carrying out usage surveys for projects implementing improved cooking devices.

This 3rd monitoring report covering VPA-1 of GS 1221 continues the documentation of stove adaption as well as behavioral changes accomplished for the period from Jan 1, 2017 through December 31, 2018.

CEDESOL is in complete agreement with GS's revised designs to monitoring as is demonstrated by a quick review of our POA and earlier monitoring reports which clearly demonstrates CEDESOL's underpinning activities towards our mutual aim of long term stove uptake through behavioral changes.

Since 1998 some of the principals of CEDESOL have been involved in developing behavior change methods to help improve health and the environment by the use of solar cookers and efficient wood stoves.

It took several years before CEDESOL realized the importance of utilizing chimneys to evacuate the dangerous gases and particles which are present even in supposedly clean burning stoves without a chimney. It was in 2006 when an ancient stove user asked why her interior ceiling was black when her single pot rocket stove did not smoke. This dramatic in the field example spoke to CEDESOL designers clearly of the hidden dangers of using an un-ventilated stove indoors.

Initially CEDESOL considered that since users were already familiar with using biomass stoves for cooking, the transition from traditional technology would not be difficult. However we discovered (what many have still to face up to), that stove uptake, be it solar, biomass or retained heat cookers must be accompanied by a social awareness program to "hold the user's hand" so to speak until the new technology becomes appropriated by their family.

To that end, CEDESOL has continually incorporated awareness campaigns and end user training into it's ecological cooking technology dissemination. But more than that, CEDESOL discovered that it's beneficiary base, mostly woman lacked basic education on health, hygiene, resource management, recycling and other areas since most never had more than a 4th or 5th grade education and many do not know how to read. CEDESOL saw an opportunity to empower it's beneficiaries with tools they needed in order for them to improve their quality of life as well as strengthen stove uptake.

In 2012 CEDESOL began developing additional training to supplement the awareness campaigns and the installation, maintenance and use training each new stove user received before taking their stove home. In 2012 and early 2013 CEDESOL experimented with a program which was further developed to be called Environmental Wellbeing Brigades.

The program is clearly described in the POA, and in MR 1 and MR 2, including the manuals, workshop dates, names of leaders, names of all participants, photographs and other information which has been extensively provided within those reports and are on file with GS.

In summary for every 25 to 30 stove users, a leader was trained in hands-on workshops and each leader replicated the workshops in their communities so that the technology and resource management information became an integral part of their development without modifying their culture. There was a series of 6 hands on workshops divided throughout an 12-month period

given in the project area, which completed the Environmental and Wellness Brigades training within a program called Modular Environmental Training (MET).

The MET contains six (6) modules, each containing three (3) workshops. In each workshop, there are two (2) lesson & two (2) activities. At the conclusion of each module, there are two (2) extension activities that can be used at any point throughout the module if a CEDESOL trainer has extra time. There are also two (2) evaluation activities to complete at the end of each module.

This or a variation of this has become an integral part of CEDESOL's clean cooking technology programs and is attributed as a reason for a reasonably high stove use uptake over time.

Additionally, further documentation of the successes and weaknesses of the CEDESOL methodology is found in the Objective Observer's report in GS archives dated 'Internal_Verification_Report_OOs_Appraisal_VPA1_GS1221-Ecological Stoves for Better Living_05052016'.

The monitoring reports 1 and 2 are names 'GS1221_MR1_CEDESOL_V2_09May16' and 'GS1221_MR2_CEDESOL_V3_11Dec17' and are on file with GS registry.

Due to the extensive Awareness activities and intensive training already carried out it is CEDESOL's observation that the END USER TRAINING and AWARENESS CAMPAIGN components of this methodology have been achieved.

Furthermore, the physical and logistical conditions of the monitored communities are not conducive to further successful trainings as described in the methodology. 1) the majority of beneficiaries live in extended areas rather than close proximity to each other. 2) their activates preclude organizing a time for training workshop without the inducements of acquiring a new stove or other benefit. 3) as an incentive to allow the interviews, each participant received 3 kilos of sugar as a "thank you" for their cooperation. 4) According to previous monitoring documents, the number of "traditional stoves" encountered was 24 compared to the current 8, so traditional stove use was reduced, demonstrating successful awareness and up take.

Dr Tim Heaton of the Oxford University Statistics Department[7] in his visit to Bolivia in 2008 documented that the usual practice was for most rural families to have a simple LPG stove, but that their main cooking was carried out with solid biomass stoves because of the difficulties and cost of obtaining the bottled LPG in rural areas. Even after project implementation, this practice continues, with stove users utilizing gas for quick meals, or when firewood was wet and this condition was recorded and taken into account during baseline and during all monitoring activities, such that the use of LPG as a fuel is not taken into consideration, therefore it was not necessary to always include these stoves which were often in other locations, when photographing project stoves.

Based on the rule update: Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices (publication date: 23/08/2017), the usage Monitoring Requirements was applied for Level A. Mandatory and Level B. Good Practice

[7] https://www.goldstandard.org/sites/default/files/v02_08-02-10_gs_cook-stove_methodology.pdf

REQUIREMENT	OBJECTIVE	CEDESOL Action taken
A. Mandatory Monitoring Requirements		
Defining stove use and non-use.	The project developer shall define project stove use versus non-use (i.e. the continued use of traditional technology) to understand who should be considered eligible for crediting. due	Done – Stove use was defined early on, and is present in our POA. Additionally for the purpose of this and future monitoring scenarios, the definition was further enhanced to include documenting the actual characteristics present, such as ashes in the combustion chambers of the project stove or traditional stove if one existed; fire wood in their proximity, pots near by, stove temperature at the time of the interview, ongoing food preparation nearby, the presence of soot or spilled food residue.
Household Usage Survey	The project developer shall carry out an in person usage survey to determine stove use.	Done – The usage survey was designed and carried out according to GS methodologies and known best practices
Kitchen observation	The surveyor shall visit the household to gather objective information to support the usage survey findings (e.g. if the stove is warm to the touch, ashes present etc).	Done – 105 individual households were physically visited, inspected and stove users interviewed per this methodology and the results are contained in accompanying documents.
Interview with the primary cook	The surveyor shall interview the primary cook of the household to gather information on stove use patterns	Done – 105 primary cooks were interviewed in accordance with the survey document and GS methodology.
Photos of the cooking area(s)	The surveyor shall take photographs of the project stoves to gather visual data on the status of the stove; whether the stove is abandoned, damaged, or being actively used shall all be shown using clear photographs.	Done – Photographs of the project stoves and traditional stove technology were taken to document the visits, interviews and stove usage. Photographs were made using phone cameras as this was the only option available. There also were difficulties with some of the users and some of the cooking spaces were very difficult to photograph. However CEDESOL is satisfied that the information provided meets or exceeds the criteria of this methodology.
GPS coordinates	The surveyor shall record the GPS coordinates of the household as they provide verification that the household was visited.	Done – GPS coordinates were recorded of every household, using GARMIN GPS 72 INSTUMENT. And is recorded in appropriate documentation.

Verification checks	The verification checks shall be performed by the project developer prior to verification by the VVB.	Done – Telephone verifications were made by project developer and documented the veracity of the interviews.
B. Good Practice Monitoring Requirements		
Field team training and supervision	The project developer shall provide training and supervision necessary to ensure field teams have the capacity required to complete usage survey successfully	Done – The project developer provided training and supervision. The dates of the trainings on applying this methodology were: March 6, 2018 from 15:00 till 17:20 hours, where the new or revised guidelines were carefully explained (based on the English document, which Eleanor and David were able to understand), verbally in Spanish to Guadalupe. The only significant difference from previous methodologies was the requirement to physically inspect the stove, take pictures and acquire the GPS coordinates. Further training was held the following week on March 13,14, and 29 to dry run an app CEDESOL developed to be utilized on an Ipad to electronically input all data. Mock interviews were made in Spanish and both Eleanor and Guadalupe practiced recording the data. On March 22 from 15:00 to 16:15 hours the methodology was discussed, the trainings discussed. Questions were answered and plans made, establishing potential travel dates to project sites. Calls were made to Brigade leaders, and timing was discussed to try and determine the best timing to suit them and the beneficiary's activities. CEDESOL also asked for information concerning replacement parts and knowledge of any stove problems so that preparations could be made to deal with them. Before the trip, the internal battery for the ipad failed and one was ordered but did not come in time so smart phones were used to record the surveys, photos and GPS coordinates. David Whitfield: supervised the

		training, onsite interviews and reporting. Eleanor May: an UK volunteer, developed an app to collect data from the field on a mobile device, without internet, and reduce the time spent analyzing this data to have results immediately with clear instructions for everything. Guadalupe Torrico: a CEDESOL proponent since 2008, who has done Brigade workshops, stove training, previous interviews (including working with the Objective Observer when he made in-country interviews). She also speaks the Quechan language used predominately in the project area.
End-User Training and follow up visits	The project developer shall provide locally appropriate end-user training on project stove use via demonstrations and follow-up visits.	Done – End user training has been documented in previous Monitoring reports however every person interviewed was also advised as to the benefits of using stove technology. Some technical problems were dealt with and replacement parts given.
Awareness campaign	The developers shall organise the campaign to make end-user aware about the benefits of continuous use of project stove and key product attributes.	Done – CEDESOl's Brigade system incorporated Awareness campaigns. Additionally, Brigade leaders assured the CEDESOL team that they addressed problems encountered with stove use or need for replacement parts.
C. Best practice requirements		
Stove use monitoring	Stove use shall be monitored in randomly selected representative sample of households with temperature-sensing data loggers known as Continuous Stove Monitors (CSMs).	Not implemented

Conclusion: According the usage rate guidelines, the project developer can claim up to maximum 90% usage rate with Level B Good Practice Monitoring Requirements and with the results of Monitoring and Usage Survey Results conducted in 2018 – 100% of the households use the ecological stoves. Based on both results, it is selected the lower values between both usage rates - 90% - which is used as usage rate in the current monitoring period.

Submitted by
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Document information

Version	*Date*	*Description*
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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