Gold Standard for the Global Goals

TEMPLATE

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

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

This document contains the following Sections

KEY PROJECT INFORMATION

Programme of Activity Information

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) Solar Cooking in Chad, Touloum (VPA-02)

Key Project Information

GS ID (s) of Project (s)	1. GS 3445 (VPA1 – Iridimi) 2. GS 12011 (VPA2 – Touloum)
Title of the project (s) covered by monitoring report	1. Solar Cooking in Chad, Iridimi (VPA-01) 2. Solar Cooking in Chad, Touloum (VPA-02)
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	1. **Iridimi**: Version 11.0, 23/09/2020 2. **Touloum**: Version 2.0, 22/01/2024
Version number of the monitoring report	1. **Iridimi**: Version 3.0 (as part of joint MR with Touloum) 2. **Touloum**: Version 3.0 (as part of joint MR with Iridimi)
Completion date of the monitoring report	17/01/2025
Date of project design certification	1. **Iridimi**: 08/01/2016 2. **Touloum**: 14/02/2024
Date of Last Annual Report	1. **Iridimi**: 18/12/2024 2. **Touloum**: 18/12/2024
Monitoring period number	5th for Iridimi (VPA-01) 1st for Touloum (VPA-02)
Duration of this monitoring period	Iridimi: 01/06/2022 to 31/12/2023 Touloum: 21/02/2022 to 31/12/2023
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	**Iridimi (VPA-01)** 15,419[1] **Touloum (VPA-02)** 19,142[2]	VERs
SDG 1 No Poverty	Average household savings i.e., decrease in expenditure on basic service such as cooking, lighting, drinking	**Iridimi (VPA-01)**: 125 **Touloum (VPA-02)**: 121	Euros / household / 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	**Iridimi (VPA-01)**: Respiratory –98.8% Eye – 90.4% **Touloum (VPA-02):** Respiratory –98.7% Eye – 83.4%	Fraction (%) of all respondents declaring that they perceived a significant or partial reduction in the occurrence of eye and

[1] 5,419 tCO2e avoided in 2022 and 10,490 tCO2e avoided in 2023 (capped at 10,000)
[2] 9,142 tCO2e avoided in 2022 and 13,168 tCO2e avoided in 2023 (capped at 10,000)

			respiratory diseases within their respective household, since the adoption of the solar cookers
SDG 7 Affordable and clean energy	Number of beneficiaries: households	**Iridimi (VPA-01)**: 4,583 **Touloum (VPA-02):** 5,702	Number of households who have benefitted from project cookers installed (as of 2023)

Table 2 – Product Vintages

			Amount Achieved
Camp/VPA	**Start Dates**	**End Dates**	**VERs**
Iridimi/VPA-01	01/06/2022	31/12/2022	5,419[3] (5,469)
Iridimi/VPA-01	01/01/2023	31/12/2023	10,000 (10,490)
Touloum/VPA-02	21/02/2022	31/12/2022	9,142
Touloum/VPA-02	01/01/2023	31/12/2023	10,000 (13,168)

[3] Over the vintage 2022 (covering MP4 and part of MP5), a total of 10,050 VERs was issued in VPA-01 (Iridimi). The micro-scale cap of 10,000 VERs per micro-scale VPA applies. Hence 50 VERs are deducted from Vintage 2022 for MP5. More details are found in the ER calculation files: "ER calculation - Iridimi 5th MP".

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 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 second VPA, includes solar cookers that have been installed in the Touloum refugee camp from February 2022 onwards.

As of March 2022, UNHCR reported 1,088,700 forcibly displaced people in Chad. In the Wadi Fira region, there were 30,242 in Touloum; 24,693 people in Iridimi; 27,392 in Am Naback; 23,990 in Mile; and 22,887 in Kounoungou[4].

The escalation of violence in Darfur has led to the rapid increase of new refugees into eastern Chad since the beginning of 2023. The table[5] below illustrates the change in population from May-October 2023 where the two VPA's (Iridimi and Touloum) where the refugee camps are located.

[4] UNHCR March 2022 report: Document - UNHCR TCHAD| Statistiques des personnes relevant de la compétence du HCR au 31 Mars 2022
[5] UNHCR (2023) | Country - Chad (unhcr.org)

Table 3 Population increase in refugees camp for 2023

Camp	Population (May 2023)	Population (Oct. 2023)	Number of Households	Household size
Iridimi	25,624	39,559	9,506	4.16
Touloum	32,161	34,148	6,947	4.92
Am Nabak	29,194	31,037	7,553	4.11
Ouré Cassoni	36,972	38,873	N/A	N/A

Iridimi and Touloum are two camps that were established by the Government of Chad to accommodate refugees from Darfur. These camps are located in a semi-desert area where rainfall and underground water, and thus growth of trees, is scarce. The World Food Programme (WFP) supplies food that can withstand three months of transport over land. However, in this semi-arid area there is virtually no wood for cooking, and the little that was there originally was sufficient for local populations. UNHCR has been trucking in a considerable amount of wood from other regions of Chad at an enormous cost, but this is not a viable long-term solution.

In this project area, there is ample solar energy to enable the usage of 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 leftover materials from the manufacture of cookers. The project has chosen a model that is cheap and easy to make to ensure that the poorest are able to afford this technology and could potentially make replacement cookers themselves with training.

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 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.

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 one to 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, in each respective camp, if they require a replacement solar cooker. Any maintenance takes only a matter of minutes to complete. If they require 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), to pay compensation for the workshop workers and to pay for overall project management costs.

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

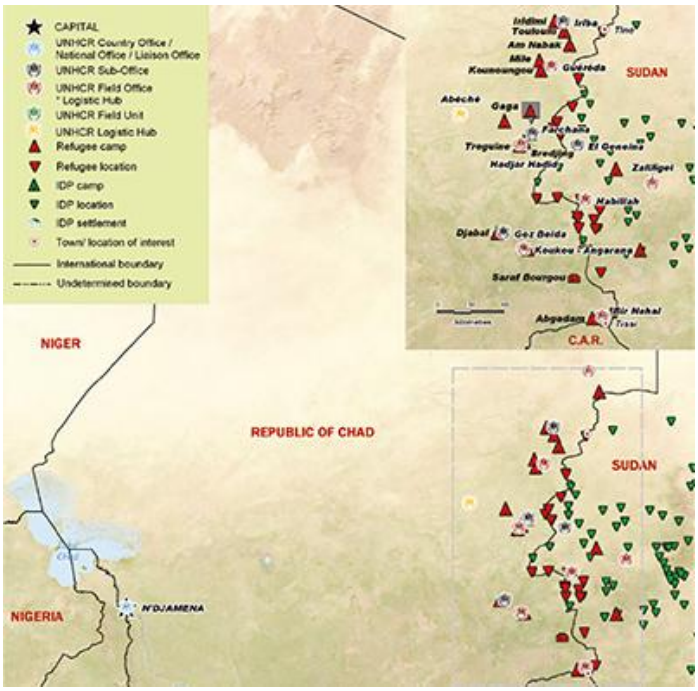
- Improved health and wellbeing: reduced combustion of firewood and fossil fuels in households will reduce indoor air pollution, thereby increasing the respiratory health of users, particularly women and children who spend a large portion of their time near the domestic hearth. The project will also 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.

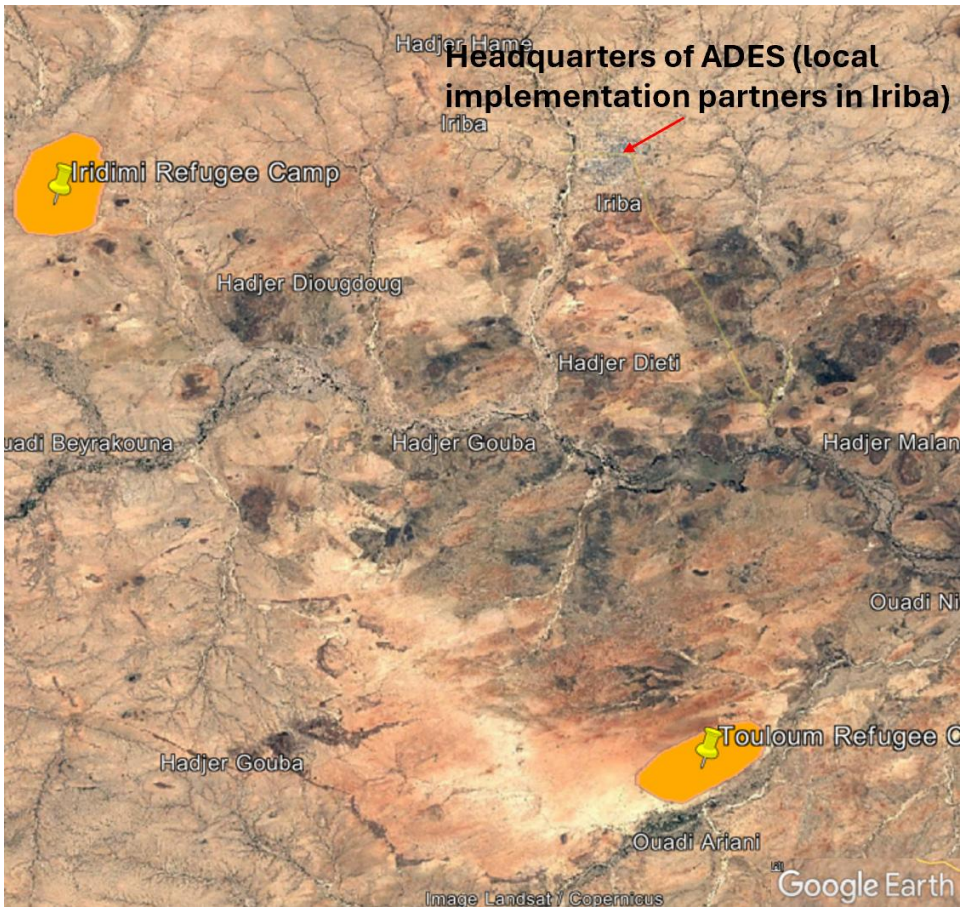
A.2. Location of project

The project is implemented in the Iridimi and Touloum camps. The approximate location is denoted in the figure below, which also shows the other refugee camps in the region.



The exact location of each camp is shown in the figure below. The coordinates for each camp (WGS1984) are as follows:

- **Iridimi (VPA-01):** 15° 6'59.52"N, 22° 7'41.45"E
- **Touloum (VPA-02):** 14°59'55.75"N, 22°16'4.38"E



A.3. Reference of applied methodology

The applicable methodology is The Gold Standard "Simplified methodology for efficient cook stoves", version 1.1 released in April 2020.

A.4. Crediting period of project

The 1st crediting period for VPA-01 Iridimi (GS1075) started on 01/01/2012 and ran for a period of 7 years. The present monitoring period for VPA-01 Iridimi is part of the 2nd crediting period which started on 01/01/2019 (and goes until 31/12/2025).

The crediting period for VPA-02 Touloum (GS12011) runs from 21/02/2022 until 20/02/2027 and is based on a 5-year renewable crediting period.

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

On 1st January 2012, the VPA-01 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. Project activities began at the Touloum refugee camp (VPA-02), in February 2022, and was officially design certified by the Gold Standard (SustainCert) in February 2024. This is the fifth monitoring period for VPA-01 (Iridimi) and the first for VPA-02 (Touloum).

In October 2019, FairClimateFund (FCF) took over the role of coordinating and managing entity (CME) from AAA (Agrometeorological Applications Associates), the former CME. FCF is a non-for-profit organisation based in the Netherlands that invests in and supports carbon project development.

The issuance of VERs for the previous monitoring period for Iridimi VPA-01 (01/01/2021 to 31/05/2022) 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, Touloum. The project remains fully funded through the sale of VERs.

The activities that took place during the 5th monitoring period for Iridimi and 1st monitoring period for Touloum 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 with the solar cookers to (both male and female heads of households)
- Manufacturing 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 5th monitoring period for Iridimi and 1st monitoring period for Touloum 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 and VPA-02), 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/VPA-02 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 (WFP distribution number) 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.

In Iridimi, by the end of the 5th monitoring period (December 2023), the Project had distributed solar cookers to 4,583 beneficiaries registered under the project. In

Touloum, by the end of the 1st monitoring period (also December 2023), the project had distributed solar cookers to 5,702 beneficiaries registered under the project.

B.1.1 Forward Action Requests

General

FAR raised from GS12011 validation report (document :' GS12011.MD.GEN.009.Validation_Report'):

A FAR#01 is raised requesting the PD to update the emission factor for EFb,fuelnonCO2 , inline with the GS rule on IPCC AR5 GWP for CH4 & N2O during the first verification of this project.

The emissions factor for $EF_{b,fuel\ nonCO2}$ has been updated to a value of 0.58 instead of 0.53 to reflect the GS rule update (link) effective as of 01/01/2021 which reports on IPCC AR5 GWP updated values. These changes have been made in the emissions reductions calculations spreadsheets for Iridimi (VPA01) and Touloum (VPA02). The changes are reflected in all relevant section of the monitoring report.

Iridimi (VPA-01):

The FAR for the fourth verification report completed 18/08/2023 (by Carbon Check) for the Iridimi camp (VPA1) states that:

CME to note that the remote audit for the monitoring period 01/01/2023 to 31/05/2022 is conducted considering the security concerns in Chad, however, in accordance with paragraph 11.1.2 of the microscale project requirement, CME shall facilitate VVB's on-site audit during the next periodic verification.

This is now a null point since the Gold Standard has approved the deviation request (DEV 695) as detailed below.

Touloum (VPA-02):

The FAR from the Design Review of the Touloum VPA-02 included within the Validation Report provided to HAMERKOP and uploaded on SustainCert on 22/01/2024 states the following:

The Project Developer shall document the deviation request (DEV_411 and DEV_552), its implications, and Gold Standard's decision in the appropriate section of the GS Monitoring report.

A short summary of these 2 deviation requests is as follow:

Summary of deviation request 411

Date of decision: 12/06/2023

Continued use of the SMEC v.1.1 for solar cookstoves project. **APPROVED**

Summary of deviation request 552

Date of decision: October 10, 2023

Request to allow exception to the 1 year rule for submission of preliminary review to allow crediting based on actual start date of the project VPA(2). **APPROVED**

The approved deviation requests shown above (**411 and 552**) are also appropriately detailed in section B.2. below. A summary of a third deviation request approved for Touloum VPA2 (**DEV 695**) is also summarized in section B.2. below.

B.2. Post-Design Certification changes

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

The approved monitoring & Reporting Plan was followed for both Touloum and Iridimi.

B.2.2. Corrections

The annual monitoring & usage survey took place in February and March 2024 and on time for the verification.

B.2.3. Changes to start date of crediting period

No changes to the start date of crediting period at **Iridimi** (VPA-01) have been requested.

For Touloum (VPA-02), HAMERKOP submitted a deviation request to the Gold Standard/SustainCERT (**Deviation reference # 552**) to allow exception of 1 year rule for submission of preliminary review to allow crediting based on actual start date of the project VPA-02 start. This deviation was **APPROVED on 10/10/2023.** The reasoning for this delay is clearly explained in the deviation request and will be made available to the VVB.

Another deviation request (and third total for Touloum VPA2) with regards to the start date of the crediting period was submitted to Gold Standard/SustainCERT **(Deviation request #695)** to allow for: **1)** Request to allow exception of VVB visit to the project site within 2 years of project activities to allow crediting based on actual start date of the project VPA, as well as **2)** request to allow for remote verification as an eligible alternative to in-person site audit due to ongoing security concerns in Chad. This

deviation request was **APPROVED by GS/SustainCERT on 05/05/2024** according to the following stipulations (as summarized in the first 2 pages of the approved deviation request):

1. *the project shall only be allowed to claim VERs for a maximum period of three years from the date of the latest site visit (physical/remote) by the VVB.*
2. *The verifying VVB shall demonstrate how, without the performance of a physical or remote site visit in this conflict zone, it was possible to comply with §2.1.6 of Annex B of the Principle and Requirements v1.2. and other relevant means of verification as per the Validation and Verification Standard V1.0.*
3. *The project developer shall:*

   a) Ensure the subsequent verification of the involved VPAs shall mandatorily involve

   a) physical onsite visit by the VVB.

   b) The remote audit shall be conducted as prescribed and/or suggested by section 4,5 and 6 of the Site visit and remote audit requirements and procedures. The CME shall apply the requirements or guidance contained in the above-mentioned sections pragmatically to the POA and VPA.

   c) Ensure that credits are claimed for the remotely verified monitoring period only, considering the security concerns in Chad.

   d) The PD shall follow the regular verification cycles for all the subsequent verifications.

   e) The PD shall document the deviation request, its implications, and GS' decision in the appropriate section of the GS Monitoring Report (for the relevant MP). The verifying VVB shall, through appropriate means at its disposal, evaluate the Project's compliance with the above-mentioned conditions and provide its opinion in the Verification Report.

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

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

b) HAMERKOP submitted a deviation request at the request of Gold Standard (**Deviation reference #411**) to enable the Touloum VPA to keep using the Simplified Methodology for Efficient Cookstoves (SMEC v.1.1). It was not clear why this deviation was necessary since the PoA level project is set up under SMEC v.1.1 and Touloum VPA inclusion falls under master PoA (GS1075). **This deviation was APPROVED on 12/06/2023.**

B.2.5. Changes to project design of approved project

There were no other changes to project design in either VPA.

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 2024. Furthermore, the workshop workers in charge of repairing broken cookers kept a record of the replacements and new distributions made throughout the monitoring period (2022-2023). This list was collected, recorded, and verified for quality assurance by ADES periodically.

In the form of an Excel datasheet, the main goal of the Sales Records (i.e., 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 (of stove) record,
- Name, company, and 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,

- and the 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 2022 and 2023 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 and Touloum refugee camps, respectively). One hundred percent (100%) of the surveys were carried out face-to-face by the local ADES teams. In turn, 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 developing 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 2024. The table below presents the list of OMS undertaken during the 5th monitoring period for Iridimi (VPA-01) and 1st monitoring period for Touloum (VPA-02). The total sample size by stove age is shown in section D4 below.

Camp / VPA	Data Collection Period	Target Population	Sample size
Iridimi (VPA-01)	26/02/2024 - 13/03/2024	4,583	323
Touloum (VPA-02)	11/03/2024 - 21/03/2024	5,702	229

For Iridimi (VPA-01), the OMS found that beneficiary households were made of 5 people on average, and beneficiaries cook outdoor (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 49.3% of meals are being cooked using the solar stove.

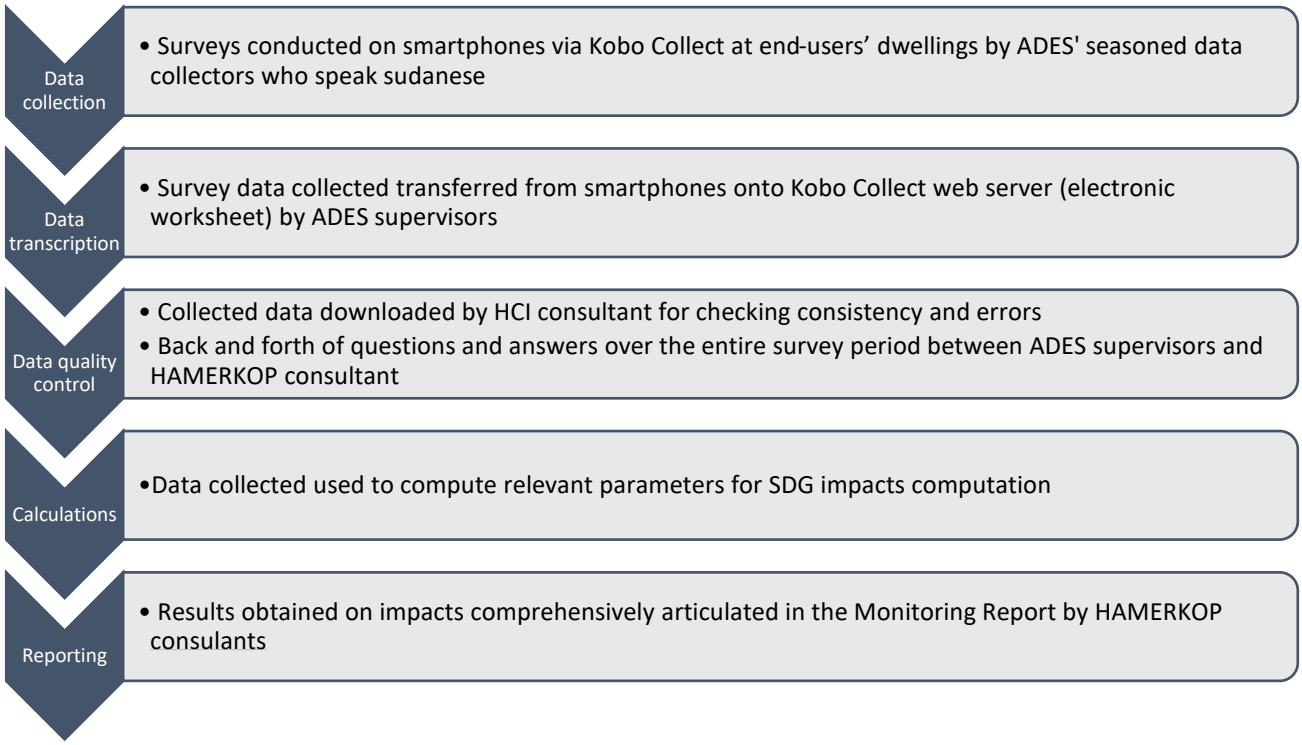
The survey of 323 beneficiary households has revealed that on average, 50.7% of the meals in a week were cooked with the baseline stove. It was also found that 100% (the usage rate) of beneficiary households have continued using their solar cookers throughout 2022 and 2023. The reason the project is able to achieve such a high rate of success was due to: 1) the frequency and quality of the cooking demonstrations and

workshops provided by the ADES team in the implementation of the project, 2) the expediency and efficiency by which the ADES team has been replacing solar cookers that are in disrepair or where the aluminium has been damaged, 3) dedicated camp-specific project staff with a continual, steady presence in the field on a week to week basis, and of course, 4) the ongoing socio-economic difficulties in the region and the high price of fuelwood is making solar cooking a crucial fixture in the daily lives of beneficiaries.

For Touloum (VPA-02), the OMS found that beneficiary households were made of 5.2 people on average, and beneficiaries mainly cook outdoor (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 49.3% of meals are being cooked using the solar stove.

The survey of 229 beneficiary households has revealed that on average, 50.7% 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 2022 and 2023 (the usage rate). The reasons that 100% of beneficiaries have been found to be using their solar cookers is detailed is consistent with those mentioned above (for Iridimi).

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	Continuous	ADES Iriba Field Office	- Mr. Zakaria Abdoulaye Bahar *ADES Chief of Delegation: Iriba office* - Mr. Gilhoube Patallet *ADES project coordinator* - *Mr.* alil Ahmat Ibrahim *Head of Evaluation and monitoring*
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. Zakaria Abdoulaye Bahar *ADES Chief of Delegation: Iriba office* - Mr. Gilhoube Patallet *ADES project coordinator* - *Mrs.* Madjirié Baradine Touloum Camp Supervisor - Mrs. Mountaha Ahmat *Iridimi Camp Supervisor*
3	Consolidating and back-up of the project database	Once a week	ADES Iriba / HAMERKOP United Kingdom	- Mr. Zakaria Abdoulaye Bahar *ADES Chief of Delegation: Iriba office* - Mr. Gilhoube Patallet *ADES project coordinator* - Ms. Dua Zehra HAMERKOP*, Project data coordinator*
4	Data analysis	As needed or requested	United Kingdom	Mr. Christophe Boyer, Ms. Dua Zehra & Mr. Olivier Levallois HAMERKOP consultancy team

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, HAMERKOP 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, HAMERKOP oversaw quality control.

Ongoing Monitoring Studies

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

- spot checks are carried out on the data collected.
- the data is consistent:
    - Verify names and WFP numbers 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	0.58 tCO_2/tonne of firewood
Choice of data or measurement methods and procedures	From rule update: Applicability of Global Warming Potential for Gold Standard For The Global Goals Projects (06/03/2021).
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:	$\eta_{p,y}$
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	It is acknowledged that 100% thermal efficiency is not possible as the laws of thermodynamics preclude any stove from operating without any energy loss during the transfer of thermal energy from the sun to the solar cooker. However, this justification is based purely on the fact that the solar cookers operate on 100% solar energy and do not require any woodfuel or other fuel to operate. This efficiency is being used for the purposes of calculating the difference in the thermal efficiency in the project scenario (solar cookers) vs the baseline scenario (firewood; as per methodology requirements) and use the equation provided by the methodology.

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[6]). Portion of stove times in use from Koundji-nan Mouya (2011)[7].
Value(s) applied	**Iridimi (VPA-01):** (89% x 0.10) + (11% x 0.31) = 12.32% **Touloum (VPA-02):** (79% x 0.10) + (21% x 0.31) = 14.42%
Choice of data or measurement methods and procedures	The monitoring survey conducted in February – March 2024 in Iridimi showed that 11% of all respondents were still using a save80 stove vs. 89% using a either the 3-stone or the banco stoves. This gives an adjusted weighted average efficiency of 12.32%. In Touloum, 21% of all respondents were still using a save80 stove vs. 79% using a either the 3-stone or the banco stoves. This gives an adjusted weighted average efficiency of 14.42%. The weighted average of the results from the usage surveys 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

[6] 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

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

	(methodology default) and a 31% efficiency for the Save80[8].
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:	$U_{p,y}$
Unit	Fraction
Description	Usage rate in project scenario p during year y
Source of data	Ongoing Monitoring Surveys (ER Calculation - Iridimi 5th MP May 2024 and ER calculation – Touloum 1st MP May 2024)
Value(s) of monitored parameter	**Iridimi (VPA-01):** 100% **Touloum (VPA-02):** 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.

8 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

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 – Iridimi 5th MP May 2024 and ER calculation – Touloum 1st MP May 2024)
Value(s) of monitored parameter	Iridimi (VPA-01): 4,583 Touloum (VPA-02): 5,702
Measurement methods and procedures	Measured. Data collected and updated by ADES and checked by HAMERKOP 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. It is acknowledged that 100% thermal efficiency is not possible as the laws of thermodynamics preclude any stove from operating without any energy loss during the transfer of thermal energy from the sun to the solar cooker. However, this justification is based purely on the fact that the solar cookers operate on 100% solar energy and do not require any woodfuel or other fuel to operate. This efficiency is being used for the purposes of calculating the difference in the thermal efficiency in the project scenario (solar cookers) vs the baseline scenario (firewood; as per methodology requirements) and use the equation provided by the methodology.

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 - Iridimi 5th MP May 2024 and ER calculation – Touloum 1st MP May 2024)

Value(s) of monitored parameter	50.7% in both **Iridimi** and **Touloum**
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 is analysed by HAMERKOP.
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 - Iridimi 5th MP May 2024 and ER calculation – Touloum 1st MP May 2024)
Value(s) of monitored parameter	Iridimi (VPA-01): 31,771,343 CFA Francs (47,657 EUR) in total per month or 125 EUR per household per year Touloum (VPA-02): 38,257,497 CFA Francs (57,386 EUR) in total per month or 121 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.
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 - Iridimi 5th MP May 2024 and ER calculation – Touloum 1st MP May 2024)
Value(s) of monitored parameter	Iridimi (VPA-01): 98.8% Touloum (VPA-02): 98.7%

Measurement methods and procedures	Estimated based on the monitoring survey results. • Iridimi (VPA-01): 98.8% respondents reported improvement; 44.3% reporting partial improvement and 54.5% reporting significant improvement. • Touloum (VPA-02): 98.7% of respondents reported improvement; 34.1% reporting partial improvement and 64.6% 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.
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 - Iridimi 5th MP May 2024 and ER calculation – Touloum 1st MP May 2024)
Value(s) of monitored parameter	Iridimi: 90.4% Touloum:83.4%

Measurement methods and procedures	Estimated based on the monitoring survey results. • Iridimi (VPA-01):90.4% of all respondents reported improvement; 66.9% reporting partial improvement and 23.5% reporting significant improvement. Estimated on the basis of the monitoring survey results. • Touloum (VPA-02): 83.4% of all respondents reported improvement; 52.8% reporting partial improvement and 30.6% 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.
Purpose of data	Calculating SDG 3 impacts in project scenario
Additional comments	-

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

The table below provides a comparison between the current monitoring period and the 4th monitoring period for Iridimi (VPA-01). As this is the 1st monitoring period for Touloum (VPA-02), there are no data values to compare for this camp, therefore, the comparison between values and the explanation in the final column is only for Iridimi.

Data / Parameter	Value obtained in this monitoring period	Value obtained in last monitoring period	Explanation
$U_{p,y}$	Iridimi: 100% Touloum: 100%	Iridimi: 100%	Stayed consistent, with beneficiaries in both camps using the stoves.
$N_{p,y}$	Iridimi: 4,583 Touloum: 5,702	Iridimi: 4,434	Small increase due to greater number of stoves distributed in the camp, which aligns with new stove users and

			replacement of existing stoves in circulation.
DF_{η}	0	0	This parameter value has not changed
$DF_{b,stove,y}$	Iridimi: 50.7% Touloum: 50.7%	Iridimi: 61.2%	A small decrease compared to previous monitoring period is most likely is a minor variation that can be explained by the natural variability in the responses of sampled beneficiaries.
$S_{p,y}$	Iridimi: 31,771,343 CFAF Touloum: 38,257,497 CFAF	Iridimi: 36,388,086 CFAF	With the stove being used for slightly reduced number of meals than in the previous monitoring period, it has resulted in a reduction of households' savings in Iridimi due to increased purchase of alternative fuelwoods.
$RD_{p,y}$	Iridimi: 98.8% Touloum: 98.7%	Iridimi: 100%	This is a minor variation that is consistent with a highly impactful project with regards to its contribution to SDG 3.
$ED_{p,y}$	Iridimi: 90.4% Touloum:83.4%	Iridimi: 100%	This decrease could be linked to the continued use of other stoves in the households in Iridimi. This is a minor variation that can be explained by the natural variability in the responses of sampled beneficiaries.

D.4. Implementation of sampling plan

The objective of the sampling effort was to meet the monitoring requirements of the Gold Standard methodology '*Simplified Methodology for Efficient Cookstoves v.1.1*' 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 1,000: Minimum sample size 10% of group size
- Project target population > 1,000 Minimum sample size 100
- Furthermore, when target population was below 30, the PD 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 in Iridimi (VPA-01), a minimum size of 275 beneficiaries was required. In order to build in a buffer pool above and beyond the 275 beneficiaries, the sample size was increased to a total of 320 beneficiaries. By the end of the usage survey, ADES managed to survey 323 beneficiaries. In Touloum (VPA-02), a minimum size of 200 was required, which was increased to 230 to, again, provide a buffer. ADES surveyed a total of 229 beneficiaries in Touloum.

As described previously, each beneficiary included in the usage survey was randomly selected by the HAMERKOP team, and a list provided to the ADES team in advance. Before the commencement of the survey, the ADES team instructed the project enumerators and educators to inform the beneficiaries in advance of the formal survey to explain why their participation was requested. The ADES team made every effort to interview the beneficiaries in the primary list sent by HAMERKOP. However, if the beneficiary was not home or not available, ADES could satisfy the survey quota by selecting another name from the secondary list.

Target Population

The target population for the application of the monitoring procedure was the households in which solar cookers have been distributed, as identified through the centralised record-keeping database managed by the CME, and updated with the records made by the ADES team. For this fifth monitoring period in Iridimi (VPA-01) camp and first monitoring period in Touloum (VPA-02), this equals 4,583 and 5,702 households respectively 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.

The table below provides sampling numbers for **Iridimi** (VPA-01). In total, 323 beneficiaries were surveyed (3 more than the 320 identified below).

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 (2023)	1,612	100	115
Age group 1-2 (2022)	743	75	90
Age group 2-3 (2021)	2,219	100	115
Age group 3-12 (2012-2020)*	9	0	0
TOTAL SAMPLE SIZE	**4,583**	**275**	**320**

*Due to age, these stoves have not been sampled in this usage survey.

The table below provides sampling numbers for **Touloum** (VPA-02). In total 229 beneficiaries were surveyed.

Age group of use of solar cookers by beneficiaries	Total population in the sales register	Sample size to be surveyed for the GS	Sample size to be surveyed for the purposes of the project and to include potential errors
Selection age 0-1 (2023)	3,700	100	115
Selection age 1-2 (2022)	2,002	100	115
TOTAL SAMPLE SIZE	**5,702**	**200**	**230**

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 spreadsheets "ER Calculation - Iridimi 5th MP May 2024 and "ER calculation – Touloum 1st MP May 2024".

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.

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

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 per camp

Camp	Period	Emission Reductions (tCO_2e)
Iridimi (VPA-01)	1 June - 31 December 2022	5,419 (5,469)
	1 January - 31 December 2023	10,000 (10,490)
Touloum (VPA-02)	1 February - 31 December 2022	9,142
	1 January - 31 December 2023	10,000 (13,168)

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

All calculations in attached spreadsheets "ER Calculation - Iridimi 5th MP May 2024" and "ER calculation – Touloum 1st MP May 2024".

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 x $U_{p,y}$ x $S_{pi,y}$

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, using figures from Iridimi:

N_p	= 4,583
$U_{p,2022\text{-}23}$	= 100%
$S_{pi,2022\text{-}23}$	= 83,189 (CFA Francs)

$S_{p,y}$ amounts to around 381,256,119 (571,884 EUR) in total or 125 EUR per household per year as of December 2023.

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, using figures from Iridimi:

$RD_{p,y}$	= 98.8%

$RDR_{p,y}$ amounts to around 98.8% of beneficiaries

$ED_{p,y}$	= 90.4%

$EDR_{p,y}$ amounts to around 90.4% 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}).

$$P_{access} = N_p \times U_{p,y}$$

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 for Iridimi is presented for illustration:

N_p = 4,583
$U_{p,2021\text{-}2022}$ = 100%
P_{access} = 4,583

P_{access} amounts to 4,583 beneficiary households in Iridimi as of December 2023.

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

The table below provides data for the **Iridimi camp (VPA-01)**:

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Emissions reductions	0 tCO_2e	2022: 5,419 tCO2e 2023: 10,490 tCO2e	2022: 5,419 tCO2e 2023: 10,490 tCO_2e (capped at 10,000 tCO2e)
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%	$RD_{p,y}$ = 98.8% $ED_{p,y}$ =90.4%	$RD_{p,y}$ = 98.8% $ED_{p,y}$ =90.4%

7	Number of beneficiaries: households	P_{access} = 0	P_{access} = 4,583	P_{access} = 4,583
1	Average annual household savings i.e., decrease in expenditure on basic service such as cooking, lighting, drinking	$S_{p,y}$ = 0 SDG	$S_{p,y}$ = 83,189 CFAF (125 EUR)	$S_{p,y}$ = 83,189 CFAF (125 EUR)

The table below provides data for the **Touloum camp (VPA-02)**:

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Emissions reductions	0 tCO2e	2022: 9,142 tCO2e 2023: 13,168tCO2e 0 tCO2e	2022: 9,142 tCO2e 2023: 13,168 tCO2e (capped at 10,000 tCO2e)
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%	$RD_{p,y}$ = 98.7% $ED_{p,y}$ =83.4%	$RD_{p,y}$ = 98.7% $ED_{p,y}$ = 83.4%
7	Number of beneficiaries: households	P_{access} = 0	P_{access} = 5,702	P_{access} = 5,702
1	Average household savings i.e., decrease in expenditure on basic service such as cooking, lighting, drinking	$S_{p,y}$ = 0 SDG	$S_{p,y}$ = 80,514 CFAF (121 EUR)	$S_{p,y}$ = 80,514 CFAF (121 EUR)

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

The following table provides data for the **Iridimi camp (VPA-01):**

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values achieved during this monitoring period
13	2022: 5,833 tCO2e (June – December period based on 10,000 tCO2e over 1 year) 2023: 10,000 tCO_2e	2022 (June to December): 5,419 tCO_2e, equivalent to 10,000 tCO2e pro rata for 12 months 2023 (January to December): 10,000 tCO_2e
3	2022: RDp,y = 99.7% EDp,y = 99.7% 2023: RDp,y = 99.7% EDp,y = 99.7%	2022: RDp,y = 98.8% EDp,y = 90.4% 2023: RDp,y = 98.8% EDp,y = 90.4%
7	2022: 4,470 2023: 4,470	2022: 4,583 2023: 4,583
1	2022: 279,875,586 XOF[9] or 84 EUR per household 2023: 279,875,586 XOF or 84 EUR per household	2022: 83,189 CFAF or 125 EUR per household per year 2023: 83,189 CFAF or 125 EUR per household per year

The following table provides data for the **Touloum camp (VPA-02)**:

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values achieved during this monitoring period
13	2022: 7,699 tCO_2e (February to December period) 2023: 10,000 tCO_2e	2022 (February to December): 9,142 tCO_2e, equivalent to 9,973 tCO2e pro rata for 12 months 2023 (January to December): 10,000 tCO_2e
3	2022: RDp,y = 99.7% EDp,y = 99.7% 2023: RDp,y = 99.7% EDp,y = 99.7%	2022: RDp,y = 98.7% EDp,y = 83.4% 2023: RDp,y = 100% EDp,y = 83.4%

[9] The Central African CFA Franc is abbreviated to XAF in currency markets. Both CFAF and XAF refer to the same currency.

7	2022: 3,894 2023: 4,500	2022: 5,702 2023: 5,702
1	2022: 75,135 XOF[10] or 112.5 EUR per household 2023: 86,821 XOF or 130 EUR per household	2022: 80,514 CFAF or 121 EUR per household per year 2023: 80,514 CFAF or 121 EUR per household per year

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

Iridimi (VPA-01)

Values used for ex-ante calculations for the Iridimi camp were provided during transition to GS4GG (in 2020 for Iridimi) and were updated based on estimates assessed through the monitoring and usage surveys conducted in the 2nd MP at Iridimi.

Touloum (VPA-02)

Values used for ex-ante calculations for the Touloum camp were based on previous experience and data collected in the usage surveys at the Iridimi camp.

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

Iridimi (VPA-01)

All values obtained during this monitoring period are similar or very close to values estimated ex ante. Nevertheless, the initial estimates have slightly underestimated the continued impact of the project. The project has gained increased momentum from the local community since the derivation of these estimates (2020; see section above). This may explain how the ex-post results have outstripped (with the exception of RDp,y and EDp,y, which show a very slight decrease) the initial estimations ex-ante. The increase in the impacts of household savings, from the initial estimate of 83 EUR to 125 EUR (actual) is likely be due to the increasing costs of firewood in the region as the war in Sudan has intensified since the beginning of 2023, bringing a renewed wave of refugees, and thus increasing an already scarce demand. SDG7 is in line with the initial

[10] The Central African CFA Franc is abbreviated to XAF in currency markets. Both CFAF and XAF refer to the same currency.

estimations and stem from population figures in the camps that have remained relatively stable for the period 2020-2023 (with an increase in the second half of 2023 due to escalation of violence in Darfur and arrival of new refugees). As a result, the estimates and obtained results for SDG7 translate into a relatively accurate estimate for SDG13, given they are directly linked.

Touloum (VPA-02)

All values obtained during this monitoring period are similar or very close to values estimated ex ante. The increase in the value of SDG 13 (ER reductions) in the monitored values as compared to the estimated values is likely due to the rapid distribution of stoves by the ADES team in 2022 and 2023 and the relatively fast adoption of stoves by the local population. Since the camp was already aware of the project from the nearby Iridimi camp, the adoption was relatively fast, and thus outpaced the initial, conservatively minded estimation. As for SDG 3, there is a slight decrease in EDp,y (% of households a showing decrease in eye infections) in measured data as compared to estimates for both 2022 and 2023, meaning that the impact was slightly overestimated. This discrepancy is likely due to random variability in the outcome of the usage survey and the individual experiences of respondents. SDG 7 reflects the rapid adoption of stoves described above. Finally, there is a minor variability in the results for SDG 1 which is likely attributed to local, and unpredictable price fluctuations for wood fuel (as detailed above).

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 camps of Iridimi (VPA-01) and

Touloum (VPA-02). 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 feedback, 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.
- Examples of some of the common grievances (as detailed in the grievance books for each camp) are the following:
  a) Need for additional/proper cooking pots for cooking.
  b) Need for better ingredients during the cooking demonstrations.
  c) Need for training for men who are responsible for cooking with solar cookers in their households.
  d) Need for solar cookers that provide faster cooking time.

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

No stakeholder mitigations were agreed to be monitored for either of the camps, as specified in the individual VPA-DDs.

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