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Introduction:

The project activity aimed to disseminate solar cookstoves in Bolivia. The availability of high incidence of solar light and high altitude in the country makes the solar energy as one of the alternative source of fuel. Since its implementation in the year 2007, it has been observed and monitored that the solar cook-stoves not only meets the cooking energy needs of the beneficiaries but is also used for other purposes such as pasteurization of water for drinking needs. The project is implemented in partnership with the two French organizations namely- Fondation GoodPlanet, Bolivia Inti Sud Soliel (henceforth BISS) and its Bolivian partner, the Inti-Illimani team (henceforth "II").

The purpose of the project is to slow down the deforestation rate and the use of fossil fuels in Bolivia, and improving the living conditions of the women by promoting the use of a clean energy source like the solar energy. The use solar cookstoves has partly replaced fuels like – firewood, LPG and dung for the daily cooking needs of the project population. The project clearly demonstrates the sustainable development in the project areas through parameters like – time saving from the collection of firewood, income-savings occurring from less consumption of LPG (some beneficiaries had to travel for more than 2 hours to purchase the LPG tank), health improvement especially among the women, due to the avoidance of the smoke emissions from firewood, which is the potential cause for lung infections. And finally, the slow and gradual cooking process of the solar stoves preserves most the food nutrients while cooking.

Implementation of the project:

The II team disseminates the solar cookstoves through construction workshops for group of beneficiaries, and each group consists of a maximum of 25 beneficiaries. In each workshop, the beneficiaries build their own solar cookstoves under the technical guidance of the II teams. The II team arranges these construction workshops in the same villages/areas of the beneficiaries and preferably held in a village community hall or in an open public space. These workshops usually last for 4-5 days, where the beneficiaries are provided with all the materials that are required for the construction of the solar stoves.

Similar kinds of workshops are held throughout the year as per the demand for the solar cookers, which has been observed to be increasing every year and therefore, these workshops are carried out with an advanced planning. The II team follows-up each of these groups on a regular basis after these construction workshops, to assure that the solar cookers are being regularly used for daily cooking needs and have not faced any problems during.

One the workshops carried out for a group by the II technical experts and the project coordinators.

Monitoring surveys/ Field tests/Follow-up meetings:

a) Kitchen Survey:

The Kitchen surveys were conducted as per the guidelines given in the GS cookstove methodology. Since the solar cookstoves were disseminated throughout the year, the kitchen surveys were carried out during each workshop. At least 5 beneficiaries, out of the total (maximum 20 participants) present in the workshop, were asked the survey questions before the use of the solar cookers and the same 5 beneficiaries were followed up after the construction courses. The kitchen survey data was collected and updated regularly by the II team members. As per the kitchen survey data, the clusters are accordingly defined for the project activity.

There has been no change in the clusters as mentioned in the PDD: 1) LPG cluster and 2) LPG & firewood cluster. All the survey data have been submitted to the Gold Standard for further verification.

Table 1: Number of Solar Cookers distributed

Year	LPG	*LPG Fw	Others	Total
2007	235	146	20	401
2008	233	125	62	420
2009	235	85	80	400
2010	386	119	77	582
2011	425	233	2	660
2012	197	456	7	660
Total	1711	1164	248	3123

**LPG Fw – LPG and firewood cluster.*

Since 2007, a total of 3123 solar stoves have been disseminated through the workshops.
Considering the *usage rate per year*, a total of 2128 out of the 2875 solar stoves from the two clusters – LPG & LPG Fw have been taken into account for the ER's calculations for the year 2011/2012.

As per the KS report already submitted to the Gold Standard, the pattern of clusters has not changed with the evolving baseline surveys. The following table gives the clusters:

		Project Scenario							
		Solar CS and LPG		Solar CS, LPG and Fw		Others		Total	
Baseline Scenario	**LPG**	222	58%	3	1%	4	1%	60%	229
	LPG and Fw	96	25%	50	13%	1	0%	38%	147
	Other	8	2%	0	0%	0	0%	2%	8
	Total	326	85%	53	14%	5	1%	100%	384

b) Kitchen Tests:

The Kitchen tests were carried out for each of the above-mentioned clusters as per the guidelines given in the GS methodology. The results for the year 2011/2012 are as follows:

Cluster	LPG consumption without SC kg/day/hh	Firewood consumption without SC kg/day/hh	LPG consumption with SC kg/day/hh	Firewood consumption with SC kg/day/hh
Average LPG	0.415		0.286	
Low IC LPG	0.359		0.230	
Average LPG Fw	0.371	6.216	0.336	1.449
Low IC LPG Fw	0.317	5.366	0.286	0.912

Selection of the sample for the Kitchen tests:

Following considerations have been taken into account for KT:
Paired samples have been taken to compare pre- and post-installation consumption in the same houses. The selection of beneficiaries groups have been randomly chosen however practical aspects for carrying out the tests have been taken into account:

a. The user's availability and motivation to participate in the required tests,
b. Dispersion of the households in the communities and ease of accessibility the areas,
c. Distance between households of the same clusters located in different villages.
d. The seasonal variations (to assure conservative approach while calculating the fuel consumption).

The period over which the tests have been carried out is one week of pre- and one week of post-installation to avoid risks of heterogeneity cooking habits and to include weekend cooking in the correct annual ratio to the week day cooking. For the emission reduction calculations, the most conservative value has been taken into account.

The sample sizes used in the different KTs are bigger than the simple size calculated using the KPT methodology by Rob Bailis to show statistically significant reductions in per capita fuel consumption. Also, as it can be verified in the ER excel sheet, the end-points of the 90% confidence interval lie within +/- 30% of the estimated mean, so the rule 90/30 is met, it proves that the sample size is big enough. Therefore, the estimated mean value have been used to calculate the total VER's.

c) Follow-up meetings with the beneficiaries:

The Inti Illimani team followed up with the group of beneficiaries after each of the construction workshops. This first follow-up meeting was usually planned after 2 weeks from the end of the workshops. These follow-ups was carried out to ensure that the beneficiaries have started using the solar cookers with the instructions already provided by the II team experts to use and maintain the solar cookers during the training programs.

The Inti Illimani team member and a local co-coordinator from the village carried out these follow-up meetings. The beneficiaries were asked to demonstrate and discuss the problems that they might have come across while using the cookers during the first 2 weeks. This was a good opportunity for II team to monitor and understand various aspects of the project activity and also to learn if the beneficiaries have tried any new food recipes during this period. It has been observed by the II team, that the beneficiaries have used the solar cookstoves regularly. The meeting includes an individual basis consultation with each of the beneficiaries.
These follow-up meetings are carried out for 4 months with each group. After completion of the 4-month follow-up meetings, the II team gives a gift to the beneficiary who has regularly completed all the activities/training/improvements proposed during the previous follow-up meetings. The gifts are usually in the form of plates/cooking pots/cups etc. as recognition of their proactive participation in the project activity.



The follow-up meetings are carried out by the BISS team member along with the help of the local coordinator of the village.

Sustainable Development Parameters:

Data / Parameter:	Access to affordable and clean energy services
Data unit:	3123 households
Description:	It has been evaluated with the number of solar cook stoves distributed since 2007. From the year 2007 till December 2012, a total of 3123 solar stoves have been distributed. Of these 3123 solar stoves: - 2875 solar stoves were defined into clusters and out of which, 2128 stoves taken into account for ER calculations after considering the usage factor. - Considering a conservative approach to calculate the total VER's for the period 2011-2012, the remaining 284 solar stoves in 'other clusters' were not taken into account for calculations but were considered while evaluating the SD parameters.
Source of data used:	Project database.
Monitoring frequency	Continuous throughout the year.
QA/QC procedures to be applied:	The total number of households in the project activity is determined from the project database. The II team collects the information of beneficiaries and records them in a database. This project database is maintained and regularly updated by the Inti Illimani team.
Any comment:	As a part of the internal verification process, the GoodPlanet team (GPF) crosschecked the database maintained by the II team members.

Data / Parameter:	Human and institutional capacity
Data unit:	156 workshops carried out from 2007 to 2012.
Description:	It has been evaluated with the number of solar cook stoves distributed since 2007. Since 2007, a total of 3123 solar stoves have been distributed till December 2012. During the workshops, apart from technical trainings to construct the solar stoves, the II team also gives each group of beneficiaries a special training on nutrition, environment and health benefits of the use of the solar cook-stoves. After the training workshops, the Inti Illimani team also visits the households as a part of the continuous monitoring of the project.
Source of data to be used:	Trainings programs database.
Monitoring frequency	Throughout the year.
QA/QC procedures to be applied:	The details of each beneficiary participating in the project activity are recoded in a database, which is maintained by the Inti Illimani team. This database also includes the details of the training programs carried out during the year (e.g.- date, total beneficiaries, project area/village etc.).
Any comment:	As a part of the internal verification process, the GoodPlanet team (GPF) crosschecked the details of the total number of training workshops carried out during the year.

Data / Parameter:	Quantitative employment and income generation
Data unit:	10 Bs/hh/month (*Bs – Bolivian Boliviano*)
Description:	During the field visits of the II team, they have observed that certainly some of the beneficiaries have shown additional usage of the cookstove for income generating activities like selling peanuts, api, corn, etc. This information will be updated as needed in the coming verification period. There has been no change in the total number of Inti Illimani staff. There are 6 members.
Source of data to be used:	Survey among the beneficiaries
Monitoring frequency	Continuous survey
QA/QC procedures to be applied:	The data is collected during the follow up meetings or during the regular field visits to the project areas.
Any comment:	This parameter will be updated as required in the next verification period

Data / Parameter:	Technology transfer and technological self-reliance
Data unit:	3123 households
Description:	It has been evaluated with the number of solar cook stoves distributed since 2007. 3123 households have participated in the construction and maintenance workshops, where the beneficiaries were trained to construct their own solar cookers by the II team. The II team members also provided all the materials that are required for the construction of the solar stoves.
Source of data to be used:	Beneficiaries database managed by II team.
Monitoring frequency	Continuous throughout the year
QA/QC procedures to be applied:	The details of each beneficiary participating in the project activity are recoded in a database, which is maintained and regularly updated by the Inti Illimani team. The beneficiaries construct their own solar stoves under the technical guidance of the Inti Illimani experts. In these workshops the technical experts also train the beneficiaries on the maintenance of the stoves. A total of 156 workshops have been carried out till 2012. The workshops shows that there is a direct transfer of technology to the project beneficiaries.
Any comment:	As a part of the internal verification process, the GoodPlanet team (GPF) crosschecked the data on the total number of workshops held and during the previous site visits, have already witnessed workshops where the beneficiaries constructed their own cookstoves.

Data / Parameter:	Biodiversity
Data unit:	61%
Description:	There have been no large deforestation or reforestation initiatives observed in the project areas. Therefore the NRB rate is constant.
Source of data to be used:	NRB study. Kitchen tests (Cluster- LPG Fw).
Monitoring frequency	-
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	Soil condition
Data unit:	61%
Description:	The project allows the people to use less firewood, which leads to the reduction in the deforestation rate in the project areas and which also helps conserves the soil, as there are less possibilities of soil-erosion in the areas. There has been no large deforestation or reforestation initiative in the project areas. Therefore the NRB rate has been constant.
Source of data to be used:	NRB study. Kitchen tests (Cluster- LPG Fw).
Monitoring frequency	Biennially
QA/QC procedures to be applied:	KT has been carried out as per the guidelines given in the GS methodology.
Any comment:	The change in the consumption of firewood among the beneficiaries is about 4 kg per day.

Data / Parameter:	Air quality
Data unit:	100 %
Description:	From the present KT, we can see that there has been a reduction on firewood consumption of about 4 kg/day for the cooking needs, therefore it can be concluded that there has been a gradual decrease in indoor air pollution due to the use of solar cookers.
Source of data to be used:	KT studies.
Monitoring frequency	
QA/QC procedures to be applied:	KT has been carried out as per the guidelines given in the GS methodology.
Any comment:	A total of 3123 stoves have been disseminated since the year 2007 and out of which 2875 stoves have been considered for the ER calculations. The remaining 284 stoves from 'other clusters' have not been taken into account for the ER calculations but as they are in regular use by the beneficiaries, therefore the total % for the sustainable parameters has been considered taking into account the total number of solar stoves that are disseminated i.e. 3123 stoves.

Data / Parameter:	Livelihood of the poor
Data unit:	10 Bs/hh/month (*Bs – Bolivian Boliviano*)
Description:	There are savings on fuel consumption for both- the LPG and firewood. The total amount (Bolivian Boliviano) that has been saved by the beneficiaries has been recorded/documented by the Inti Illimani team.
Source of data to be used:	Follow-up surveys.
Monitoring frequency	Continuously
QA/QC procedures to be applied:	
Any comment:	Only money savings coming from LPG savings has been taken into account. Money savings for LPG + Fw cluster will be given in the next verification period.

Emission reduction monitoring parameters:

Data / Parameter:	**P.1** Number of Solar cookstoves (SCS)
Data unit:	2128 cookstoves considered for ER calculations.
Description:	Number of beneficiaries by cluster and community since 2007. A total of 3123 solar stoves have been distributed till December 2012. Out of these total solar stoves – - 2875 solar stoves were defined into clusters and after considering the usage factor, a total of 2128 solar stoves have been taken into account for the ER calculations. - The remaining total 284 solar stoves in 'other clusters' were not taken into account for ER calculations but were taken into consideration for the SD parameters.
Source of data to be used:	Project database
Monitoring frequency	Measured every month according to the data collected during the workshops.
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and GoodPlanet
Any comment:	The project database has been established from the very beginning of the project activity, giving all the all the details of each beneficiary. The Inti Illimani team members update this database regularly.

Data / Parameter:	**P.2** LPG consumption by cluster in the project scenario
Data unit:	*LPG cluster:* 8.58 Kg/month/household *LPG + FW cluster*: 10.08 Kg/month/household
Description:	Amount of LPG consumed by beneficiaries having solar cookstoves
Source of data to be used:	Kitchen Tests, precision level of 90% for confidence interval.
Monitoring frequency	Study led biennially on a representative sample of beneficiaries
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and GoodPlanet
Any comment:	KT has been done according with guidelines given in the GS methodology. The "90/30 rule" is met, so mean value have been used.

Data / Parameter:	**P.3** firewood consumption by cluster in the project scenario
Data unit:	LPG + Fw cluster: 43.48 Kg/month/household
Description:	Amount of firewood consumed by beneficiaries having solar cookstoves
Source of data to be used:	Kitchen Tests, precision level of 90% for confidence interval.
Monitoring frequency	Study led biennially on a representative sample of beneficiaries
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and GoodPlanet
Any comment:	KT has been done according with guidelines given in the GS methodology. The "90/30 rule" is met, so mean value have been used.

Data / Parameter:	**P.4 - X_{NRB}**
Data unit:	61%
Description:	Non-renewable fraction of biomass
Source of data to be used:	NRB study
Monitoring frequency	The NRB fraction may be updated if there any afforestation/deforestation activities are observed in the project areas.
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and GoodPlanet
Any comment:	

Data / Parameter:	**P.5 - Usage in year 2011, 2012**
Data unit:	2009: 85% people who got their solar cookstove in 2007 90% people who got their solar cookstove in 2008 2010: 80% people who got their solar cookstove in 2007 85 % people who got their solar cookstove in 2008 90 % people who got their solar cookstove in 2009 2011: 75% people who got their solar cookstove in 2007 80 % people who got their solar cookstove in 2008 85 % people who got their solar cookstove in 2009 90 % people who got their solar cookstove in 2010 2012: 75% people who got their solar cookstove in 2007 75 % people who got their solar cookstove in 2008 80 % people who got their solar cookstove in 2009 85 % people who got their solar cookstove in 2010 90% people who got their solar cookstove in 2011
Description:	Percentage of stoves of age x remaining in use in year y
Source of data to be used:	A study carried out by third party for the solar cookers implemented in Bolivia.
Monitoring frequency	Survey led once a year on a representative sample of beneficiaries
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and BISS
Any comment:	A survey will be taken up in the next verification period to get the use of stoves data more precisely.

Data / Parameter:	**P.6 – Age**
Data unit:	2009: Efficiency of solar cookstoves built in 2007: 100 % Efficiency of solar cookstoves built in 2008: 100 % 2010: Efficiency of solar cookstoves built in 2007: 100 % Efficiency of solar cookstoves built in 2008: 100 % Efficiency of solar cookstoves built in 2009: 100 % 2011: Efficiency of solar cookstoves built in 2007: 100 % Efficiency of solar cookstoves built in 2008: 100 % Efficiency of solar cookstoves built in 2009: 100 % Efficiency of solar cookstoves built in 2010: 100 % 2012: Efficiency of solar cookstoves built in 2007: 100 % Efficiency of solar cookstoves built in 2008: 100 % Efficiency of solar cookstoves built in 2009: 100 % Efficiency of solar cookstoves built in 2010: 100 % Efficiency of solar cookstoves built in 2011: 100 %
Description:	Efficiency compared with a new Solar Cooker
Source of data to be used:	Monitoring Survey
Monitoring frequency	Survey led once every two years on a representative sample of Solar Cookers well maintained.
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and GoodPlanet
Any comment:	All tests results show that older solar cookers are more efficient than new ones. But in order to simplify calculations and to keep a conservative approach, we consider that efficiency of old solar cookers is the same that new ones.

Data / Parameter:	**P.7** Money savings
Data unit:	LPG cluster: 10 Bs/hh/month
Description:	Amount of money saved by the beneficiaries by using a mix of LPG/solar cookstoves/firewood.
Source of data to be used:	Monitoring survey (scanned copy of the KS with the parameter has been provided)
Monitoring frequency	Calculated from KS data and from price of LPG.
QA/QC procedures to be applied:	Crosschecked by Inti Illimani, BISS and GoodPlanet.
Any comment:	Money savings come from fuel savings. Only money savings coming from LPG savings has been taken into account. Money savings for LPG + Fw cluster will be provided in the next verification period.

Data / Parameter:	**P.8** Time savings
Data unit:	100%
Description:	% of people who consider that time-saving is one of the main benefits of the solar cooker.
Source of data to be used:	Monitoring survey (scanned copy of the KS with the parameter has been provided)
Monitoring frequency	Continuously done by the Inti Illimani team members
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and BISS
Any comment:	Questions were asked to the beneficiaries to collect information about time saved due to the use of the solar cookers and from the responses provided it shows that they have more time for other activities.

Data / Parameter:	**P.9** Share of the solar energy in the total energy mix
Data unit:	LPG cluster: 31% is solar energy LPG and Fw cluster: 63% is solar energy
Description:	% of the solar energy used along with others fuel mix
Source of data to be used:	Monitoring survey
Monitoring frequency	Biennially during the KT studies.
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and GoodPlanet
Any comment:	Calculated from fuel consumption reduction (KT) and its energy equivalence.

Data / Parameter:	**P.10 Distance**
Data unit:	2011: around 5000 Km/year 2012: around 6000 Km/year
Description:	Total annual distance from La Paz city to communities.
Source of data to be used:	Monitoring survey
Monitoring frequency	Annually.
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and BISS
Any comment:	As the project is carried out throughout the year, this parameter is calculated from distance per course and it is included in the reports from each course.

Data / Parameter:	**P.11** Fraction of the distance using common transport
Data unit:	100 %
Description:	Fraction of the distance using common transport (bus)
Source of data to be used:	Monitoring survey
Monitoring frequency	Calculated from distance per course and kind of transport used included in the reports from each course.
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and BISS
Any comment:	As Inti Illimani doesn't have their own vehicle, the team uses the public transports during the travel.

Data / Parameter:	**P.12**
Data unit:	2011: 100% 2012: 100%
Description:	Fraction of the courses where measures have been taken to ensure that not damage to soil is being caused by the paint
Source of data to be used:	Monitoring survey
Monitoring frequency	Final evaluation course questionnaire made by beneficiaries
QA/QC procedures to be applied:	Parameter double-checked by Inti Illimani and BISS
Any comment:	During the courses the instructors make sure that during painting soil is protected by a plastic sheet or the activity is carried out in a large community hall. This parameter will also be separately documented during the courses in the next verification period.

Emission Reductions Calculations:

The project activity was initiated in the year 2007 and was registered with the Gold Standard in the year 2011. As per the Gold Standard rules the emission reductions have been considered since the year 2009.

This monitoring report gives the emission reduction calculations for the years 2011 & 2012. The emission reductions data for each year are given in following tables: -

Emission reductions for the year 2011

	Baseline Emissions kg CO2/month		Project Emissions kg CO2/month		Emission Reductions kg CO2/month		Total ER tCO2/month
	LPG	LPG Fw	LPG	LPG Fw	LPG	LPG Fw	
Aug	48972	133453	33771	44723	15201	88730	104
Sep	51557	141203	35553	47320	16004	93883	110
Oct	52786	150952	36401	50588	16385	100365	117
Nov	53718	155452	37043	52096	16674	103356	120
Dec	54819	155452	37803	52096	17016	103356	120
Total							571

Emission reductions for the year 2012

	Baseline Emissions kg CO2/month		Project Emissions kg CO2/month		Emission Reductions kg CO2/month		Total ER tCO2/month
	LPG	LPG Fw	LPG	LPG Fw	LPG	LPG Fw	
Jan	52947	145515	36512	48765	16435	96750	113
Feb	52947	145515	36512	48765	16435	96750	113
Mar	52947	147265	36512	49352	16435	97913	114
Apr	54133	157264	37330	52703	16803	104561	121
May	54980	170513	37914	57143	17066	113370	130
Jun	55277	172513	38119	57813	17158	114700	132
Jul	55785	202761	38469	67950	17316	134811	152
Aug	57226	215010	39463	72055	17763	142955	161
Sep	57692	234259	39784	78506	17908	155753	174
Oct	58709	244008	40485	81773	18224	162236	180
Nov	59599	259507	41099	86967	18500	172540	191
Dec	61294	259507	42268	86967	19026	172540	192
Total							1774

Conclusion:

A total of 3123 solar stoves have been implemented from 2007 till December 2012.
The emission reduction calculations have been considered for the year August 2011 till December 2012.

The project activity not only promotes sustainable development but also reduces the demand for firewood and LPG in the project areas. The following data summarizes the emission reductions for the respective years.

Emission reduction for the year 2011	: 571 tCO2/yr
Emission reduction for the year 2012	: 1774 tCO2/yr
Total emission reductions	**: 2345 tCO2/yr**

Annexe 1

Kitchen survey scanned copies from the project database have been uploaded on the Gold Registry for further verification.

Annexe 2

Kitchen tests scanned copies from the project database have been uploaded on the Gold Registry for further verification.

Annexe 3

Scanned copies the exam carried out at the end of the workshop for the beneficiaries to assure that they have followed the training programs have been uploaded on the Gold Registry for further verification.

Annexe 4

Scanned copies the follow-up meetings sample sheets filled in by beneficiaries from the project database have been uploaded on the Gold Registry for further verification.

Glossary:

Solar SC/ SC: Solar Cookers

LPG: Liquefied petroleum gas

Fwd/FW: Firewood

NRB: Non-renewable Biomass.

Bs: Bolivianos (Bolivian currency)

II: Inti Illimani

BISS: Bolivia Inti Sud Soliel