Gold Standard
for the Global Goals

TEMPLATE

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

RELATED SUPPORT – **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

KEY PROJECT INFORMATION

Programme of Activity Information – (delete below table if N/A)

GS ID of Programme	GS1220
Title of Programme	Ecological Stoves for Better Living - Micro Scale PoA
Version of POA-DD applicable to this monitoring report	2.1
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	GS1221: GS 1220 Ecological Stoves for Better Living - Micro Scale PoA - VPA1 Bolivia GS2421: GS 1220 Ecological Stoves for Better Living – Microscale PoA – VPA2 Bolivia

Key Project Information

GS ID (s) of Project (s)	GS1221
Title of the project (s) covered by monitoring report	GS 1220 Ecological Stoves for Better Living – Microscale PoA – VPA1 Bolivia
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	2.0
Version number of the monitoring report	1.1
Completion date of the monitoring report	24/05/2021
Date of project design certification	19/06/2014
Date of Last Annual Report	NA
Monitoring period number	5th
Duration of this monitoring period	01/12/2019 – 31/12/2020
Project Representative	Foundation myclimate – The Climate Protection Partnership
Host Country	Bolivia
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	Technologies and Practices to Displace Decentralized Thermal Energy Consumption

	version 1
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
SDG1: No Poverty	Perception of time and monetary savings	100	%
	Proportion of families which noticed their income increased	18	%
SDG3: Good health and well-being	Air quality improvement	92	%
	Proportion of families which noticed lesser visit to medical facilities	63	%
SDG4: Quality Education	Number of people trained in educational program	832	pp
SDG5: Gender equality	Number of women trained by CEDESOL	41	pp
SDG7: Affordable and clean energy	Number of persons that benefit from efficient and clean technologies	2459	pp
SDG8: Decent work and economic growth	Number of jobs offered	4	pp
SDG12: Responsible consumption and production	Fuel savings achieved$_{2019}$ Fuel savings achieved$_{2020}$	46.09 46.09	% %
SDG13: Climate Action	ER expected in the crediting period$_{2019}$ ER expected in the crediting period$_{2020}$	159 1906	VERs VERs
SDG15: Life on Land	Amount of wood equivalents saved by the project$_{2019}$	144	Tons

	Amount of wood equivalents saved by the project$_{2020}$	1,694	Tons
SDG17: Partnership for the goals	Number of ecological stoves units installed in Bolivia	832	Units

Table 2 – Product Vintages

		Amount Achieved
Start Dates	**End Dates**	**VERs**
01/12/2019	31/12/2019	159
01/01/2020	31/12/2020	1,906

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

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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

[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.

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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[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

[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

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%**

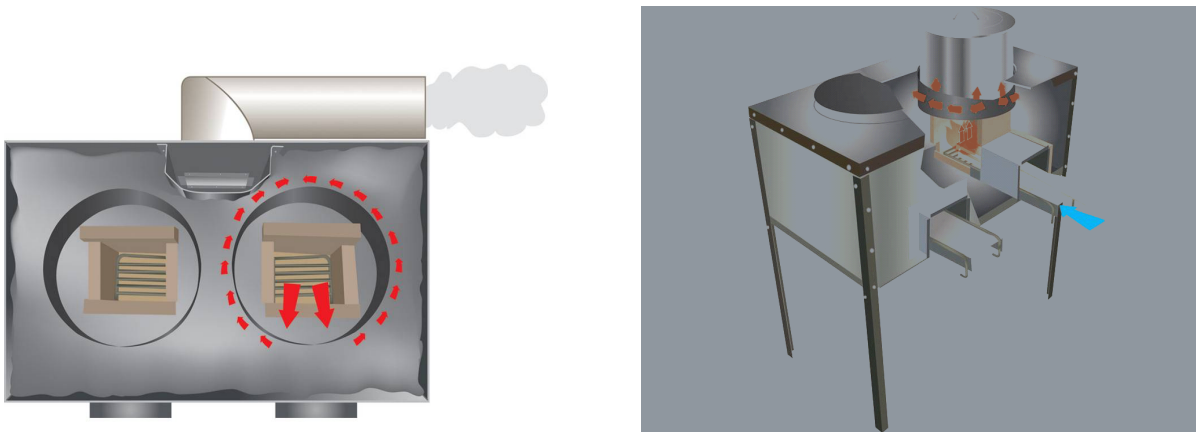
**HAP is the new designation for Indoor Air pollution (IAP), meaning Household Air Pollution as defined by the Global alliance for Clean Cookstoves.*

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.

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 – 03/04/2018
4th GS Monitoring Period: 04/04/2018 – 30/11/2019
5th GS Monitoring Period: 01/12/2019 – 31/12/2020

Actual GHG emission reductions in this monitoring period: 2,065 t CO_2e

A.2. Location of project

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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.

GPS coordinates

Department	Latitude	Longitude
Cochabamba	-17° 22' 59.99" S	-66° 09' 60.00" W
Chuquisaca	-20°00'0.00" S	-64°24'59.99" W

A.3. Reference of applied methodology

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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.4. Crediting period of project

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The project has a 10 year fixed 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

B.1. Description of implemented project

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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.1.1. Forward Action Requests

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Not applicable.

B.2. Post-Design Certification changes

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B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

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The deviation request requested was based on the section 3.1.1(a) of the Rule Update - COVID-19: Interim Measures (dated 24.07.2020). Accordingly, the Project Developer implements the alternative monitoring approach of conducting monitoring and usage surveys through telephonic interviews only for the fifth monitoring period (MP5) ranging from 01/12/2019 to 31/12/2020. Based on a conservative approach only for this monitoring period it is applied the Level A (mandatory requirements) of the 'Rule Update - Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices (dated 23/08/2017)' for conducting monitoring and usage surveys and applied a maximum value of usage rate of 75% which leverage the potential differences in terms of data quality between the face-to-face interviews and phone calls.

Deviation request: COVID_DEV156 approved September 23rd, 2020.

B.2.2. Corrections

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Not applicable.

B.2.3. Changes to start date of crediting period

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Not applicable.

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

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Not applicable.

B.2.5. Changes to project design of approved project

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Not applicable.

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

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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 - Pr-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, 108 surveys were performed in Chuquisaca between December 2020 – January 2021.

The main results of this survey:

- 100% of the families used three times the ecological stove per day.
- 100% of the families use firewood and 100% collect it from the forest.
- 69% of the families use LPG as a second fuel, one 'garrafa' (10 kg) is used during two or three months and used for emergencies during the evening. Its use increased because the current COVID pandemic as the families have more time at home.
- On average families goes 1.00 time per week to collect firewood.
- 100% of the families state that 'there has been significant change in the use of fuel' (compared with the old stove).
- 100% of the families state that five years ago it was easier to obtain fuel than now. The main reasons are it was easier to collect, less distance to collect and high quantity of fuel.
- 100% of the families state that fuel is more expensive than 5 years ago because shortage of fuel and there is a 100% increase in the price of fuel.

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 age 0-1. If an equal number of technologies in the first year of use (age 0-1) and second year of use (age 1-2) are credited, a usage parameter is required that is weighted to be equally representative of drop off rates for technologies age 0-1 and age 1-2.

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 interviews were conducted through telephonic interviews in person in combination with the Monitoring Survey.

A usage survey has been conducted (at the same time with the monitoring survey) to families who have a rocket domestic stove, 108 surveys were performed in Chuquisaca Between December 2020 and January 2021, 81 were done in families with stoves age$_{8\text{-}9}$ and 27 to stove age$_{7\text{-}8}$. These two stoves ages represent the 96% of the domestic rocket stove installed, despite that stoves exists from ages $_{4\text{-}5}$ and $_{5\text{-}6}$ these were not surveyed because of the reduced number of stoves installed.

The main results of this survey:

- 100% of the families used the ecological stove.
- 100% of the families declare that the stove is in regular state.
- The interviewer confirms that 100% of the ecological stoves are being used.

(a) Description of implemented sampling design

The monitoring and usage survey were done at the same time with the same beneficiaries, the sample size set was 108 which is greater than 100 which is the minimum size allows for monitoring surveys described in the PoA-DD, besides comply the rule of usage survey which the minimum total sample size is 100, with at least 30 samples for project technologies of each age being credited. As described below the rule is complied.

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The special circumstances to conduct the monitoring and usage survey – telephonic surveys - prioritize the random selection of families which a telephone registered in CEDESOL database. As some of the families had changed their telephone numbers, the project developer contacted the innovative leaders to locate families without a registered telephone number in CEDESOL database. When a family was located the two monitoring personnel involved in the surveys contacted these families through the telephone of the innovative leaders.

(b) Collected data

The usage survey provides information of parameter $U_{r-d,y}$ cumulative usage rate for technologies in project scenario r-d (rocket domestic) in year y, based on first linear assumption.

The monitoring surveys provides information of the next parameters:

- Perception of time and monetary savings
- Proportion of families which noticed their income increased
- Air quality improvement
- Proportion of families who noticed better health and less medical problems because the introduction of an ecological stove
- Average household size

(c) Analysis of the collected data

The collected data for rocket domestic users for usage surveys is the usage rate of each project technologies age detailed below:

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But for ER calculation and based on deviation requested approved COVID_DEV156 approved 25.09.2020, the usage parameter set is 0.75 for each year of the monitoring period.

Parameters	**Values**
$U_{r-d,y}$	2017: 0.75
	2018: 0.75
	2019: 0.75

The monitoring surveys provides information of the next parameters

Parameters	**Values**
Perception of time and monetary savings	100%

Proportion of families which noticed their income increased	18%
Air quality improvement	92%
Proportion of families who noticed better health and less medical problems because the introduction of an ecological stove	63%
Average household size	4.03

(d) Demonstration that the required confidence/precision level has been met;
The only absolute parameter is the 'Average household size' which has 7% therefore comply the 90/30 precision required in methodology 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption' version 1. More detail in "GS1221_MR5_Monitoring & Usage Surveys_CEDESOL_V1.xls" spreadsheet 'Survey Responses'.

(e) Demonstration that the samples were randomly selected and are representative of the population.
As explained in point a) despite the special situation with the pandemic the monitoring and usage surveys were carried out using representative and random sampling based on the families with a telephone number registered in CEDESOL database.

The methodology for collecting data, sampling, analysis and achieved confidence levels has been the same since the inception of the PoA in 2012 and is used for both currently active VPA 1 and 2. The only difference in methodology is the use of electronic forms developed from the written forms previously implemented. Changes to the information collected was done as per Transition and Development Goals require modification, but the methodology remained the same. See https://www.kobotoolbox.org/ to understand this process.

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 December 2019 to define the fuel consumption of this scenario. The previous PFT was conducted in June 2017, the goal is to perform every other year this test as registered PDD, but because some delay in getting finance, besides National elections held in October (due to problems during this election, the whole country was on strike with roads blocked all throughout the country). By the end of November, the situation became calm, but CEDESOL had to schedule the monitoring trip with the rural stove owners and depended upon them to give adequate advice as to the safety of CEDESOL traveling and working in their area. For those reason the current monitoring session was completed in December 2019 which was the absolute soonest is could have been done.
The main results of this survey:

- On average, each family used 6.53 kg/day per ecological stove. A reduction of 46.09% compared with baseline consumption of firewood.

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).

(a) Description of implemented sampling design
The sample size set is 35 which is greater than 20 (see 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption' version 1 page 13), a random sampling approach was chosen.

(b) Collected data
The PFT provides a fuel consumption assessment representative of project scenario r-d (rocket domestic) currently in use which will allow to estimate the $P_{r\text{-}d,d,y\ s}$ specific fuel savings for domestic rocket stoves in Bolivia of project scenario r-d (rocket domestic).

(c) Analysis of the collected data
The only collected data for PFT update is the fuel consumption of rocket domestic users

(d) Demonstration that the required confidence/precision level has been met;
As stated in methodology 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption' version 1 the 90/30 precision is achieved as estimated

in the table below. More detail in "GS1221_MR5_Domestic-Rocket Stove_Field test_CEDESOL_V1.xls" spreadsheet 'Error Analysis'.

Domestic Rocket Stove

Information Baseline test (Sep 2014)	
Bbl,y Average (kg/day/stove)	12.11
Standard deviation (kg/day)	3.90
BL variance	15.18
Sample size	22
Information Project Scenario test	
Bpj,y Average (kg/day/stove)	6.53
Standard deviation (kg/day)	3.05
PS variance	9.31
Sample size	35

Analysis of independent samples	
Do they have the same variance (Ho)?	
BL variance	15.176
PS variance	9.313
F test	1.630
F value ($F_{21,34,95\%}$)	1.875
F value ($F_{21,34,5\%}$)	0.503
Conclusion: The variances are not equal	

Error analysis for variances not equal	
Average daily wood savings (kg/day/stove)	5.58
degrees of freedom	36.93
t value for 90% Confidence Interval	1.70
Bpj,y Upper bound (kg/day/stove)	7.24
Bpj,y Lower bound (kg/day/stove)	3.91
error	29.84%

(e) Demonstration that the samples were randomly selected and are representative of the population.

The project surveys are carried out for each possible scenario using representative and random sampling.

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 and is reassessed with the latest surveys conducted.

As defined on PoA Level and as described in the TPDDTEC meth., 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 baseline 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. Only 832 ecological stoves have been installed and its effect over the NRB fraction is negligible. However, locally some variations are expected. Based on Monitoring Survey 2020, the main results of this survey in NRB fraction within project area are described as:

- Five years ago, it was easier to obtain fuel than now, the main reason were: Less distance to collect, high quantity of fuel and easier to collect and also the price has increased 67% in the last 5 year which impact the availability of firewood (cell C140 spreadsheet 'Data analysis' of Monitoring & Usage Surveys).

It is confirmed that local variations have occurred at project level in terms of a shortage of firewood which would increase the NRB fraction, but for conservatism is not applied for this monitoring period. Therefore is reasonable to consider that the fNRB has not been impacted.

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. And based on monitoring surveys 2020 0% of the families us the stove for heat the room (cell C180 spreadsheet 'Data analysis' of Monitoring & Usage Surveys).

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: As described under D.4.1 of PDD the existing Baseline Scenario is inefficient kitchen equipment and confirm with Monitoring Survey 2020 (27% of the household confirm the use clay wood-fired stoves once a week - cell D176 spreadsheet 'Data analysis' of Monitoring & Usage Surveys). 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:

$L = \sum L_i = 0$

Procedure for old Baseline stove

Beneficiaries were asked to but not be forced to destroy their old stoves when purchasing a new more efficient one. We think it is not in our position to do so. However families have been trained about the benefits of the new technology and its positive impacts on health, energetic consumption, smoke and more in CEDESOLs environmental programme (see MET program description in PoA DD). So the goal of the programme is that participants disclaim the old technology on a voluntary base. Anyway, if old stoves are still in use during the project this will be included in the Field Tests and thus accounted in the Emission Reduction calculation.

Based on Monitoring Surveys 2020, traditional stoves have been:

- 68% of the families destroyed or threw away the old stove or it is in the house and never being used (cell D66 spreadsheet 'Data analysis' of Monitoring & Usage Surveys).

5) Non-Renewable Biomass Assessment Update

Completed annually, if new CDM default values are published.

There is no DNA submissions to UNFCCC https://cdm.unfccc.int/DNA/fNRB/index.html about fNRB

Sustainable Development Goals Monitoring Plan

The SDG monitoring is discussed inside the Verification Appraisal Report of the VPA1. More details of the parameters and its indicators in section D below.

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

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Relevant SDG Indicator: SDG 13 Climate Action

Data/parameter:	**fNRB, 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	Calculation of baseline scenario Calculation of project scenario
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	Calculation of baseline scenario Calculation of project scenario
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	Calculation of baseline scenario Calculation of project scenario
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)	8.692
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	Calculation of baseline scenario Calculation of project scenario
Additional comments	

D.2. Data and parameters monitored

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Relevant SDG Indicator: SDG 1

Target 1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

Data/Parameter:	Perception of time and monetary savings
Unit	%
Description	Proportion of families confirming the reduction of time or monetary expenditures after installation of ecological stoves units
Source of data	Monitoring survey (December 2020)
Value(s) applied	100%
Measurement methods and procedures	Annual household surveys provide data if time and monetary expenditures for has been reduced
Monitoring frequency	Annual

QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario
Additional comments:	Surveys with questions about the amount fuel, money and time saved. Monitoring survey excel file – Data Analysis (cell B195)

Data/Parameter:	Proportion of families which noticed their income increased
Unit	%
Description	Percentage families confirming the increasing of their income after installation of ecological stoves units
Source of data	Monitoring survey (December 2020)
Value(s) applied	18%
Measurement methods and procedures	Annual household surveys provide data if family income has increased
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario
Additional comments:	Surveys with questions about increasing of their income. Monitoring survey excel file – Data Analysis (cell B198)

Relevant SDG Indicator: SDG 3

Target 3.9.1 Mortality rate attributed to household and ambient air pollution

Data/parameter:	Air quality improvement
Unit	%
Description	Proportion of families confirming the reduction on smoke in households
Source of data	Monitoring survey (December 2020)
Value(s) applied	92%
Measurement methods and procedures	Question about the improvement of air quality after using ecological stove
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario

Additional comments:	Surveys with question confirming the reduction on smoke in households Monitoring survey excel file – Data Analysis (cell B185)

Data/parameter:	Proportion of families who noticed better health and less medical problems because the introduction of an ecological stove
Unit	%
Description	Percentage families confirming better health and less medical problems since installing the ecological stove
Source of data	Monitoring survey (Oct-Nov 2020)
Value(s) applied	63%
Measurement methods and procedures	Annual household surveys provide data if family have reduced their visit to medical facilities.
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario
Additional comments:	Surveys with questions confirming better health and less medical problems Monitoring survey excel file – Data Analysis (cell B202)

Relevant SDG Indicator: SDG 4

Target 4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

Data/Parameter:	Number of people trained in educational program
Unit	Number of persons
Description	Number of folks completing the Modular Environmental Training (MET)
Source of data	CEDESOL records
Value(s) applied	832 of folks completing the Modular Environmental Training (MET)
Measurement methods and procedures	Counting number of people trained
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario

Additional comments:	The project will have a strong educational component through a Modular Environmental Training (MET).

Relevant SDG Indicator: SDG 5

Target 5.5.2 Proportion of women in managerial positions

Data/parameter:	Number of women trained by CEDESOL
Unit	Number of women
Description	Number of women trained by CEDESOL as innovative leaders
Source of data	CEDESOL training records
Value(s) applied	41 (Innovative Leaders trained)
Measurement methods and procedures	Counting number of female leaders
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario
Additional comments:	N.A

Relevant SDG Indicator: SDG 7

Target 7.1.2 Proportion of population with primary reliance on clean fuels and technology

Data/Parameter:	Number of persons that benefit from efficient and clean technologies
Unit	Number of beneficiaries
Description	Number of persons that benefit from efficient and clean technologies
Source of data	Project database, Monitoring survey
Value(s) applied	2459
Measurement methods and procedures	Total number of units installed multiplied with usage rates multiplied with average household size
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario

Additional comments:	Number of domestic ecological stoves: 814 Usage rate: 75% Average household size: 4.03 (Monitoring survey December 2020– Data Analysis – cell B47)

Relevant SDG Indicator: SDG 8

Target 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities

Data/parameter:	Number of jobs offered
Unit	Number of employees
Description	Number of jobs offered by CEDESOL to local employees
Source of data	CEDESOL employment records
Value(s) applied	56 (Total number of people employed from 2012 to present) In addition to the 4 full time CEDESOL employees Average salary is above Bolivian minimum wage (2122 BOB per month)
Measurement methods and procedures	Total number of employees
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting The wages are in line with Bolivian minimum wage salary approved by the Government https://www.ine.gob.bo/index.php/estadisticas-economicas/salario-minimo-nacional-cuadros-estadisticos/
Purpose of data:	Calculation of project scenario
Additional comments:	Currently CEDESOL do not offer jobs except when doing monitoring which was not the case because the pandemic.

Relevant SDG Indicator: SDG 12

Target 12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

Data/Parameter:	Fuel savings achieved
Unit	%

Description	Fuel savings in % achieved by project technologies compared to baseline.
Source of data	Baseline and Project Scenario Field Test (2017)
Value(s) applied	46% for ecological stoves installed
Measurement methods and procedures	Fuel savings divided by baseline fuel consumption expressed in %
Monitoring frequency:	Every other year
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario
Additional comments:	NA

Relevant SDG Indicator: SDG 13 Climate Action

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
Source of data	See relevant FT spread sheet.
Value(s) applied	0.0065
Measurement methods and procedures	See Description of measurement methods for the parameter. 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.
Monitoring frequency	Every two years
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	Calculation of baseline scenario Calculation of project scenario
Additional comments	See excel file ” GS1221_MR2_Domestic-Rocket Stove_Field test_CEDESOL.xls”

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
Source of data	Sales record
Value(s) applied	See relevant ER calculation spread sheet For y = 2019: 25,234 2020: 297,110
Measurement methods and procedures	CEDESOL database
Monitoring frequency	Continuously
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	Calculation of baseline scenario Calculation of project scenario
Additional comments	See excel files "GS1221_MR5_Sales record_CEDESOL_V1.xls" and "GS1221_MR5_ER Calc_CEDESOL"

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
Source of data	Sales record
Value(s) applied	See relevant ER calculation spread sheet For y = 2019: 558 2020: 6570
Measurement methods and procedures	CEDESOL database
Monitoring frequency	Continuously
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	Calculation of baseline scenario Calculation of project scenario
Additional comments	See excel files "GS1221_MR5_Sales record_CEDESOL_V1.xls" and "GS1221_MR5_ER Calc_CEDESOL"

Data/Parameter	**$U_{r\text{-}d,y}$**
Unit	Fraction
Description	Cumulative usage rate for technologies in project scenario r-d (rocket domestic) in year y, based on first linear assumption.
Source of data	Usage survey

Value(s) applied	See relevant ER calculation spread sheet. For y = 2019: 0.75 2020: 0.75
Measurement methods and procedures	Average of the usage rate based on results of usage surveys and the threshold of Level A (mandatory requirements) of the Rule Update - Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices (dated 23/08/2017).
Monitoring frequency	Annually
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	Calculation of baseline scenario Calculation of project scenario
Additional comments	See excel files "GS1221_MR5_Monitoring & Usage Surveys_CEDESOL.xls"

Data/Parameter	**$U_{r\text{-}ic,y}$**
Unit	Fraction
Description	Cumulative usage rate for technologies in project scenario r-ic (rocket institutional/commercial) in year y, based on first linear assumption.
Source of data	Usage survey
Value(s) applied	See relevant ER calculation spread sheet. For y = 2019: 0.75 2020: 0.75
Measurement methods and procedures	Average of the usage rate based on results of usage surveys and the threshold of Level A (mandatory requirements) of the Rule Update - Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices (dated 23/08/2017).
Monitoring frequency	Annually
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	Calculation of baseline scenario Calculation of project scenario
Additional comments	See excel files "GS1221_MR5_Monitoring & Usage Surveys_CEDESOL.xls"

Data/Parameter:	**$LE_{p,y}$**
Unit	tCO_{2e}/yr
Description	Leakage for project scenario p in year y
Source of data	Leakage assessment on VPA-DD under B.5.2.

Value(s) applied	For y = 2019: 5 2020: 50
Measurement methods and procedures	Based on section E.3 of the Monitoring Report
Monitoring frequency	Not applicable
QA/QC procedures	Not applicable
Purpose of data	Calculation of leakage
Additional comments	See excel files "GS1221_MR5_ER Calc_CEDESOL_V1.xls" sheet 'LPG assess'.

Relevant SDG Indicator: SDG 15

Target 15.1.1 Forest area as a proportion of total land area

Data/Parameter:	Amount of wood equivalents saved by the project
Unit	Tons of wood equivalents
Description	Amount of wood savings achieved by the project per year expressed in wood equivalents
Source of data	Baseline and Project Scenario Field Test
Value(s) applied	2019: 141 tons of wood saved for domestic rocket stoves installed and 3 tons of wood saved commercial/institutional rocket stoves. 2020: 421 ,658 tons of wood saved for domestic rocket stoves installed and 37 tons of wood saved commercial/institutional rocket stoves.
Measurement methods and procedures	Project technology days multiplied with wood savings in t/day/stove
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of baseline scenario Calculation of project scenario
Additional comments:	N.A.

Relevant SDG Indicator: SDG 17

Target 17.7.1 Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies

Data/Parameter:	Number of ecological stoves units installed in Bolivia
Unit	Number (quantity)
Description	Number of ecological stoves units installed in Bolivia
Source of data	814 domestic rocket stoves installed and 18 commercial/institutional rocket stoves installed
Value(s) applied	Based on latest Total Sales Record
Measurement methods and procedures	Total number of ecological stove units installed since project start
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Calculation of project scenario
Additional comments:	N.A.

D.3. Comparison of monitored parameters with last monitoring period

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
Perception of time and monetary savings	100%	100%
Proportion of families which noticed their income increased	18%	0%
Air quality improvement	92%	92%
Proportion of families who noticed better health and less medical problems because the introduction of an ecological stove	63%	80%
Number of people trained in educational program	832	832
Number of women trained by CEDESOL	41	41
Number of persons that benefit from efficient and clean technologies	2459	2594

Number of jobs offered	4	6
Fuel savings achieved	2019: 46.09% 2020: 46.09%	2018: 46.09% 2019: 46.09%
$P_{r\text{-}d,d,y}$	0.0065	0.0065
$P_{r\text{-}ic,d,y}$	0.0065	0.0065
$N_{r\text{-}d,y}$	2019: 25,234 2020: 297,110	2018: 220,594 2019: 270,062
$N_{r\text{-}ic,y}$	2019: 558 2020: 6570	2018: 4,878 2019: 5,994
$U_{r\text{-}d,y}$	2019: 0.75 2020: 0.75	2018: 0.90 2019: 0.90
$U_{r\text{-}ic,y}$	2019: 0.75 2020: 0.75	2018: 0.90 2019: 0.90
$LE_{p,y}$	2019: 5 2020: 50	0
Amount of wood equivalents saved by the project	2019: 144 2020: 1,694	2018: 1,258 2019: 1,546
Number of ecological stoves units installed in Bolivia	832	832

D.4. 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:
108 monitoring and usage surveys were performed in the department of Chuquisaca as almost 88% of the domestic rocket stoves were installed in this department. 81 surveys in families with the project technologies for 8-9 years (79% of the total stoves installed has 8-9 ages) and 27 surveys in families with 7-8 years with the project technology (17% of the total stoves installed has 7-8 ages). It was only consider these two ages because stove with 5 or 6 years does not represent a significant amount (only 4% of the total stoves installed).

The families selected were randomly identified beneficiaries that received the rocket stoves.

A summary of the main findings are included in the annex 3 and the excel file "GS1221_MR5_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 December 2019.

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 5.58 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 details Field Test spreadsheet "GS1221_MR4_Domestic-Rocket Stove_Field test_CEDESOL".

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

>>

SDG1: No Poverty

Without the project, there is no time and monetary savings

Baseline value = 0%

Without the project, there are no families, which noticed their income increased time and monetary savings.

Baseline value = 0%

SDG3: Good health and well-being

Without the project, there is no air quality improvement

Baseline value = 0%

Without the project, there is not a reduction in visiting medical facilities

Baseline value = 0%

SDG4: Quality Education

Without the project, there is not people trained in educational program

Baseline value = 0.

SDG5: Gender equality

Without the project, there is not women trained as innovative leaders

Baseline value = 0.

SDG7: Affordable and clean energy

Without the project, there is anybody with an ecological stove

Baseline value = 0.

SDG8: Decent work and economic growth

Without the project, there is no local people employed by a sustainable project

Baseline value = 0.

SDG12: Responsible consumption and production

Without the project, there would be families which consumes firewood for cooking

Baseline value $_{2019}$ = 0.0121 tonnes wood/day/unit

Baseline value $_{2020}$ = 0.0121 tonnes wood/day/unit

SDG13: Climate Action

It is not applicable as the methodology used only has a formula for Emission Reduction (see section E.3). But the baseline emissions are estimated based on the same formula for ER but instead of the parameter fuel savings is used the fuel consumption for baseline scenario (12.106 kg/day/stove).

Baseline value domestic stoves $_{2019}$ = 360 tCO_2

Baseline value domestic stoves $_{2020}$ = 4,249 tCO_2

SDG15: Life on Land

Without the project, there would be families which consumes firewood for cooking

Baseline value domestic stoves $_{2019}$ = 0.0121*25234 = 305 tonnes

Baseline value domestic stoves $_{2020}$ = 0.0121*297110 = 3,597 tonnes

Baseline value commercial/institutional rocket stoves $_{2019}$ = 0.0121*558 = 7 tonnes

Baseline value commercial/institutional rocket stoves $_{2020}$ = 0.0121*6570 = 80 tonnes

SDG17: Partnership for the goals

Without the project, there are not any stoves installed

Baseline value domestic stoves = 0.

Baseline value commercial/institutional = 0.

E.2. Calculation of project value or estimation of project situation of each SDG Impact

>>

SDG1: No Poverty

Proportion of families confirming the reduction in time or money since the use of ecological stove

Project value = 100%

Proportion of families confirming the increasing of their income since the use of ecological stove

Project value = 18%

SDG3: Good health and well-being

Proportion of families confirming the reduction on smoke in households

Project value = 92%

Proportion of families confirming a better health and less medical problems because the introduction of an ecological stove

Project value = 63%

SDG4: Quality Education

Number of folks completing the Modular Environmental Training (MET)

Project value = 832.

SDG5: Gender equality

Number of innovative leaders women.

Project value = 41.

SDG7: Affordable and clean energy

Number of persons that benefit from efficient and clean technologies

Project value = 2459 persons benefit by the project.

SDG8: Decent work and economic growth

Number of local people employed due to the project activity (permanent and temporary).

Project value = 4 full time CEDESOL employees, 2 temporary jobs.

SDG12: Responsible consumption and production

With the project, still there are families which consumes firewood for cooking

Project value $_{2019}$ = 0.0065 tonnes wood/day/unit

Project value $_{2020}$ = 0.0065 tonnes wood/day/unit

SDG13: Climate Action

It is not applicable as the methodology used only has a formula for Emission Reduction (see section E.3). But the project emissions are estimated based on the

same formula for ER but instead of the parameter fuel savings is used the fuel consumption for project scenario (6.527 kg/day/stove).
Project value domestic stoves $_{2019}$ = 196 tCO_2
Project value domestic stoves $_{2020}$ = 2,293 tCO_2

SDG15: Life on Land

With the project, still there are families which consumes firewood for cooking
Project value domestic stoves $_{2019}$ = 0.0065*25234 = 165 tonnes
Project value domestic stoves $_{2020}$ = 0.0065*297110 = 1,939 tonnes
Project value commercial/institutional rocket stoves $_{2019}$ = 0.0065*558 = 4 tonnes
Project value commercial/institutional rocket stoves $_{2020}$ = 0.0065*6570 = 43 tonnes

SDG17: Partnership for the goals

Number of ecological stove units produced and disseminated in Bolivia.
Project value domestic stoves = 814.
Project value commercial/institutional = 18.

E.3. Calculation of leakage

>>

This specific micro VPA-DD is analyzed and it is concluded that there is no leakage due to the project activity. But based on LPG assessment there is an increasing of the LPG consumption (comparing the results of latest monitoring surveys and the baseline surveys), for more detail see the excel file "GS1221_MR5_ER Calc_CEDESOL" sheet 'LPG assess'.

LPG Assessment

		Value	Unit	Source
months per year		12	months	
Fuel Savings	Pp,b,y	-0.1672	garrafa 10kg /month	*Monitoring Survey (domestic stoves)*
Consumption baseline scenario		0.1754	garrafa 10kg /month	*Baseline and Project Survey 2011/2012*
Consumption project scenario		0.3426	garrafa 10kg /month	*Monitoring Survey 2020*

Conclusion: The consumption of LPG has been increased in the last year (COVID pandemic) something that have not happened in the first 7 years of the project (comparison between BS and PS), therefore in search of a conservative approach this LPG increasing will be accounted as leakage.

Unit

1 Garrafa =	10	kg of LPG
Fuel increasing =	0.1672	garrafa/month/hh
	1.6715	kg of LPG/month/hh
	20.0585	kg of LPG/year/hh
-> Fuel increasing for the entire 832 users	16.69	tn of LPG/year

Estimation of leakage emissions because LPG increasing

Parameter	Value	Unit	Source
EF_LPG_CO2	63.1000	tCO2/TJ	*IPCC*
EF_LPG_CH4	0.0010	tCO2/TJ	*IPCC*
EF_LPG_N2O	0.0001	tCO2/TJ	*IPCC*
GWP_CH4	25		*IPCC*
GWP_N2O	298		*IPCC*
NCV_LPG	0.0473	TJ/tn	*IPCC*
LE for additonal LPG use	49.85	tCO2/y	
LE_{2019}	5.0	tCO2/y	
LE_{2020}	50.0	tCO2/y	
	55.0		

It is concluded for first time since project started the LPG consumption is higher in current monitoring survey than baseline consumption (potential reason is the impact of the pandemic). The LPG usage rate is 69% with a frequency of 1 garrafa - 10kg is bought each 11.6 weeks or 0.3426 garrafa - 10kg is bought per month (cell H95-H96 spreadsheet 'Data analysis' of Monitoring & Usage Surveys) which is higher than the value found in Baseline and Project Survey 2011/2012: 0.1754 garrafa - 10kg is bought per month. As calculated the leakage emission because the LPG consumption is estimated in 49.85 tCO_2/y, this value was prorated for 2019 and 2020.

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	ER expected in the crediting period	2019: 360 2020: 4249	201* 2343*	159 1906
1	Perception of time and monetary savings	0%	100%	100%
1	Proportion of families which noticed their income increased	0%	18%	18%

3	Air quality improvement	0%	92%	92%
3	Proportion of families which noticed lesser visit to medical facilities	0	63%	63%
4	Number of people trained in educational program	0	2832	832
5	Number of women trained by CEDESOL	0	41	41
7	Number of persons that benefit from efficient and clean technologies	0	2459	2459
8	Number of jobs offered	0	4	4
12	Fuel savings achieved	2019: 0 2020: 0	46.09% 46.09%	46.09% 46.09%
15	Amount of wood equivalents saved by the project	2019: 312 2020: 3676	168 1982	144 1694
17	Number of ecological stoves units installed in Bolivia	0	832	832

*Project estimate plus leakage

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values[7] achieved during this monitoring period
13	**2019: 754** **2020: 8240**	**2019:159** **2020:1906**
1	**100%**	**100%**
1	**60%**	**18%**
3	**100%**	**92%**

[7] Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

3	**70%**	**63%**
4	**832**	**832**
5	**41**	**41**
7	**2909**	**2459**
8	**6**	**4**
12	**55%**	**46.09%**
15	**2036**	**2019:144** **2020:1694**
17	**832**	**832**

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

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For SDG 13 the ex-ante value used is based on ER calculation from the VPA-DD registered which assumed the installation of 2500 domestic rocket stoves between 2011-2020 and 200 institutional/commercial rocket stoves in the same period. The value for 2019 was considering only 1 month of the proposed 12 month value for the year 2019 in PDD.

The four parameters for SDG 1 and 3 was estimated in in GS Transition annex.

For SDG 4 the number of folks completing the Modular Environmental Training (MET), the value was set in GS Transition annex which was written when the project developer installed all the stoves so far.

For SDG 5 the number of women leaders, the value was set in GS Transition annex which was written when the project developer installed all the stoves so far.

For SDG 7, the number of persons that benefit from efficient and clean technologies was defined in GS transition annex with information from 2018.

For SDG 8, the number of jobs created was defined in GS transition annex with information from 3rd Monitoring Report.

For SDG 12, the % of fuel savings was defined in GS transition annex with information from 3rd Monitoring Report.

For SDG 15, the wood saved was defined in GS transition annex with information from 3rd Monitoring Report.

For SDG 17 the number of ecological stoves units produced and disseminated was set in GS Transition annex which was written when the project developer installed all the stoves so far.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

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In case of SDG 1 No poverty, the 100% of households surveyed perceived time or monetary savings after the installation of the ecological stove, the same percentage as expected in GS4GG transition annex.
Also for SDG 1 No poverty, 18% households surveyed perceived an increasing in their income because the introduction of the ecological stove. The proportion is less than expected in GS4GG transition annex. The possible reason is that families perceived a monetary savings but not a proper increase of their income.

In case of SDG 3 Good health and well-being, 92% of households surveyed confirm the reduction on smoke in households. The proportion is less than expected in GS4GG transition annex, which was 100% (based on previous monitoring surveys), but still is a higher value that infers the positive impact over the health of families after the installation of the ecological stove.
Also for SDG 3 Good health and well-being, 63% of households surveyed confirm a better health and less medical problems because the introduction of an ecological stove. The proportion is a little less the value expected in GS4GG transition annex, but confirms the conclusion of the first indicator for this SDG, the positive impact of the project over the health of the families.

In case of SDG 4 Quality education, 832 folks completed the Modular Environmental Training (MET), the same number expected in GS4GG transition annex.

In case of SDG 5 Gender Equality, 41 innovative leader women were trained as part of project goals, the same number expected in GS4GG transition annex.

In case of SDG 7 Affordable and clean energy, 2459 persons were benefited from efficient and clean technologies. The proportion is less than expected in GS4GG transition annex because the usage rate used for this monitoring period was 75% which is lower than the value used in transition annex which is 90%.

In case of SDG 8 Decent work and economic growth (number of local people employed), the same values are accomplish as there are no change with the situation of the last year (ex-ante values in GS4GG transition annex used are from latest monitoring report).

In case of SDG 12 Sustainable consumption and production, the fuel savings was 46% a slightly below than expected in GS4GG transition annex because an increase of the firewood consumption for the households who installed the ecological stove (based on Field test results).

In case for SDG 13 Climate Action, the quantity of net GHG emission reductions (t CO2e) was 2065 t CO2e and it was below than expected (8,994 t CO2e) during the monitoring period. The project considered the implementation of 2500 domestic rocket stoves between 2011-2020 and 200 institutional/commercial rocket stoves in the same period, but because some delays in the project implementation, until December of 2020, 814 domestic rocket stoves and 18 institutional/commercial rocket stoves were installed. The ER per stove estimated in VPA-DD was set in 2.76 and 2.56 tCO2/y (based on fuel savings 0.0071 t wood/day/unit) – see cell M26-N26 spreadsheet 'Scenario r-d' excel file 'GS 1221 ER calculation' therefore the ER per stove is below than expected."- and the ER per stove during the current monitoring period is 2.00 tCO2/y (based on fuel savings 0.0056 t wood/day/) see cell N29-O29 spreadsheet 'Scenario r-d' excel file 'GS 1221 ER calculation' therefore the ER per stove is below than expected.

In case of SDG 15 Life on land the wood savings was 1694 (in 2020) and 144 (in 2019) a below than expected in GS4GG transition annex because an increase of the firewood consumption for the households who installed the ecological stove (based on Field test results).

In case of SDG 17 Partnerships for the goals the total of stove installed was 832, the same value is accomplish as there are no change with the situation of the last year (ex-ante values in GS4GG transition annex used are from latest monitoring report).

SECTION F. SAFEGUARDS REPORTING

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a. **An update on the implementation including information on relative success and failures, or improvements to proposed mitigation measures**

   There was nor any further implementation after the 4th Monitoring Report, the latest rocket stove was installed in October 2015.

b. **Monitoring and reporting on any key indicators identified, including against pre-set tolerances**

   The parameters identified in Safeguarding Principles Assessment table (GS transition annex approved at PoA level) and included in mitigation measure column were already included in section D.2. Data and parameters monitored.

c. **Information on any assessment questions answered 'Potentially' or where Requirements call for regular re-assessment**

   Any safeguarding principle was answer as 'Potentially' in GS transition annex approved at PoA level.

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

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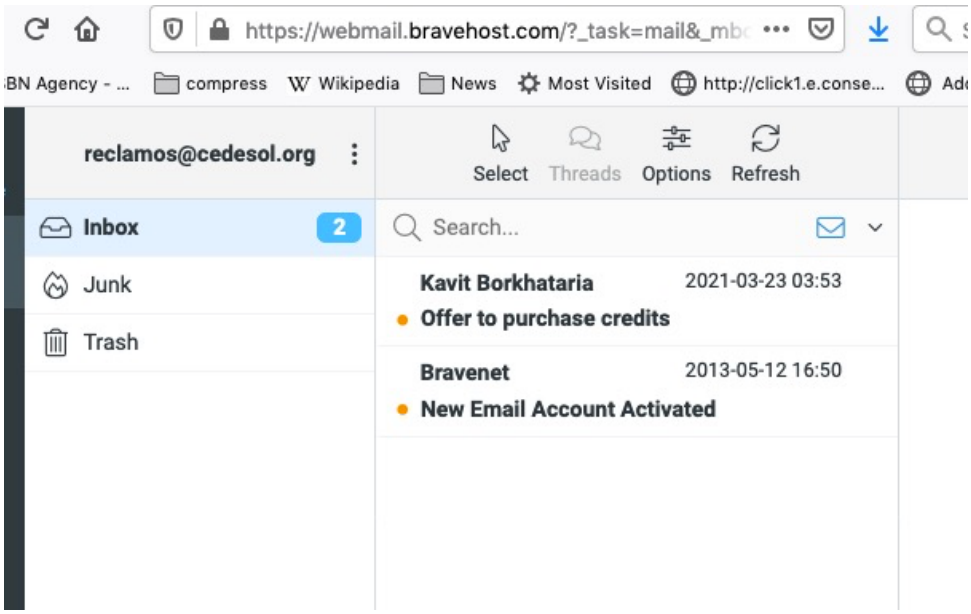
No grievances or complaints were received during the monitoring period.



G.2. Report on any stakeholder mitigations that were agreed to be monitored.

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There are not any stakeholder mitigations to be monitored agreed in previous official documents.

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

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There is not any legal contest or dispute during the monitoring period.

Revision History

Version	Date	Remarks

1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption