



**Monitoring report form for CDM programme of activities  
(version 01.0)**

*Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form for CDM programme of activities" at the end of this form.*

**MONITORING REPORT**

<b>Title of the programme of activities (PoA)</b>	Programme of Activities for Local Improved Cookstoves in West Africa	
<b>UNFCCC reference number of the PoA</b>	9941	
<b>Version number(s) of the PoA-DD(s) applicable to this monitoring report</b>	07	
<b>Coordinating/managing entity (CME)</b>	GERES	
<b>Version number of this monitoring report</b>	01	
<b>Completion date of this monitoring report</b>	01/02/2016	
<b>Monitoring period number and dates covered by this monitoring report</b>	First monitoring period 01/06/2014 to 31/12/2015	
<b>Monitoring report number for this monitoring period</b>	01	
<b>Host Party(ies)</b>	Host Party(ies) of the PoA	Is this a host Party to a specific-case CPA covered in this monitoring report?(Yes/No)
	Mali	Yes
	Benin	No
<b>Sectoral scope(s)</b>	Sectoral scope 3: Energy demand	
<b>Selected methodology(ies)</b>	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 05.0)	
<b>Selected standardized baseline(s)</b>	N/A	
<b>Total amount of GHG emission reductions or net GHG removals by sinks for all specific-case CPAs in the PoA covered in this monitoring report</b>	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0 tCO <sub>2</sub> e	2,096 tCO <sub>2</sub> e

## PART I - Programme of activities

### SECTION A. Description of PoA

#### A.1. Brief description of the PoA

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This Small-Scale Programme of Activities (SSC-PoA) involves the promotion, distribution and sale of the Improved charcoal Cookstoves (ICS) in the West African region, in Mali and Benin. The ICS disseminated through this programme replace the prevailing inefficient traditional or charcoal cookstoves commonly used by the target population in urban, peri-urban and rural areas, which combust wood more efficiently, and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

##### A.1.1. Generic CPA(s)

Title, identification/reference number and/or version number of the generic CPA(s) of the PoA	Sectoral scope(s)	Applied methodology(ies) or combination of methodologies and/or standardized baseline(s)
Project Activity for Local Improved Cookstoves in Bamako _ CPA 9941-0001_Version 09	Sectoral scope 3: Energy demand	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 05.0)

##### A.1.2. Specific-case CPA(s) covered in this monitoring report

Reference number of the specific-case CPA included in the PoA as of the end of this monitoring period	Title, identification/ reference number and version number of the generic CPA to which the specific-case CPA applies	Crediting period dates of the specific-case CPA	Is this specific-case CPA covered in this monitoring report? (yes/no)
9941-0001	Project Activity for Local Improved Cookstoves in Bamako – Version 09	01/06/2014 to 31/12/2015	Yes

#### A.2. Contact information of the coordinating/managing entity (CME) and/or responsible persons(s)/entity(ies)

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Baptiste FLIPO

GERES Association

2 cours Foch, 13400 Aubagne – France

[www.geres.eu](http://www.geres.eu)

**SECTION B. Implementation of PoA**

**B.1. Implementation of the management system of the PoA**

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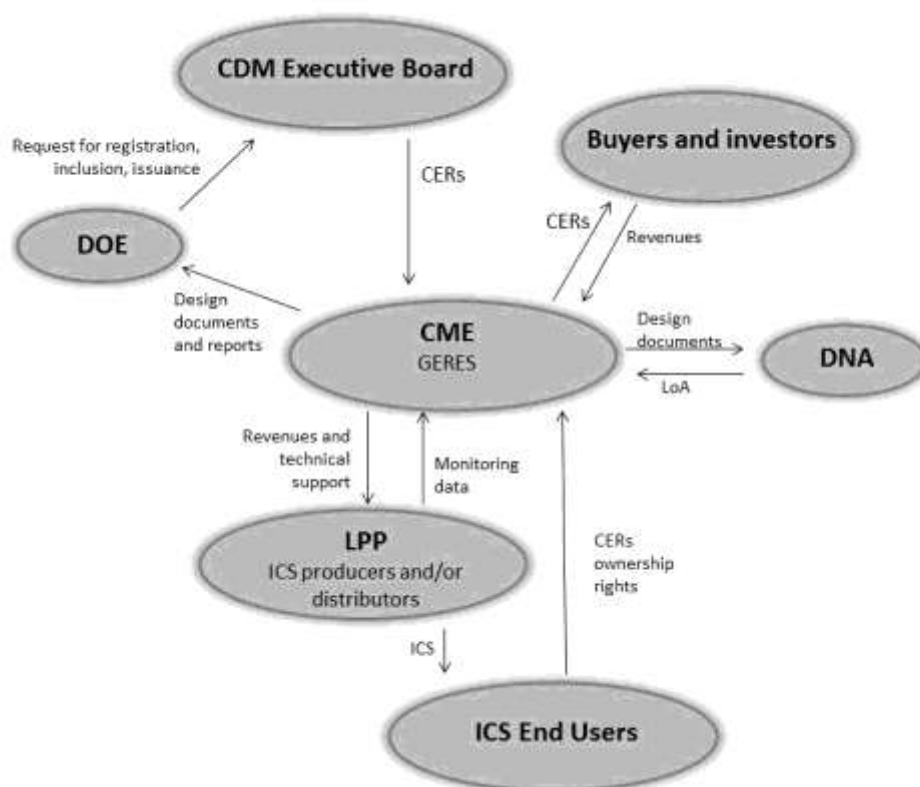
- a) *Definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;*

This PoA is a joint initiative of international and local organizations. GERES Association (Groupe Energies Renouvelables, Environnement et Solidarités) a French NGO based in Aubagne, France with an office in Bamako, Mali and Cotonou, Benin, is the Coordinating and Managing Entity (CME) of the PoA.

GERES Association has a role of supply chain technical assistant and carbon project developer, and is the communication focal point with carbon standards. GERES has managed and coordinated activities of the partners, and also provided all necessary marketing and promotion support. GERES also coordinated the monitoring of the programme activities, and is responsible for the sale of ERs and the sharing of benefits between CPAs.

The ICS production and diffusion activities will be implemented by various local actors individually referred to as a Local Project Partners (LPP). LPPs are responsible for ICS production, diffusion, monitoring and quality control supported by GERES CEnAO team at the beginning, with a progressive withdrawal. The designation of operational responsibilities shall be clearly defined in between the CME and the LPP previous to the CPA starting date and shall be documented. These responsibilities may change according to the readiness of the LPPs. The issue of the emissions reductions property transfer shall be clarified by a written statement, that clarify that the end-users waive their carbon credit ownership rights to the CME.

Figure: Organisation of the Coordinating and Managing Entity of the PoA



b) *Record Keeping System*

An electronic database is managed at the CME level. This database summarizes all the information regarding the CPAs registered under this PoA as following:

- Name and ID of the CPA
- Name and contact details of the corresponding LPP
- Name and type of ICS distributed by the CPA
- Serial numbers of the ICS distributed under this CPA (and their date of production/sales, as well as the name and contact of the producer/retailer and end-user when available)

This database is updated continuously for each CPA, for their whole crediting period, and for the two years following their crediting period. A monitoring team dedicated to each CPA is responsible for the monthly update of the database, and the CME revises it every 3 months to ensure the validity of the data. In addition to the database, the CME gather and keep available the following documentation:

- Hard copies of the logbooks or invoices used for monitoring
- Raw data and reports of baseline studies
- Raw data and report of performance tests
- Raw data and report of users surveys
- DOE reports and related documentation
- Hard copies of contracts (ERPAs or similar documents) in between the CME, and LPPs of the different CPAs included
- Meeting notes of the CME meetings and internal procedures
- Original version of the PoA Charter signed by the CME and LPPs

The logbooks are filled continuously by the different actors of the ICS production and supply chain for each CPA, and hard copies are collected by a monitoring team every month or less according to stage of maturity of the monitoring system and the level of stove production. The hard copies of the logbooks, and the raw data and reports of monitoring tests will be gathered by the monitoring team at the CPA level, and provided to the CME for validation every three months or larger periods according to the level of maturity and production.

In the case of CPA inclusion, the LPPs will provide technical data on the proposed technology and target group to the CME that will be responsible of the technical review. This technical review will be done to ensure that the potential CPA is eligible under the PoA before submitting its inclusion to the DOE. Training of the LPPs staff will also be provided at this time to ensure that data monitoring and recording, reporting, internal quality control, and maintenance are followed by the CPA, and so ensure the quality of the data provided to the CME for monitoring.

Finally, to ensure a continuous improvement of the PoA management system, a biennial revision of the management procedures will be done between the CME and the LPPs concerned.

## **B.2. Implementation of single sampling plan(s)**

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### Sampling design

Due to the large number of ICS distributed as part of the CPA, it was not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling was undertaken as part of a SSC-PoA-wide (by grouping and sampling across CPAs) Sampling Plan that is designed in

line with the requirements of the “Standard for sampling and surveys for CDM project activities and programme of activities” from EB69, Annex 4 (the *Sampling standard*).

**(i) Objective and Reliability Requirements:**

The objective was to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period, and with 95/10 confidence/provision for biennial sampling across CPAs.

**Monitored Parameters**

Parameter	Description of Parameter
$N_{y,i}$	Proportion of ICS still in operation
$B_{y,new,KPT}$	The quantity of woody biomass used by a project device per year will be assessed through Kitchen Performance Tests. The tests will be conducted annually or biennially if the project proponent is able to demonstrate that the efficiency of the cookstove does not drop significantly as compared to the initial efficiency of the new device, over a time of two years of typical usage.
$\eta_{new,y,i}$	The efficiency of the system being deployed as part of the project activity will be assessed through Water Boiling Tests. The tests will be conducted annually or biennially if the project proponent is able to demonstrate that the efficiency of the cookstove does not drop significantly as compared to the initial efficiency of the new device, over a time of two years of typical usage.
$SC_{new}$	The specific fuel consumption or fuel consumption rate of the devices deployed i.e. fuel consumption per quantity of item processed (e.g. food cooked) or fuel consumption per hour, will be assessed through Controlled Cooking Tests. The tests will be conducted annually or biennially if the project proponent is able to demonstrate that the efficiency of the cookstove does not drop significantly as compared to the initial efficiency of the new device, over a time of two years of typical usage.
$B_{y,new,survey}$	The annual quantity of woody biomass used during the project activity in tonnes per device will be assessed through household surveys focused on energy practices. The households will be selected among the project device users, picked up from the monitoring database. The survey will be conducted annually or biennially if the project proponents are able to demonstrate that the efficiency of the cookstove does not drop significantly as compared to the initial efficiency of the new device, over a time of two years of typical usage
$U_i$	The usage rate per vintage (% of stoves operating by age group) will be assessed thanks to surveys conducted on a representative sample of end-users randomly selected from the monitoring sales database. The surveys will be implemented every two years.

**(ii) Target Populations:**

The target population of the tests and surveys proposed in the monitoring plan are the users of the improved cookstoves disseminated by the CPAs under this PoA. The target population corresponds to ICS users identified in the monitoring database and located in the CPAs boundaries.

**(iii) Sampling Frame**

The PoA is open to different CPA Implementers and different models of ICS, which introduces variability to the target population. 95/10 confidence precision was required for a single CPA using annual sampling.

**(iv) Sampling Method**

For each monitored parameter, a sampling method is proposed.

-  $B_{y,new,KPT}$ ,  $B_{y,new,survey}$  and  $U_i$

The selection of households that will participate to Kitchen Performance Tests or surveys will be selected amongst the monitoring database. The sampling approach used will be a random sampling in order to obtain unbiased and reliable estimates. According to the local context of each CPA and the characteristics of the target population, the random sampling might be simple or stratified. A simple random sampling should be used if the target population is considered as homogeneous with respect to the parameter studied; whereas a stratified random sampling should be used if there are obvious groupings of target population elements whose characteristics are more similar within groups than across groups (specific fuel users, or age of the cookstoves for instance).

-  $\eta_{new}$  and  $SC_{new}$

The ICS that will be tested through WBT will be selected randomly amongst the freshly produced stoves of the producers. Regarding the ICS already in use, a sample of every vintage (one vintage corresponding to one year) or every 2 years if the Project Proponent is able to prove that the efficiency does not decrease over a time of two years of typical usage, will be tested and the ICS will be randomly selected amongst the users database. In that case the ICS will be taken from the households for the tests, and the households will receive in exchange a new ICS.

**(v) Sample Size**

For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision for biennial sampling. Of the three parameters to be monitored, two are proportions/percentages ( $U_i$  and  $N_{y,i}$ ) and one is a mean value  $\eta_{new}$ .

**Data to be collected****(i) Field Measurements:**

The field data will be collected through surveys for the measurement of the  $U_i$  parameter and the ratio of equipment as main data and ICS sampling for lab tests. The sampling procedure is described in the previous chapter.

**(ii) Quality Assurance/Quality Control****a. Data archiving**

Hard copies of the surveys is kept and the registration database has a back up. Original stove purchase receipts (paper registration) by the users are stored in the main office of the coordinating entity. A process to verify the data collection is realized through a double check of the data collected after their inclusion in the database. All data monitored and required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

b. Analysis

The data collected will be analysed in order to calculate the average, standard deviation and validation of the 95/10 rule using Microsoft Excel®.

**SECTION C. Post-registration changes to the PoA (including the generic CPA(s))****C.1. Corrections**

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N/A

**C.2. Inclusion of a monitoring plan to the registered PoA-DD (including its generic CPA-DD(s)), if a monitoring plan was not included at the time of registration**

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N/A

**C.3. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline**

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N/A

**C.4. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA**

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N/A

**C.5. Types of changes specific to afforestation and reforestation activities**

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N/A

**PART II - Specific-case component project activity(ies)****SECTION D. Description of specific-case CPA(s)**

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**D.1. Brief description of implemented specific-case CPA(s)**

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*(a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks;*

The CPA (9941-0001) involve the promotion, distribution and sale of the Improved charcoal Cookstoves (ICS) in the district of Bamako, the capital of Mali, produced by the Group of Economic Interest PFA (GIE PFA), the PFA's ICS.

The ICS disseminated through this programme replace the prevailing inefficient three-stone fires or traditional pot support with stoves which combust charcoal more efficiently, and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

(b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria;

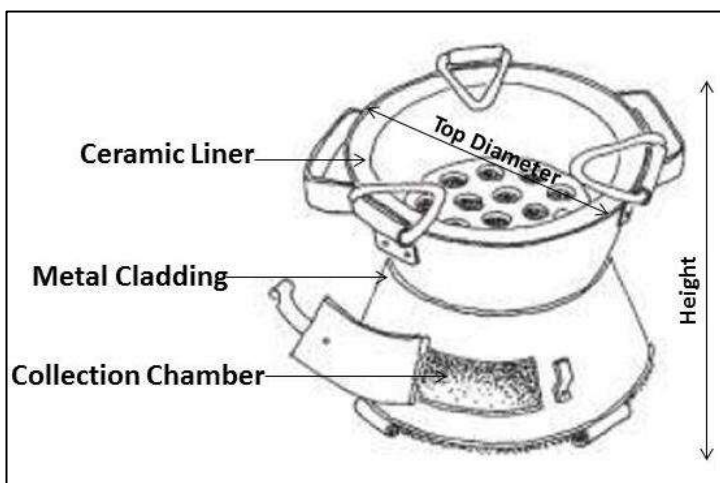
The PFA's ICS is locally manufactured and was introduced in Mali in 1996 by "Entreprise Works". It is the equivalent of the ICS usually referred as "Nansu" in Benin, "Gyapa" in Ghana, "Asuto" in Togo and "Jambar" in Senegal. In Ghana, this technology is well developed as noted by the Ghana Country Action Plan of the GACC (Global Alliance for Clean Cookstoves): "This technology has been successfully adopted by urban and peri-urban Ghanaian consumers because it effectively meets the cooking and cultural needs », and benefit from carbon finance.

The PFA's ICS stove is an ICS made with a metal cladding surrounding a ceramic liner. The ceramic liner provides the combustion chamber insulation and improves the overall efficiency of the stove.

Figure : PFA's ICS producer



Figure : A PFA's ICS improved cookstove



Five sizes of PFA's ICS are currently produced in Bamako, nevertheless the "Large" and "Super" sizes (dimensions are presented in the Table below) represent more than 80% of the total sales, therefore to remain conservative, only these two sizes will be accounted for emissions reductions.

Table : PFA's improved cookstoves sizes

Size	Top Diameter (mm)		Height (mm)	
	Minimum	Maximum	Minimum	Maximum
Large	318	349	245	262
Super	340	355	260	274

(c) Relevant dates for the specific-case CPA(s);

**Sales and Registration of ICS**

CPA	9941-0001
Date of first ICS sold and registered	01/06/2014
Date of last ICS sold and registered in the database	31/12/2015
Total ICS sold and registered (till 31/12/2015)	6521



**Monitoring Survey**

CPA	9941-0001
Survey date for parameter $N_y$	Montly
Survey date for parameter $\eta_{new,y,i}$	Large: 26.57% Super: 26.39%

(d) Total GHG emission reductions or net GHG removals by sinks achieved in this monitoring period for the specific-case CPA(s), including information on how double counting is avoided.

CPA	Emission reductions (t CO <sub>2</sub> e)
9941-0001	2,096
<b>Total</b>	2,096

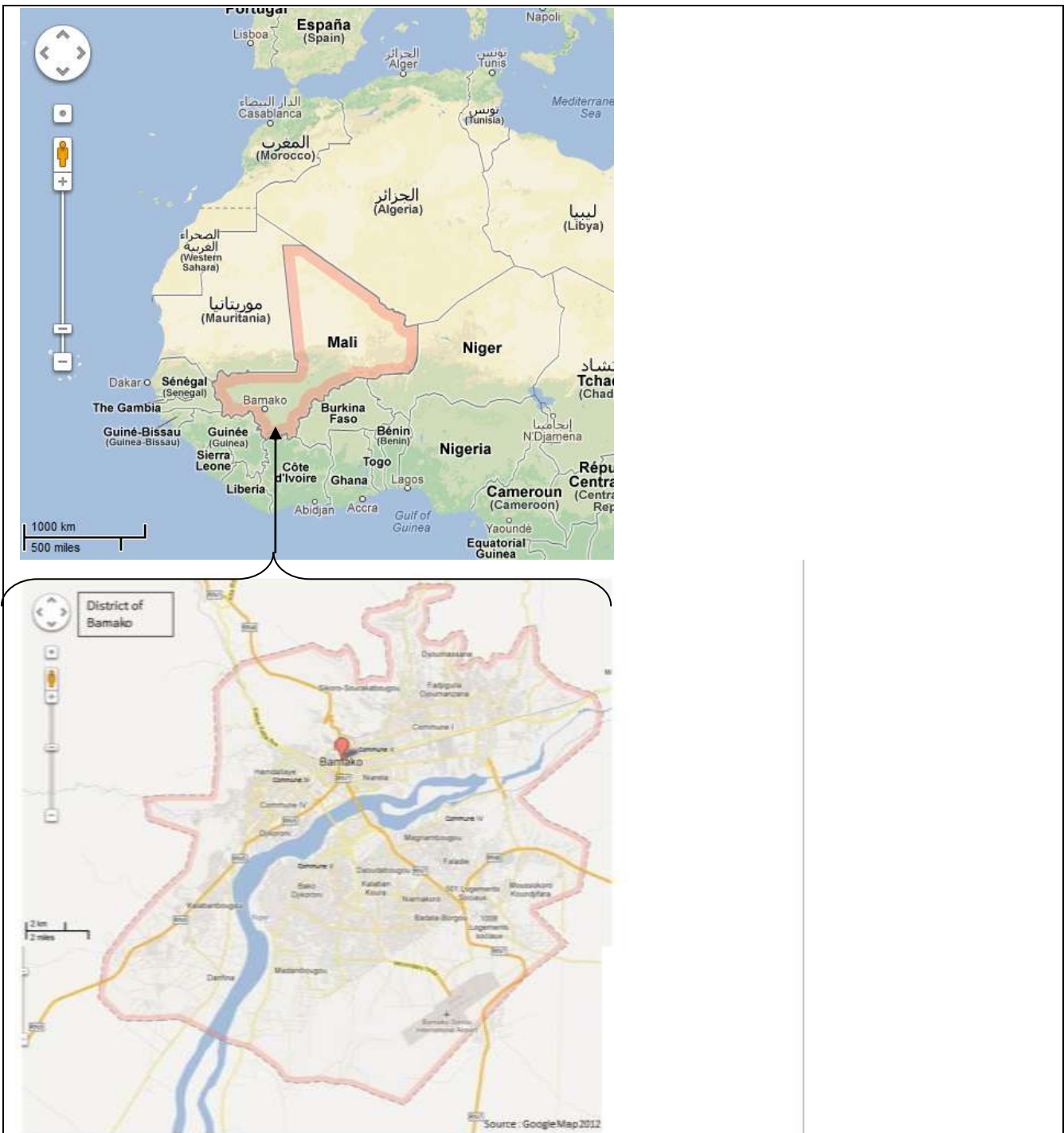
## D.2. Geographical references or other means of identification of the location of the specific-case CPA(s)

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The CPA boundary corresponds to the district of Bamako, the capital city of the Republic of Mali, where the GIE PFA produces and disseminates PFA's improved cookstoves. The district of Bamako includes 6 communes. The workshop of Medine market, where most of the tinsmiths are gathered, is located in the Hippodrome neighbourhood (Commune II, north of Bamako); and the retailers are spread over the 6 communes of Bamako.

Moreover, as Coordinating and Managing Entity of the PoA, GERES has an office in the Torokorobougou neighbourhood (Commune V – South of Bamako).

Figure : Map of Mali and the district of Bamako



**SECTION E. Post-registration changes to specific-case CPA(s)**

**E.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

>>  
N/A

**E.2. Corrections**

>>  
N/A

**E.3. Changes to the start date of the crediting period of the specific-case CPA(s)**

>>  
N/A

**E.4. Inclusion of a monitoring plan into the specific-case CPA(s) that was not included at registration**

>>  
N/A

**E.5. Permanent changes to the monitoring plan as described in the registered specific-case CPA-DD(s), applied methodology or standardized baseline**

>>  
N/A

**E.6. Changes to project design of the specific-case CPA(s)**

>>  
N/A

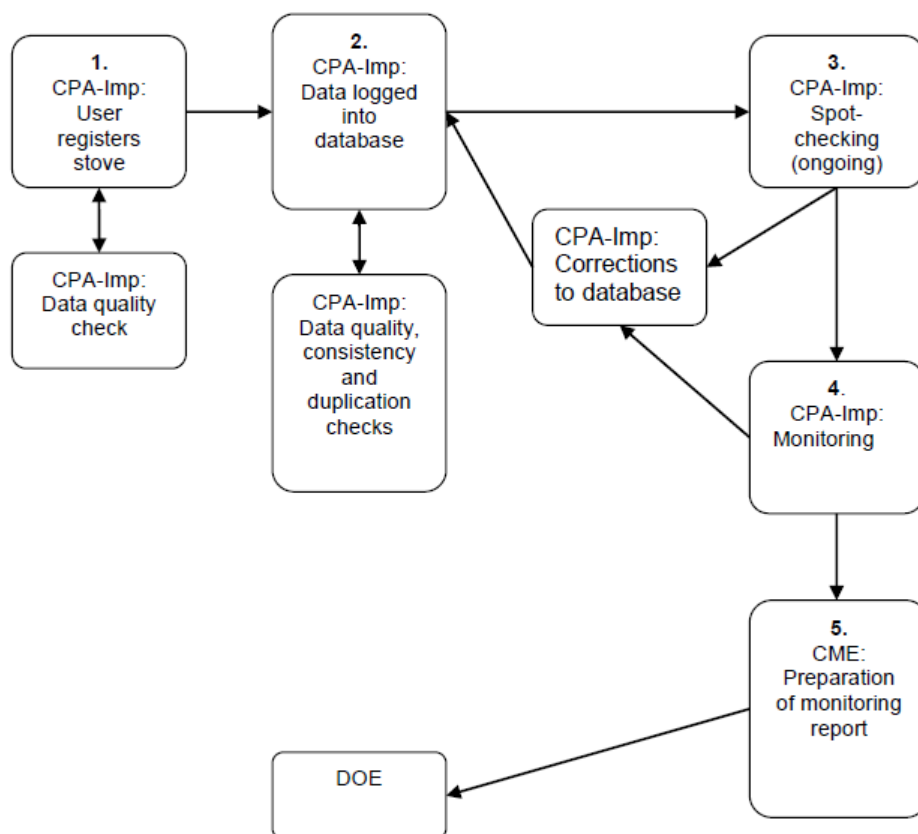
**E.7. Types of changes specific to afforestation and reforestation specific-case CPA(s)**

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N/A

**SECTION F. Description of the monitoring system of specific-case CPA(s)**

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The monitoring system applied involves a number of key elements that ensure that the CME and CPA-Implementer have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating Certified Emission Reductions (CERs) following AMS II.G version 5.0 on the basis of the amount of non-renewable biomass saved by the ICS in the CPA. The below flow-chart illustrates the roles and responsibilities of the parties during the implementation of the monitoring plan for the SSC-CPA. In the below flowchart, the CPA implementer is abbreviated to "CPA-Imp", and can be the CME or another party authorized by the CME.



Below is the description of the above steps on the flow-chart.

**1. CPA-Imp: User registers stove:** CPA Implementer collects/receives the necessary information requested on the Registration Card from the user. Means of collecting this information is through a physical Registration Card filled by CPA-Imp staff, retailers, end-users or partner organization's staff, or through the use of ICTs or SMS. CPA Implementers' staff spot check the accuracy of information provided, and request for field staff additional clarifications if needed;

**2. CPA-Imp: Data logged into database:** CPA Implementer trained staff input the data in the database either manually (if data collected from physical Registration Card) or automatically if data was collected using ICTs or SMS. CPA Implementer staff double check the information included on the database and check for duplications. Any duplicate information is investigated and errors corrected or excluded from the database if it is a true duplicate entry.

**3. CPA-Imp: Spot-checking (ongoing):** CPA Implementer field staff randomly select households included in the database and visit them to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (e.g. change in the address of a user) will be updated on the database, and in the case ICS are found to be no longer in use, they will be clearly marked as such and excluded from emission reductions calculations.

**4. CPA-Imp: Monitoring:** CPA Implementer follows the requirements as per SSC-POA-DD to collect the necessary information for a monitoring report.

**5. CME: Preparation of monitoring report:** the CPA Implementers prepare the final monitoring report to be provided to the verifier DOE for verification of emission reductions. A copy of the monitoring report will remain with the CME.

The CME coordinates and manages each CPA Implementer and assists them in implementing each element of the monitoring plan.

## SECTION G. Data and parameters

### G.1. Data and parameters fixed ex ante, at registration, inclusion or renewal of crediting period

(Copy this table for each piece of data and parameter)

Data/parameter	$B_{old}$
Unit	Tonnes per year per device
Description	Average annual consumption of woody biomass per appliance in absence of the project activity
Source of data	Kitchen Performance Tests performed by GERES in 2012-2013; Baseline user survey conducted by GERES in 2012.
Value(s) applied	0.29
Choice of data or measurement methods and procedures	Baseline consumption per household is estimated using KPT performed following PCIA published guidelines and then divided by the cooking stoves equipment ratio obtained by the baseline user survey to get the baseline woody biomass consumption per device.
Purpose of data	Calculation of baseline emissions
Additional comments	This value has been updated during the monitoring period to account for the evaluation of the equipment ratio for the GIE PFA ICS users.

Data/parameter	$\eta_{old}$
Unit	Fraction
Description	Efficiency of the baseline stoves mix
Source of data	UNFCCC, AMS-II.G v05.0 default value
Value(s) applied	19,21%
Choice of data or measurement methods and procedures	Households survey has been undertaken to estimate the distribution of the traditional stoves in the baseline (GERES, 2012). This value has been calculated considering a default factor of 10% for the 3 stones stoves and 20% for the others in accordance with the AMS.II-G version 5.0 methodology. Therefore, the result is a weighted value of 19.21%.
Purpose of data	Calculation of baseline emissions
Additional comments	

Data/parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data	UNFCCC Default Values of fNRB for LDCs and SIDs in 35th meeting Report Annex 20, page 1.
Value(s) applied	Mali: 0.73
Choice of data or measurement methods and procedures	Update from UNFCCC website: <a href="http://cdm.unfccc.int/DNA/fNRB/index.html">http://cdm.unfccc.int/DNA/fNRB/index.html</a>
Purpose of data	Calculation of baseline and project emissions
Additional comments	

<b>Data/parameter</b>	<b><i>EFprojected_fossilfuel</i></b>
Unit	tCO <sub>2</sub> /TJ
Description	Emission factor for the substitution of non-renewable wood biomass by similar consumers.
Source of data	IPCC default value as provided in Version 5 of AMS IIG.
Value(s) applied	81.6
Choice of data or measurement methods and procedures	It is assumed that the mix of present and future fuel used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 tCO <sub>2</sub> /TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO <sub>2</sub> /TJ for Kerosene and 63.0 tCO <sub>2</sub> /TJ for Liquefied Petroleum Gas (LPG)).
Purpose of data	Calculation of baseline and project emissions
Additional comments	As a default value is applied, monitoring is not required

<b>Data/parameter</b>	<b><i>NCVbiomass</i></b>
Unit	TJ/ tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	IPCC Guidelines 2006, Chapter 1, Table 1.2
Value(s) applied	0.015
Choice of data or measurement methods and procedures	Default IPCC value, also suggested by the AMS-II.G v05.0 methodology on page 4.
Purpose of data	Calculation of baseline and project emissions
Additional comments	As a default value is applied, monitoring is not required.

<b>Data/parameter</b>	<b><i>CFch-fw</i></b>
Unit	-
Description	Conversion factor from charcoal to wood according to the charcoal production techniques in Mali
Source of data	Schéma directeur d'approvisionnement en bois énergie de Bamako, 2006 – Malian Agency for the Development of Energy and Rural Electrification (AMADER)
Value(s) applied	7
Choice of data or measurement methods and procedures	Value specific to the charcoal production chain chosen to maximise the accuracy of the emission reduction calculations
Purpose of data	Calculation of leakage
Additional comments	As a default value is applied, monitoring is not required.

<b>Data/parameter</b>	<b>Leakage (L)</b>
Unit	Fraction
Description	Leakages related to the use/diversion of non-renewable biomass saved under the project activity by non-project households/users that previously used renewable energy sources ; the use of non-renewable woody biomass saved under the project of activity to justify the baseline of other CDM project activity; or to the increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines.
Source of data	AMS-II.G v05.0 default value
Value(s) applied	0.95
Choice of data or measurement methods and procedures	A net to gross adjustment factor (0.95 default) is applied in order to adjust $B_{old}$ to account for leakages as per paragraph 20 of the AMS II.G, version 5 methodology.
Purpose of data	Calculation of leakage
Additional comments	As a default value is applied, no monitoring is required

## G.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

<b>Data/parameter</b>	<b><math>N_{y,j}</math></b>			
Unit	Number of stoves sold			
Description	Total number of stoves installed since the beginning of the project per vintage			
Measured/calculated/ default	Measured			
Source of data	Monitoring database			
Value(s) of monitored parameter	CPA	large	Super	Total
	9941-0001	3476	3045	(a) 6521
Monitoring equipment	Sampling surveys and project database			
Measuring/reading/ recording frequency	At least once every two years			
Calculation method (if applicable)				
QA/QC procedures	As each stove has a unique serial number, and the monitoring database will be checked at the CPA level, and at the coordinating entity; therefore double counting will be avoided			
Purpose of data	Calculation of baseline and project emissions ( $N_y$ calculation)			
Additional comments				

<b>Data/parameter</b>	<b><math>\eta_{new,y,i}</math></b>
Unit	Fraction
Description	Efficiency of the stove implemented at year y
Measured/calculated/ default	Measured

Source of data	Water Boiling Test (WBT)
Value(s) of monitored parameter	Large : 26.57% Super: 26.39%
Monitoring equipment	The tests were coordinated by the CME and undertaken following a simplified version of WBT protocol 4.2.2.
Measuring/reading/ recording frequency	Biennially as the project proponent have been able to demonstrate that the efficiency of the cookstove does not drop significantly as compared to the initial efficiency of the new device, over a time of two years of typical usage.
Calculation method (if applicable)	According to the methodology AMS-II.G v05.0, efficiency of the device being deployed as part of the project activity will be determined annually using the water boiling test (WBT) protocol carried out in accordance with national standards or international standards or guidelines. Weighted average values will be used to consider the share of Large and Super PFA's ICS disseminated in use
QA/QC procedures	The WBT will be conducted in accordance with international or national adapted protocols
Purpose of data	Calculation of project emissions
Additional comments	Available ex-post

<b>Data/parameter</b>	<b><math>U_i</math></b>
Unit	Fraction
Description	Usage rate per vintage (% of stoves operating by age group)
Measured/calculated/ default	Calculated
Source of data	Monitoring surveys, users feedback
Value(s) of monitored parameter	For i being the number of month in operation, (b) $U_i = 1 - 2.05\% * i$
Monitoring equipment	
Measuring/reading/ recording frequency	Biennially
Calculation method (if applicable)	Surveys will be conducted on a representative sample of end-users picked up from the monitoring sales database
QA/QC procedures	The survey shall be carried out with a statistically valid sample as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities"
Purpose of data	Calculation of baseline and project emissions ( $N_y$ calculation)
Additional comments	

**G.3. Implementation of specific-case CPA level sampling plan**

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For this first monitoring period, considering the timeframe of the period considered, it was not possible to measure the evolution of the Usage Rate and Efficiency parameters, as well as the equipment ratio, over the full expected life-time of the GIE PFA's ICS.

Therefore, the  $U_i$  parameter as well as the equipment ratio have been surveyed among the baseline KPT sample after 2 years of use. This specific case sampling plan allowed to assess long-term potential changes in usages and to compare the efficiency of 2 year old GIE PFA's ICS compared to new GIE PFA's ICS in order to assess an eventual decline in efficiency.



The following monitoring periods will allow to measure the above-mentioned parameters over the GIE PFA's ICS lifetime from a sampling from the sales database.

## SECTION H. Calculation of GHG emission reductions or net GHG removals by sinks

### H.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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This SSC-PoA calculated emission reductions through application of the following equations:

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel} * N_y * CF_{ch-fw}$$

Where:

**ER<sub>y</sub>** = Emissions reductions during the year y in tCO<sub>2</sub> per year

**B<sub>y,savings</sub>** = Quantity of woody biomass that is saved in tonnes per year

**f<sub>NRB,y</sub>** = Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass. UNFCCC default value of 0.73 is used.

**NCV<sub>biomass</sub>** = Net Calorific Value of the non-renewable woody biomass that is substituted. IPCC default value for wood fuel of 0.015TJ/t is used.

**EF<sub>projected\_fossil fuel</sub>** = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Default value suggested by the methodology of 81.6 tCO<sub>2</sub>e/TJ is used.

**CF<sub>ch-fw</sub>** = Conversion factor from charcoal to wood according to the charcoal production techniques in Mali. National value proposed is 7.

**N<sub>y</sub>** = Number of project devices operating in year y

Where :

$$N_y = \sum N_{y,i} * U_i$$

**N<sub>y,i</sub>** = Total number of stoves deployed in year y.

*The projection for PFA's ICS production chosen are made thanks to an assesment of the current production capacity for the ceramic liners per size, with an assumption of 10% growth per year. The assesment of the current production capacity has been done by GERES under the CEnOA program developped in Bamako.*

**U<sub>i</sub>** =Usage rate, measured *ex post* using surveys and users feedback (% of stoves operating by age group)

*The usage rate chosen for ex-ante calculations is based on the values used in a carbon project supporting a similar technology in the same area. The data have been used as the project is located in the district of Bamako and aims at diffusing "Sewa"® type ICS, a portable charcoal stove composed of a metal cladding surrounding a ceramic liner. As the project has a similar target population (households of the district of Bamako) and disseminate a similar technology within the same boundaries, the usage rates of this project have been judged applicable to the PFA's ICS.*

## Calculating $B_{y,savings}$

$$B_{y,savings} = B_{old-adj} \times \left( 1 - \frac{\eta_{old}}{\eta_{new,y}} \right)$$

$$B_{old-adj} = B_{old} * L$$

Where:

**Bold** = Quantity of woody biomass used in the absence of the project activity in tonnes per device. The value has been assessed through KPT carried out by GERES according to PCIA guidelines in 2012-2013 and baseline user survey. This value has been updated to account for the difference in equipment ratio. The value used during this monitoring period is 0.29 t/year per device.

$\eta_{old}$  = Efficiency of the device being replaced using weighted UNFCCC default value according to the baseline survey undertaken by GERES in 2012. The value is 19.21%.

$\eta_{new,y}$  = Efficiency of the device being deployed as part of the project activity (fraction), as determined annually using the water boiling test (WBT) protocol carried out in accordance with national standards (if available) or international standards or guidelines. For ex-ante calculation, the value used is 26.19% according to the tests undertaken by CNESOLER, the Mali national testing center (also shared with the DOE) .

**L** = Leakages related to the use/diversion of non-renewable biomass saved under the project activity. The value used is 0.95 as proposed in the AMS-II.G v05.0 methodology.

**Bold-adj** = Quantity of woody biomass used in the absence of the project activity in tonnes per device adjusted by the leakage factor. The value obtained is 0.27 t/year per device.

## H.2. ICS. The full calculation of each ICS is available in Excel spreadsheet for sharing with DoE. Calculation of project emissions or actual net GHG removals by sinks

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N/A

## H.3. Calculation of leakage

>>  
N/A

## H.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	GHG emission reductions or net GHG removals by sinks (tCO <sub>2</sub> e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
9941-0001	8,030	5,934	110	0	2,096	2,096
<b>Total</b>	8,030	5,934	110	0	2,096	2,096

#### H.5. Comparison of GHG emission reductions or net GHG removals by sinks with estimates in the included CPA-DD(s)

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
9941-0001	46,821	2,096
<b>Total</b>	46,821	2,096

#### H.6. Remarks on difference from the estimated value in the included CPA-DD(s)

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There is a high difference between the estimated value in the included CPA-DD and the actual values achieved by the specific-case CPA during this monitoring period. This could be explained with the following information :

- The monitoring period only includes half of the year 2014, as the project was registered in June 2014.
- The contractualisation between all the partners of the PoA takes more time than expected. As the contract was finally signed in December 2014, the monitoring activity has only be fully operating since beginning of 2015, even ICS were still being sold.
- Even with the operationalisation of the monitoring activities, the CPA partners encountered big challenges to monitor every selling information among the value chain. Especially, some resellers are illiterate and cannot write the information corresponding to the final users, even ICS were being bought and used by households.
- Moreover, the ICS production was rather less than expected during this monitoring period.

These information raised the fact that the actual GHG emission reductions calculated are very under-estimated, as there were more ICS sold during the corresponding period than ICS monitored. Estimated ER are therefore highly conservative.

In order to solve some monitoring issues, project participants have initiated a trial to facilitate the monitoring process for illiterate resellers, enabling them to monitor the ICS with the only barcode.

**Appendix 1. Contact information of coordinating/managing entity and/or responsible persons/entities**

<b>Coordinating/managing entity and/or responsible person/entity</b>	<input checked="" type="checkbox"/> Coordinating/managing entity <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
<b>Organization name</b>	GERES
<b>Street/P.O. Box</b>	2 cours Foch
<b>Building</b>	-
<b>City</b>	13400 Aubagne
<b>State/Region</b>	-
<b>Postcode</b>	-
<b>Country</b>	FRANCE
<b>Telephone</b>	+33 4 42 18 55 88
<b>Fax</b>	+33 4 42 03 01 56
<b>E-mail</b>	-
<b>Website</b>	<a href="http://www.geres.eu">www.geres.eu</a>
<b>Contact person</b>	Baptiste FLIPO
<b>Title</b>	Project manager
<b>Salutation</b>	
<b>Last name</b>	Flipo
<b>Middle name</b>	
<b>First name</b>	Baptiste
<b>Department</b>	GERES Mali
<b>Mobile</b>	+223 93 07 04 90
<b>Direct fax</b>	
<b>Direct tel.</b>	
<b>Personal e-mail</b>	<a href="mailto:b.flipo@geres.eu">b.flipo@geres.eu</a>

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