Gold Standard for the Global Goals

TEMPLATE

MONITORING REPORT

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VERSION **v. 1.1**

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

This document contains the following Sections

Key Project Information

0 - Description of project

0 - Implementation of project

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KEY PROJECT INFORMATION

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

GS ID of Programme	GS 1075
Title of Programme	Solar Cooking in Chad
Version of POA-DD applicable to this monitoring report	Version 10.0, 23/09/2020
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	Solar Cooking in Chad, Iridimi VPA-01: GS 3445

Key Project Information

GS ID (s) of Project (s)	GS 3445
Title of the project (s) covered by monitoring report	Solar Cooking in Chad, Iridimi
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	Version 11.0, 23/09/2020
Version number of the monitoring report	Version 1.0
Completion date of the monitoring report	10th June 2022
Date of project design certification	08/01/2016
Date of Last Annual Report	N/A. Completed verification in 2021 instead
Monitoring period number	4th
Duration of this monitoring period	01/01/2021 to 31/05/2022
Project Representative	FairClimateFund
Host Country	Republic of Chad
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	The Gold Standard Simplified Methodology for Efficient Cookstoves v1.1 (April 2020)
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
SDG 13 Climate Action (mandatory)	Emissions Reductions	13,120	VERs
SDG 1 No Poverty	Average household savings i.e., decrease in expenditure on basic service such as cooking, lighting, drinking	148	Euros / HH / year
SDG 3 Good health and well-being	Households' perception of health benefits (reduction in the incidence of eye and respiratory diseases) as a fraction	100 (respiratory) 100 (eye)	Fraction (%) of all respondents declaring that they perceived a significant or partial reduction in the occurrence of eye and respiratory diseases within their respective household, since the adoption of the solar cookers
SDG 7 Affordable and clean energy	Number of beneficiaries: households	4,434	Number of households who have benefitted from project cookers installed (as of 2022)

Table 2 – Product Vintages

		Amount Achieved
Start Dates	**End Dates**	**VERs**
01/01/2021	31/12/2021	8,538
01/01/2022	31/05/2022	4,582

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

Since 2003, the war in Darfur has led to the influx of over 230,000 refugees into eastern Chad. These refugees are divided across 12 camps in the Wadi Fira region, bordering Sudan. The influx of refugees has mobilized a response from the United Nations, with the United Nations High Commissioner for Refugees (UNHCR) and other humanitarian organisations working to improve the living conditions of refugees. The climate is semi-arid, and rainfall is scare and irregular. Natural resources such as water and firewood are increasingly rare, requiring the refugee population to travel increasingly large distances to collect firewood. This is a high-risk activity, with many women assaulted or raped.

To help tackle this problem, the project aimed to meet basic domestic energy needs through the provision of solar cookers for use in the refugee camps. The present VPA, which is the first VPA for this project includes solar cookers that have been installed in the **Iridimi refugee camp** since 1st January 2012, the date at which the project was 'listed' with the Gold Standard.

The purpose of the project is twofold:

- To train refugees in the manner of solar cooking, somewhat different from cooking on wood, and in the manufacture of cookers; and
- To equip all households with two solar cookers, one for the main meal, one for the sauce. Big households may need an extra cooker and pot for a larger amount of the main-meal-food (we found that bigger cookers for bigger pots are less efficient in capturing the solar energy) but not for the sauce.

Iridimi is one of the camps established by the Government of Chad to accommodate the refugees from Darfur. It is located in a semi-desert area where rainfall, and thus growth of trees, is scarce. The camps are located in the vicinity of a dry valley, where a limited amount of underground water can be found. The World Food Program (WFP) supplies food (dried flour, beans, etc., that can stand a three month long overland transport). However, in this semi-arid area there is virtually no wood for cooking, and the little that was there originally was just sufficient for the local, often itinerant, population. UNHCR has been trucking in, at enormous cost, a very considerable amount of wood from other regions of Chad, but this is not a viable long-term solution, its

transport is not environment friendly, and moreover this is harmful to the environment and population elsewhere.

In this project-area there is ample solar energy to allow the use of simple solar cookers, both for cooking the midday meal in the morning and the evening meal in the afternoon. The latter is kept warm in a locally made "guffa", a simple thermos basket made from empty WFP food bags and snippets from the manufacture of the cookers. The adult population has the habit of eating nothing or very little in the morning, but small children are often given a small amount of porridge, that will have to be prepared either the day before or in the morning.

The project has chosen the cheapest and easiest-to-make model of cooker, allowing its use by even the poorest and the possibility for users to make replacement cookers themselves, following training.

The cookers are made from cardboard and aluminium foil and sprayed with a water repellent on the back. Their lifetime is limited by the reflectivity of the aluminium foil and by the handling of the cooker each evening after use. The working life of a solar cooker is about two years. Thereafter the cookers need to be replaced. Users are instructed to contact members of CoBFoCuS (Refugee Committee for the Good Use of Solar Cookers) or to go directly to the manufacturing facility if they require a replacement solar cooker. Any maintenance takes only a matter of minutes to complete. If they require to purchase a new solar cooker, receipt of the replacement cooker is recorded in a Replacement Record, which confirms the user's name, WFP food ration number, batch number of the cooker and the date of receiving the replacement. The date of receiving the replacement and new batch number is then entered into the project database to replace old solar cooker data.

The cost of the basic materials and labour for manufacturing for each cooker, not counting overheads, is in the order of 4 USD. The refugees have virtually no possibility to earn money except for work within the camp due to there being, understandably, regulations to protect the scarce employment possibilities in the area for the Chadian population. The solar cooker activity provides this opportunity for remunerated work. Refugees are thus asked to pay a reasonable sum of 150 FCFA (or 0.25 USD) to cover the cost of the work of making the replacement cookers. Carbon credits are sought to pay for the provision of the basic materials for manufacture (cardboard, aluminium foil, Arabic-gum for gluing, sticky tape to protect the cut edges of the cardboard from

unfurling, eyelets to attach cords, held down by a few rocks, to protect cookers against movement in strong winds).

The VPA contributes to sustainable development in a number of ways:

(i) Environmental

- The programme reduces greenhouse gas (GHG) emissions
- The programme reduces deforestation and forest degradation in areas where non-renewable biomass is used as a source of fuel. This will contribute to the overall stability of all ecosystems, which support biodiversity and watersheds

(ii) Social

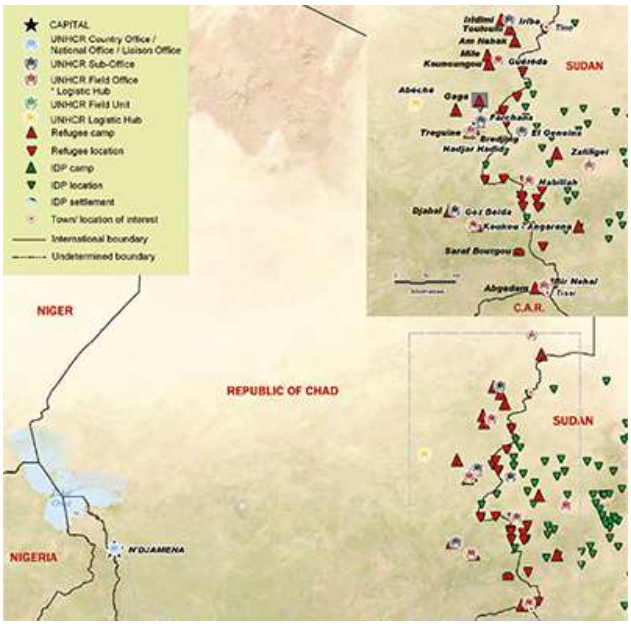
- Improved health and wellbeing: reduced combustion of firewood and fossil fuels in households will reduce indoor air pollution, thereby increasing the respiratory health of users, particularly women and children who spend a large portion of their time near the domestic hearth. The project will also greatly facilitate the life of handicapped persons.
- Improved security: in refugee camps the project will reduce the need for women to leave the security of the camp environment to search for wood and will reduce conflicts between persons seeking wood.
- Increased time to spend on other activities: the project will give women free time to look after their family or to do cash-generating handiwork and allow girls to attend school instead of searching for wood.

(iii) Economic

- Reduced end-user expenses from the purchase of firewood
- Provides a source of employment: locals are directly employed in the manufacture, distribution and maintenance of the solar cookers.

A.2. Location of project

The project is implemented in the Iridimi camp. The camp covers an almost circular area with a diameter of about 6 km located in the district of Wadi Fira, about 12 km west of the town of Iriba. Its geographic coordinates are 15 08°N and 22 05°E. The approximate location is denoted in the figure below.



A.3. Reference of applied methodology

The project activity uses the following approved baseline Gold Standard VER Methodology "The Gold Standard simplified methodology for efficient cook stoves", version 1.1 released in April 2020.

A.4. Crediting period of project

The project applies a renewable crediting period of 7 years. The 1st crediting period started on 1st January 2012. The present monitoring period is part of the 2nd crediting period which started on 01/01/2019 (and goes until 31/12/2025).

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

On 1st January 2012, the project was listed by the Gold Standard. This date also corresponds to the official project start date. In March 2015, an Objective Observer came to visit the project as part of the validation audit. In January 2016, the PoA and VPA-01 were registered under the Gold Standard. In May 2016, a first monitoring survey was carried out followed by a usage survey. The 1st verification was started in November 2016 and the 1st batch of credits issued at the end of 2017.

In Summer 2018, the former CME (Agrometeorological Applications Associates - AAA) started looking for an entity to replace it as a CME and in October 2019, for this purpose, a contract was signed between AAA and FairClimateFund (FCF). SustainCert accepted the change in October 2019.

The issuance of VERs for the previous monitoring period (01/01/2019 – 14/05/2020) has allowed the project to have the necessary resources to keep funding the project in Iridimi camp and to expand to one of the nearby camps. The project remains fully funded through the sale of VERs.

The activities that took place during the 4th monitoring period were:

- Awareness raising and training of refugees on the usage of solar cookers
- Workshops on maintenance and repair of solar cookers
- Cooking demonstrations to show how to prepare food on the solar cooker
- Manufacture of solar cookers
- Distribution of solar cookers
- Replacement of solar cookers
- Maintenance of the project database and monitoring surveys

The entities involved in the project activities in the 4th monitoring period were:

1. FCF: responsible for the overall management of the PoA, including:
   - Marketing the programme internationally
   - Overseeing project implementation and adherence to procedures
   - Coordinating contributions of all entities involved
   - VER commercialization
   - Requesting the Gold Standard Secretariat to issue VERs into their registry
2. ADES: responsible for implementing the project on the ground (VPA-01), including:

- Marketing the programme locally
- Capacity building for users and solar cooker artisans
- Quality control of the solar cookers
- Organising annual monitoring efforts and writing monitoring reports
- Overseeing the collection of user information and distribution of solar cookers by the technology suppliers
- Keeping a record of local financial transactions throughout the project
- Maintain the PoA/VPA-01 Database

3. Hamerkop Climate Impacts (HCI): responsible for the overall carbon management and project technical support of the PoA, including:
   - Overseeing the monitoring surveys
   - Quality control of annual monitoring reports
   - Organisation of monitoring efforts
   - Communicating with the validator/verifier and the Gold Standard Secretariat
   - Overviewing project implementation and performance

4. End-users purchase a pair of solar cookers and pots, complete training on how to use and care for them correctly and are responsible for informing the VPA Implementer when their solar cooker is no longer functioning. They are also responsible for sharing their correct personal details with the VPA Implementer upon purchase of a solar cooker.

5. Technology suppliers (artisans and CobFoCuS): Suppliers are responsible for distributing reliable solar cookers, constructed to the specifications detailed during the training artisans receive. They are also providing after-sale services to users, including maintenance, repairs and are responsible to offer replacement solar cookers at a reduced price to end-users when their existing devices no longer function. Finally, they are responsible for collecting user information.

As of the end of the 4th monitoring period (May 2022), the Project had distributed solar cookers to 4,434 beneficiaries registered under the project.

B.1.1 Forward Action Requests

No FARs were provided in the last performance review.

B.2. Post-Design Certification changes

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

A minor deviation from the approved monitoring and reporting plan methodology or standardized baseline was made. The annual monitoring & usage survey was delayed due to the impacts of Covid, availability of staff and the findings from the previous monitoring survey; December and January are the months when beneficiaries usually go farming outside the camp and are therefore absent for long periods of time. It should have occurred by December 2021 but did not take place until February – March 2022.

B.2.2. Corrections

The annual monitoring & usage survey took place in February – March 2022 and on time for the verification.

B.2.3. Changes to start date of crediting period

No changes to the start date of the crediting period have been requested.

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

No permanent changes to the design certified monitoring plan have been put in place.

B.2.5. Changes to project design of approved project

There were no other changes to project design.

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

The following tasks have been undertaken at different frequencies as stated below.

Maintenance of the Sales Record

Information on the beneficiary households is collected by two supervisors who are assisted by an assistant coordinator in the field. In the camps, the two supervisors are accompanied by members of CoBFoCuS (artisans and trainers) who fill out the procurement record with the beneficiary households. A member of the Project team then enters the data in the Sales Record, carrying out the initial checks.

The same sales record was used to complete the ongoing monitoring survey in February-March 2022. Furthermore, the workshop workers in charge of repairing broken cookers kept a record of the replacements and new distributions made throughout the monitoring period (2021-2022). This list could be collected and verified by ADES periodically.

In the form of an Excel datasheet, the main goal of the Sales Records (aka list of beneficiaries or user database) is to keep track of the equipment distributed and assess the use of equipment and the benefits associated with them.

The 'list of beneficiaries' or Sales Records contain the information listed below:

- VPA number
- Date of the procurement record
- Name, company, contact details of the officer (trainer) completing the procurement record.
- Name of the end-user
- Gender
- Address of the end-user (in as much detail as possible)
- Mobile phone number/landline of the user (if available)
- Household size
- WFP Food distribution number
- Type of solar cookers distributed
- Primary baseline cookstove used (3-stone/Banco/Save 80/other)
- Confirmation that the user has received training on how to use the solar cookers

- Date of initial stove procured and any subsequent replacements

Project database / Emission Reduction worksheet

The project database is derived from the total sales record with project cookstoves. As noted above, the project database has been updated with most recent sales record data for 2021 and 2022 and the Emissions Reduction worksheet contains the results of the ongoing monitoring studies to provide a calculation of emission reductions generated by the Project during the present monitoring period.

Ongoing Monitoring Studies

The main goal of the Ongoing Monitoring Studies (OMS) is to determine the use and benefits associated with the purchase of fuel-efficient stoves by the households and to assess the number of stoves that are still under use over the time.

Households were selected from the Sales Records Database according to the age year of their solar cookers (the last year when their solar cookers were repaired or replaced).

They were then regrouped on this basis. A random selection was then done for each age group using the RANDOM function in Excel. Prior to this step, the sales records database was audited to remove duplicates and beneficiaries who left the camp since the last monitoring survey. The RANDOM function was used to return random numbers for each household in each age group. These numbers were then ordered from the lowest to the highest number. The sample for each age group was then selected based on this order.

Questionnaires were updated based on the previous OMS and submitted by ADES' 3 local enumerators; Mountaha Ahmat, Gilhoube Patallet and Madjirié Baradine, helped by 10 educators in charge of raising awareness among refugees about the project's benefits and liaising with them on behalf of ADES (recruited among refugees in the Iridimi refugee camp). 100% of the surveys were carried out face-to-face by them. ADES was supported by technical consultants at HAMERKOP who assisted in ensuring that the requirements of the Gold Standard and applied methodology were adhered to throughout this process. The team collaborated in determining the sample size, selecting the beneficiaries to be surveyed and the development of the survey questionnaire. The local consultants carried out the surveys and ensured quality of the data, after which point HAMERKOP carried out a second qualitative check as well as the

analysis of data for input into the emission reductions' calculation spreadsheet and monitoring report.

The methodology specifies that "*Monitoring shall consist of checking of a representative sample, once every year (annually) to ensure that project cookstoves are still operating by carrying out the usage survey as per the guidelines below. A usage survey must be conducted to estimate the drop off rates as project cookstove may not be adopted or may be disposed of and potentially replaced by a baseline stove again. Prior to the verification, a usage survey for each cookstove age-group is required. For example, if only cookstoves in the first year of use (age 0-1) are being credited, a usage parameter must be established for age-group 0-1, through a usage survey for cookstove age 0-1. If cookstoves of age 0-1 and age 1-2 are being credited (as part of first request for issuance), usage parameter must be established for age-group 0-1 and 1-2, respectively through usage survey. If cookstoves of age-group 0-1 and age-group 1-2 are being credited (as part of second request for issuance), usage parameter must be established for age-group 1-2 only through usage survey as the usage rate for cookstoves of age group 0-1 can be applied from the previous issuance*.".

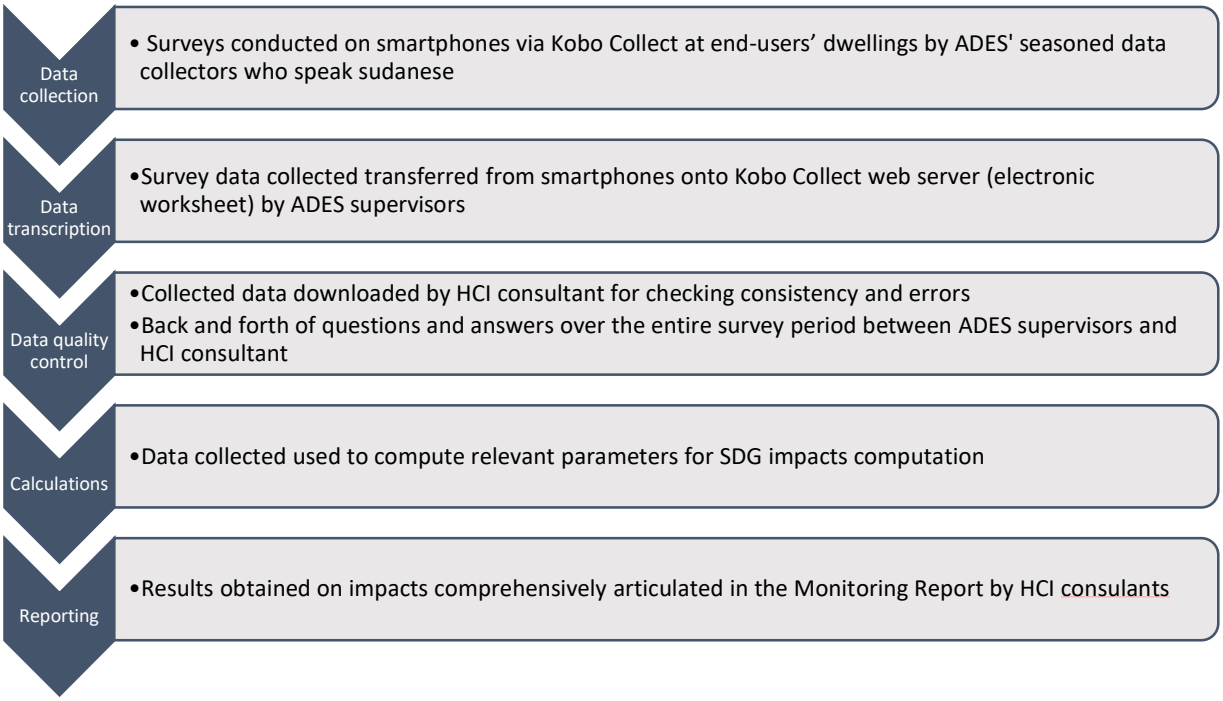
The OMS included the usage surveys carried out between February-March 2022. The table below presents the list of OMS undertaken during the 4th monitoring period.

Monitoring Tasks	**Data Collection Period**	**Target Population**	**Sample size**
OMS	10/02/2022 – 03/03/2022	4,434	124

The OMS found that beneficiary households are rather small (4.75), and beneficiaries mainly cook outdoors (100% of sample). Furthermore, it is still common for households to keep cooking with their traditional stoves, notably for cooking in the morning as it takes less time. In total, some 61.2% of meals are being cooked using the solar stove.

The survey of 124 beneficiary households has revealed that on average, 39% of the meals in a week were cooked with the baseline stove. It was also found that 100% of beneficiary households have continued using their solar cookers throughout 2021 and 2022 (the usage rate).

The diagram below shows the data flow taking place for the usage/monitoring surveys.



The table below shows the project data management and key responsibilities:

STEP	DESCRIPTION	FREQUENCY	LOCATION	RESPONSIBILITY
1	Procurement record maintenance	Ongoing basis	ADES Iriba Field Office	- Mr. Hamit Moukou Haggar *ADES Iriba Head of Office* - Mr. Zakaria Abdoulaye Bahar *ADES Project coordinator*
2	Populating the project's database (*Updates made via Kobo Collect are reported onto the master Excel spreadsheet*)	Once a week	ADES Iriba Field Office	- Mr. Hamit Moukou Haggar *ADES Iriba Head of Office* - Mr. Zakaria Abdoulaye Bahar *ADES Project coordinator* - Mr. Gilhoube Patallet *ADES project coordinator assistant*
3	Consolidating and back-up of the project database	Once a week	ADES Iriba / HCI United Kingdom	- Mr. Hamit Moukou Haggar *ADES Iriba Head of Office* - Mr. Zakaria Abdoulaye Bahar *ADES Project coordinator* - Mr. Gilhoube Patallet *ADES project coordinator assistant*

				- Mr. Olivier Levallois *Hamerkop Climate Impacts, Project coordinator*
4	Data analysis	As needed or requested	United Kingdom	HAMERKOP Ms Karen Liu & Mr. Olivier Levallois

Data collection, processing and archiving

The data for the usage/monitoring surveys was collected through smartphones using Kobo Collect. A similar questionnaire as the one used in the previous monitoring period was installed on Kobo Collect. ADES' enumerators then used this application and the questions installed in it, to conduct the surveys. Responses were entered directly into the application and then uploaded to the Kobo Humanitarian project server. The HCI project coordinator then compiled these responses together and downloaded them in an MS Excel spreadsheet.

The relevant information required in the monitoring and computation of emission reduction contained in the original responses and compiled in the Excel spreadsheet were then extracted for analysis. Then, HCI analysed this data and drafted the Monitoring Report. All the original responses to the questionnaires are kept on the Kobo server and can be provided upon request by SustainCert.

Specific attention was paid to:

Sale Records / List of beneficiaries / User Database

- to ensure all information was accurate and in line with reality.
- the sales records were consolidated and controlled by ADES' staff, HCI oversaw quality control.

Ongoing Monitoring Studies

For at least 10% of beneficiaries interviewed, HCI ensured:

- spot checks are carried out on the data collected.
- the data is consistent:
    - check names of beneficiaries.
    - ensure the beneficiaries have been randomly selected.

SECTION D. DATA AND PARAMETERS

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

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)
Data/parameter:	$EF_{b,fuel,CO2}$
Unit	tCO_2/tonne of firewood
Description	CO_2 emission factor arising from use of firewood in baseline scenario
Source of data	Section 4 of The Gold Standard Simplified Methodology for Efficient Cookstoves
Value(s) applied	1.747 tCO_2/tonne of firewood
Choice of data or measurement methods and procedures	Factor recommended by the methodology.
Purpose of data	Deriving the greenhouse gas emissions released by non-renewable biomass saved.
Additional comments	-

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)
Data/parameter:	$EF_{b,fuel,non-CO2}$
Unit	tCO_2/tonne of firewood
Description	Non-CO_2 emission factor arising from use of firewood in baseline scenario
Source of data	Section 4 of The Gold Standard Simplified Methodology for Efficient Cookstoves
Value(s) applied	0.53 tCO_2/tonne of firewood

Choice of data or measurement methods and procedures	Factor recommended by the methodology.
Purpose of data	Deriving the greenhouse gas emissions released by non-renewable biomass saved.
Additional comments	-

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)
Data/parameter:	η_p
Unit	Fraction
Description	Efficiency of the cookstove being used in the project scenario
Source of data	The cookers do not use fuel *per se* and so there is no loss of energy being used.
Value(s) applied)	100%
Choice of data or measurement methods and procedures	-
Purpose of data	Feeding the calculation for quantity of firewood that is saved in year y.
Additional comments	-

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)
Data/parameter:	fNRB
Unit	Fraction
Description	Fraction of non-renewable biomass

Source of data	A new value was submitted by the project developer on 25/09/2020 to the GS. This value was accepted by the GS on 08/10/2020.
Value(s) applied)	96%
Choice of data or measurement methods and procedures	Data was calculated.
Purpose of data	Considering only the non-renewable portion of biomass as subject to emission reductions.
Additional comments	-

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)
Data/parameter:	$B_{b,y}$
Unit	Tonnes firewood per household per year
Description	Firewood consumption for cooking in baseline
Source of data	Derived from the minimum service level (MSL) or KPT
Value(s) applied)	MSL: 0.5 tonne per capita per year (MSL method)
Choice of data or measurement methods and procedures	For MSL, the household size is assessed during the usage survey carried out on a yearly basis: Option (c) of the methodology for the Quantity of firewood consumed in the baseline scenario. Household size value for this monitoring period is almost the same as the household size value for the previous monitoring period. It was thus assumed that the 0.5 t/capita value could also be used.
Purpose of data	Feeding the calculation for quantity of firewood that is saved in year y.
Additional comments	-

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)

Data/parameter:	L_y
Unit	Fraction
Description	Leakage adjustment factor period *y*
Source of data	Default value
Value(s) applied)	0.95
Choice of data or measurement methods and procedures	According to GS Simplified methodology leakage related to NRB saved by project activity is not considered for micro-scale project activities. However, for micro-scale PoA the net emission reductions shall be discounted by a factor of 0.95 to account for leakages related to non-renewable biomass saved by the project activity.
Purpose of data	Taking into account leakages related to non-renewable biomass saved by the project activity.
Additional comments	-

D.2 Data and parameters monitored

Relevant SDG Indicator	SDG 13 (emission reductions from all beneficiaries)
Data/parameter:	η_b
Unit	Fraction
Description	Efficiency of the cookstove being used in the baseline scenario.
Source of data	Monitored parameter. Furthermore, methodology default value for 3-stone fires/banco stoves and stove tests for Save 80 (CDM PDD, pg 51[1]). Portion of stove times in use from Koundji-nan Mouya (2011)[2].
Value(s) applied	(39.5% x 0.3112) + (60.5% x 0.10) = 18.35%
Choice of data or measurement methods and procedures	The monitoring survey conducted in February – March 2022 showed that 40% of all respondents were still using a save80 stove vs. 60% using a either the 3-stone or the banco stoves. This gives an adjusted weighted average efficiency of 18.35%. The weighted average of the results from the procurement records within each VPA is used to determine the weighted average efficiency of the baseline stove, assuming a 10% efficiency for a 3-stone fire/Banco (methodology default) and a 31.12% efficiency for the Save80[3].
Purpose of data	Calculation for quantity of firewood saved in year y.
Additional comments	-

Relevant SDG Indicator	SDG 1, SDG 7 & SDG 13
Data/parameter:	$U_{p,y}$

[1] Source: CDM PDD, Efficient Fuel Wood Stoves for Nigeria, pg 51 (link: https://cdm.unfccc.int/filestorage/l/z/23VFX68ADZ9LMN1RU4WPEIOSYGB5H7.pdf/130218_Nigeria_PDD_form02_v03_PRC_clean.pdf?t=aHh8cTRnMWR1fDD_dEsYZC4CZyC03CgsBjEx) ; Koundji-nan Mouyo (2011) Evaluation des actions du projet « cuisine solaire » de l'ONG « TchadSolaire » "2. Memoire redaction FINALE 08.11.2012b", pg 34

[2] Source: 23. Koundji-nan Mouyo (2011) Evaluation des actions du project ENLGISH. Pg 34

3 Source: Comparative Analysis on the Performance of Four Selected Fuel Wood Stoves Using Water Boiling Tests: https://www.researchgate.net/publication/324694858_Comparative_Analysis_on_the_Performance_of_Four_Selected_Fuel_Wood_Stoves_Using_Water_Boiling_Test

Unit	Fraction
Description	Usage rate in project scenario p during year y
Source of data	Ongoing Monitoring Studies (ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL)
Value(s) of monitored parameter	100%
Measurement methods and procedures	Estimated on the basis of the monitoring survey results. All respondents surveyed answered that they were using their solar cooker.
Monitoring frequency	Annual
QA/QC procedures	Gathered data is cross-checked with sales record for user identification and stove installation date. During the ongoing monitoring studies, qualitative checks on the physical condition of stoves are performed to cross-check with information provided by the user and potentially flag premature stove failure. All information gathered and analysed by local ADES' staff and HAMERKOP (carbon consultant).
Purpose of data:	Calculating NRB saved and calculating SDG 1, 7 & 13 impacts.
Additional comments	-

Relevant SDG Indicator	SDG 1, SDG 7 & SDG 13
Data/parameter:	$N_{p,y}$
Unit	Number
Description	Number of project cookers installed
Source of data	Sales records (ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL)
Value(s) of monitored parameter	4,434

Measurement methods and procedures	Measured. Data collected and updated by ADES and checked by HCI on the basis of the number of stoves distributed and entered into the sales records. Some duplication of records was identified, these could relate to different family members using the same WFP number but to be conservative it has been decided to remove these possible duplications.
Monitoring frequency	Continuous
QA/QC procedures	Checks that contracts contains all information required, once information is entered into the spreadsheet, checks that information match over a 10% sample.
Purpose of data	Calculating NRB saved.
Additional comments	-

Relevant SDG Indicator	SDG 13
Data/parameter:	DF_{η}
Unit	Fraction
Description	Discount factor to account for efficiency loss of project cookstoves
Source of data	N/A
Value(s) of monitored parameter	0
Measurement methods and procedures	N/A
Monitoring frequency	N/A
QA/QC procedures	N/A
Purpose of data	Calculating NRB saved.
Additional comments	Solar cookers' efficiency is considered as 100% with no loss of efficiency

Relevant SDG Indicator	SDG 13

Data/parameter:	$DF_{b,stove,y}$
Unit	Fraction
Description	Discount factor to account for usage of baseline cookstove during the year y in project scenario
Source of data	Ongoing Monitoring Studies (ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL)
Value(s) of monitored parameter	61.2%
Measurement methods and procedures	Calculated on the basis of the monitoring survey results. Calculation method: Average number of meals cooked with the baseline stove / Average number of meals cooked over a period of 7 days
Monitoring frequency	Annual
QA/QC procedures	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered and analysed by a local independent consultant and Hamerkop Climate Impacts (carbon consultant).
Purpose of data	Calculating NRB saved.
Additional comments	-

Relevant SDG Indicator	SDG 1
Data/parameter:	$S_{p,y}$
Unit	CFA francs / year
Description	Cumulated saving from an average household using the project cookstoves in year y
Source of data	Ongoing Monitoring Studies (ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL)
Value(s) of monitored parameter	36,388,086 CFA Francs (54,582 EUR) in total per month or 148 EUR per household per year

Measurement methods and procedures	Calculated based on the monitoring survey results. Calculation method: $S_{p,y} = N_p \times U_{p,y} \times S_{pi,y}$ Where: N_p = number of households who have received / acquired / using a solar cooker $U_{p,y}$ = usage rate in project scenario *p* during year *y* $S_{pi,y}$ = yearly cumulated money saving from an average representative household in year *y*
Monitoring frequency	Annual
QA/QC procedures	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered and analysed by a local independent consultant and Hamerkop Climate Impacts (carbon consultant).
Purpose of data	Calculating SDG 1 impacts
Additional comments	-

Relevant SDG Indicator	SDG 3
Data/parameter:	$RD_{p,y}$
Unit	fraction
Description	Portion of households experiencing fewer respiratory diseases after adopting solar cooking during year y
Source of data	Ongoing Monitoring Studies (ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL)
Value(s) of monitored parameter	100%
Measurement methods and procedures	Estimated based on the monitoring survey results. All respondents reported improvement; 55.6% reporting partial improvement and 44.4% reporting significant improvement.
Monitoring frequency	Annual

QA/QC procedures	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered and analysed by a local independent consultant and Hamerkop Climate Impacts (carbon consultant).
Purpose of data	Calculating SDG 3 impacts in project scenario
Additional comments	-

Relevant SDG Indicator	SDG 3
Data/parameter:	$ED_{p,y}$
Unit	fraction
Description	Portion of households experiencing fewer eye infections after adopting solar cooking during year *y*
Source of data	Ongoing Monitoring Studies (ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL)
Value(s) of monitored parameter	100%
Measurement methods and procedures	Estimated based on the monitoring survey results. All respondents reported improvement; 62.9% reporting partial improvement and 37.1% reporting significant improvement. Estimated on the basis of the monitoring survey results
Monitoring frequency	Annual
QA/QC procedures	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered and analysed by a local independent consultant and Hamerkop Climate Impacts (carbon consultant).
Purpose of data	Calculating SDG 3 impacts in project scenario
Additional comments	-

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

Data / Parameter	Value obtained in this monitoring period	Value obtained last monitoring period	Explanation
$U_{p,y}$	100%	74.4%	Considerably improved due to the issuing of new stoves and better training/project management.
$N_{p,y}$	4,434	4,646	Minor changes due to population movement from the camp and removal of suspected duplicate entries from the project database to maintain a conservative approach.
DF_{η}	0	0	This parameter value has not changed
$DF_{b,stove,y}$	61.2%	49.8%	No significant changes compared to previous monitoring period. Slight increase could be the result of behavioral change due to issuance of new stoves and better training/awareness.
$S_{p,y}$	36,388,086	2,189,935	This apparently significant variance relates to an error in the reported figure in the 3rd monitoring plan. The correct saving should have been reported as 16,982,633 in the last monitoring period. In this monitoring period, those surveyed reported significantly higher average monthly savings, hence the positive variance.
$RD_{p,y}$	100%	92.6%	This is a minor variation that is consistent with a highly impactful project with regards to its contribution to SDG 3.
$ED_{p,y}$	100%	91.7%	This is a minor variation that is consistent with a highly impactful project with regards to its contribution to SDG 3.

D.4. Implementation of sampling plan

Sampling Design & Method

The objective of the sampling effort was to meet the monitoring requirements of the Gold Standard methodology '*Simplified Methodology for Efficient Cookstoves*' applied to

this project for the calculation of monitored parameters. Following the methodology requirement, a simple random sampling approach was carried out and minimum sample size was determined as per the guidelines below:

- Project target population < 300: Minimum sample size 30
- Project target population 300 to 1000: Minimum sample size 10% of group size
- Project target population > 1000 Minimum sample size 100
- Furthermore, when target population was below 30, the project developer sought to survey the entire group

The only monitoring task requiring sampling was the OMS. This study was carried out through a survey. In accordance with the requirements set forth in the methodology, a randomly selected survey list was created for each of the age groups. For this purpose, the Sales Records was used, and stove age was calculated to form groups. Year age was rounded up and the RANDOM function in Excel was used for each year (generate random numbers). In relation to the whole project population, a minimum size of 100 was therefore required and oversampling was applied and 124 were surveyed.

Within the surveys target areas, beneficiaries were randomly selected. ADES' enumerators used the project educators/trainers to sensitise beneficiaries to the survey. This allowed the enumerators to have more efficient access to the beneficiaries and to better explain why their participation to it was needed. From there, households interviewed were those, among the list of randomly pre-selected, available at the time the enumerators where in the target area.

Target Population

The target population for the application of the monitoring procedure was the households in which solar cookers have been installed, as identified through the centralised record-keeping database managed by the CME updated with the records made by the workshop workers. For this fourth monitoring period in Iridimi camp, this equals 4,302 households at the time the sampling breakdown was undertaken.

Following the applied methodology, the usage survey was performed per age group, i.e. the age category in which solar cookers belong. The table below provides an overview of the different age groups involved as part of the usage survey, their sizes, minimum sample sizes and actual number of sampled households as part of this monitoring effort. As with the monitoring survey, oversampling was applied to ensure meeting the minimum thresholds for each age categories.

Age group of use of solar cookers by beneficiaries	Total population in the sales register	Sample size to be surveyed for the Gold Standard	Sample size to be surveyed for the purposes of the project and to include potential errors
Age group 0-1 (2021)	4290	100	115
Age group 1-2 (2020)	4	4	4
Age group 2-3 (2019)	4	4	4
Age group 3-4 (2018)	2	2	2
Age group 4-5 (2017)	2	2	2
TOTAL	4302	112	**127**

In total 124 beneficiaries were surveyed. The actual breakdown of stove age groups surveyed was 2020 (1-2) 4; 2021 (0-1) 114 and 2022 (0-1) 6. This reflected several recently replaced stoves, compounded by the delay in commencing the survey for the reasons stated above.

SECTION E. CALCULATION OF SDG IMPACTS

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

All calculations in attached spreadsheet "ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL"

SDG 1. No Poverty

The impacts are assessed through the cumulated money saving from all households using the project cookstoves in year y ($S_{p,y}$).

Money saving from not cooking with the project cooker is 0 CFA francs.

SDG 3. Good health and well-being

The heath situation improvement from not cooking with the project cooker is 0%.

SDG 7. Affordable and Clean Energy

The impacts will be assessed through the additional number of persons having access to clean technology for cooking compared to the baseline scenario (P_{access}).

Households benefiting from clean technology for cooking in the baseline is 0.

SDG 13 (Climate Action)

For the calculations and estimation of emission reductions, The Gold Standard Simplified Methodology for Efficient Cookstoves (April 2020) is used.

$$ER_y = \sum_{0tol}^{xtoy} N_{P,y} * P_y * U_{P,y} * (f_{NRB,y} * EF_{b,fuel,CO2} + EF_{b,fuel,non\_CO2}) * (1 - DF_{b,Stove,y})$$

Where:

$N_{P,y}$ = Number of project cookstoves of each age group operational in the year *y*

P_y = Quantity of firewood that is saved in the year *y* (tonnes per household in year *y*)

$U_{P,y}$ = Usage rate for project cookstoves in year *y*, based on adoption rate and drop off rate revealed by usage surveys (fraction)

$f_{NRB,b,y}$ = Fraction of non-renewable biomass, used in year *y* for baseline scenario.

$EF_{b,fuel,CO2}$ = CO_2 emission factor of firewood that is substituted or reduced.

$EF_{b,fuel,non\_CO2}$ = Non-CO_2 emission factor of firewood that is substituted or reduced.

$DF_{b,Stove,y}$ = Usage of baseline cookstove during the year *y* (fraction) in project scenario

x = *y* – 1

y = Year of the crediting period

with quantity of fire wood that is saved (P,y) estimated as follows: $P_y = B_{b,y} * (1-\eta_b/\eta_{p,y})$

Where:

$B_{b,y}$ = Quantity of firewood consumed in baseline scenario during year y (tonnes per household per year)

$\eta_{p,y}$ = Efficiency of project cookstove in year y (fraction)

η_b = Efficiency of the baseline cookstove being replaced (fraction). A default value of 10% shall be used if the replaced cookstove is a three stone fire, or a conventional device without a grate or a chimney i.e., with no improved combustion air supply or flue gas ventilation

Vintage wise breakdown of baseline emissions

Period	Emission Reductions (tCO_2e)
1 January - 31 December 2021	8,538.5
1 January - 31 May 2022	4,581.9

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

(All calculations in attached spreadsheet "ER calculation - Chad Solar Cookers MP4_07.06.2022 FINAL")

SDG 1. No Poverty

The impacts are assessed through the cumulated money saving from all households using the project cookstoves in year y ($S_{p,y}$).

$S_{p,y} = N_p \times U_{p,y} \times S_{pi,y}$

Where:

N_p = number of households who have received / acquired / using a solar cooker

$U_{p,y}$ = usage rate in project scenario *p* during year *y*

$S_{pi,y}$ = yearly cumulated money saving from an average representative household in year *y*

The below calculation is presented for illustration:

N_p = 4,434

$U_{p,2021\text{-}22}$ = 100%

$S_{pi,2021\text{-}22}$ = 436,657,030 (CFA Francs)

$S_{p,y}$ amounts to around 436,657,030 (654,986 EUR) in total or 148 EUR per household per year as of May 2022.

SDG 3. Good health and well-being

The impacts are assessed through the beneficiaries' perception of health benefits (frequency of respiratory- and eye-related illness).

(1) $RDR_{p,y}$ = $RD_{p,y}$

Where:

$RDR_{p,y}$ = % of beneficiary perceiving an improvement in their respiratory diseases during year *y*

$RD_{p,y}$ = number of households experiencing fewer respiratory diseases after adopting solar cooking during year *y*

(2) $EDR_{p,y}$ = $ED_{p,y}$

Where:

$EDR_{p,y}$ = % of beneficiary perceiving an improvement in their eye infections during year *y*

$ED_{p,y}$ = number of households experiencing fewer eye infections after adopting solar cooking during year *y*

The below calculation is presented for illustration:

$RD_{p,y}$ = 100%

$RDR_{p,y}$ amounts to around 100% of beneficiaries

$ED_{p,y}$ = 100%

$EDR_{p,y}$ amounts to around 100% of beneficiaries

SDG 7. Affordable and Clean Energy

The impacts will be assessed through the additional number of persons having access to clean technology for cooking compared to the baseline scenario (P_{access}).

P_{access} = N_p x $U_{p,y}$

Where:

P_{access} = number of additional persons having access to clean cooking technology

N_p = number of households who have received / acquired / using a solar cooker

$U_{p,y}$ = usage rate in project scenario p during year y

The below calculation is presented for illustration:

N_p = 4,434

$U_{p,2021\text{-}2022}$ = 100%

P_{access} = 4,434

P_{access} amounts to 4,434 beneficiary households as of May 2022.

SDG 13 (Climate Action)

Emissions from the project are considered to be 0 tCO_2e

E.3. Calculation of leakage

As per methodology, for micro-scale POA net ER_y shall be discounted by 0.95 to account for leakages related to NRB saved by the project.

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

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Emissions reductions	2021: 8,538.5 tCO_2e 2022: 4,581.9 tCO_2e	0 tCO_2e	2021: 8,538.5 tCO_2e 2021: 4,581.9 tCO_2e
3	Households' perception of health benefits (reduction in the incidence of eye and respiratory diseases) as a fraction	$RD_{p,y}$ = 0% $ED_{p,y}$ = 0%	$RD_{p,y}$ = 100% $ED_{p,y}$ =100%	$RD_{p,y}$ = 100% $ED_{p,y}$ = 100%
7	Number of beneficiaries: households	P_{access} = 0	P_{access} = 4,434	P_{access} = 4,434
1	Average household savings i.e., decrease in expenditure on basic service such as cooking, lighting, drinking	$S_{p,y}$ = 0 SDG	$S_{p,y}$ = 98,479 CFAF (148 Euro)	$S_{p,y}$ = 98,479 CFAF (148 Euro)

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[4] achieved during this monitoring period
13	2021: 7,525 tCO_2e 2022: 10,000 tCO_2e	2021: 8,538.5 tCO_2e 2022 (January to May): 4,581.9 tCO_2e
3	2021: RDp,y = 99.7% EDp,y = 99.7% 2022: RDp,y = 99.7% EDp,y = 99.7%	2021: RDp,y = 100% EDp,y = 100% 2022: RDp,y = 100% EDp,y = 100%

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

7	2021: 4,470 2022: 4,470	2021: 4,434 2022: 4,434
1	2021: 279,875,586 XOF or 84 EUR per household 2022: 279,875,586 XOF or 84 EUR per household	2021: 436,657,030 CFAF or 148 EUR per household per year 2022: 436,657,030 CFAF or 148 EUR per household per year

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

Values used for ex ante calculations were obtained during transition to GS4GG and were updated based on estimates assessed through the monitoring and usage surveys conducted in the 2nd MP. At the time these surveys were conducted, the project had suffered several setbacks and difficulties and was still at a latent stage. Values then estimated were thus rather pessimistic. The updated ex-ante calculations are now supported by the actual calculations.

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

All values obtained during this monitoring period are similar or very close to values estimated ex ante except for SDG 13 values.

SDG 13 values in 2021 exceed the ex-ante forecast due to the renewal of stoves, greater awareness of their benefits in the camp and improved training on their use. It should be noted that the SDG 13 actuals only cover the first 5 months of the year suggesting that the project remains on target to attain the ex-ante forecasted reductions by the end of the year.

SECTION F. SAFEGUARDS REPORTING

There were no safeguarding principles deemed to be triggered by the project activities. Furthermore, no mitigation measures were implemented during this monitoring period.

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.

A clear mechanism is in place:

- The local project implementation partner, ADES, has nominated focal points for each composing blocks within the refugee camp of Iridimi. These focal points are chosen from among the refugees themselves.
- The focal points communicate feedback given to them by the refugees to ADES' officers when they visit the camp.
- These feedbacks, if and when there were any, were then reported onto a centralised grievance book, uploaded on a google doc file, which could then be accessed by the project developer and addressed as necessary.
- However, the project participants have not received any comments or specific feedbacks from any stakeholders during this 4th monitoring period.

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

No stakeholder mitigations were agreed to be monitored.

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

No legal contest has arisen with the project 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