



MADAGASCAR IMPROVED COOKSTOVE PROJECT BY KCM-WOOD#CPA-W-009



Project title	Madagascar Improved Cookstove Project by KCM-Wood#CPA-W-009
Project ID	2685
Monitoring period	01-October-2023 to 30-April-2024 (inclusive of both dates)
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Version	02.2
VCS Standard Version	VCS Standard version 4.7
Prepared by	Korea Carbon Management Ltd.

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PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

This is a community-based project activity that implemented energy efficient improved cooking practice at households to replace inefficient open firing practice at the baseline. This project activity is a registered 'Component Project Activity' (CPA) of a "Programme Of Activities" (PoA) registered under 'Clean Development Mechanism' (CDM) of UNFCCC which was registered under VCS mechanism with ID 2685 via successful gap validation practice of VERRA¹.

This CPA was registered as component under the PoA as the 9th CPA of the program.

Title of the registered CDM PoA : Madagascar Improved Cookstove Project by KCM
UNFCCC reference number : 10443²
Coordinating/Managing entity (CME) : Korea Carbon Management Ltd. (KCM)

The main objective of this CPA is dissemination of the efficient improved cooking stove (ICS) woody biomass-based ICS to the rural household of Madagascar, which has resulted in reduced firewood consumption leading to climate change mitigation in a sustainable manner. Overall objectives are reduction of greenhouse gases, conservation of forests and woodlands as well as improved health conditions of ICS users due to improved indoor air quality.

The ICS promoted under this project activity is a single pot improved cookstove made of clay liner baked to high standards and insulated with outer metal sheet, which are commonly available in Host Country. It's joined with a mortar of high quality, which holds together the clay liner and metal sheet. In particular, the design made have higher pressure than the atmosphere, hence raising the airflow rate in the improved cook stove tunnel, as it is heated at the bottom. This way, the top point of the improved cook stove experiences more pressure and heat.

The project activity targets households in rural communities with no previous ICS access. The geographical boundary is the Country of Madagascar. ICS are distributed free of cost to users. Korea Carbon Management Ltd. (KCM) financed the implementation of the CPA in full. The project activity is fully implemented with a total of 13,752 numbers of households which were covered under this project. Each household received one ICS, hence total ICS implemented under the project is 13,752.

The total emission reductions achieved during the current monitoring period is 19,372 tCO₂e which covers the period 01-October-2023 to 30-April-2024 (Inclusive of both dates). The detailed calculation and emission reductions are referred under the emission reduction sheet.

The details of the project are mentioned in the table:

Project Investors' Name	ICS distribution Date	ICS Number	Location (Village/State)
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¹ <https://registry.terra.org/app/projectDetail/VCS/2685>

² https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/KUFLHOD3N8E5W2BIMRAVTGJX014S76/view

Korea Carbon Management Ltd. (KCM)	03-April-2020 ³	13,752	State : Malagasy Region : Haute Matsiatra Districts : Ikalamavony, Isandra & Vohibato
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1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
CDM Validation & CPA Inclusion	26-March-2020	<u>CDM</u>	KBS Certification Services Pvt. Ltd	-
CDM ⁴ Verification III	01-November-2019 to 31-May-2020 (Inclusive of both dates)	CDM	LGAI Technological Center, S.A. (Applus+ Certification)	0 year, 07 months
CDM Verification IV	01-June-2020 - 31 December 2020 (Inclusive of both dates)	CDM	LGAI Technological Center, S.A. (Applus+ Certification)	0 year, 07 months
VCS Gap Validation	22-September-2022	VCS	LGAI Technological Center, S.A. (Applus+ Certification).	-
VCS Verification I	01-January-2021 to 31-December-2022 (Inclusive of both dates)	VCS	VKU Certification Pvt. Ltd.	2 years 00 months
VCS Verification II	01-January-2023 to 30-September-2023 (Inclusive of both dates)	VCS	VKU Certification Pvt. Ltd.	0 years 09 months
VCS Verification III	01-October-2023 to 30-April-2024 (Inclusive of both dates)	VCS	VKU Certification Pvt. Ltd.	0 years 07 months
Total				4 years 6 month

This is the 3rd monitoring period under VCS. The current monitoring period is considered from 01-October-2023 to 30-April-2024 (includes both the dates) which is part of the fixed crediting period '03-April-2020 to 31-March-2030' (Inclusive of both dates) as prescribed under VCS Registry. The total GHG emission reductions or removals generated in this monitoring period are 19,372 tCO₂e (calculated value to be referred in the ER sheet).

³ The total ICS under the CPA were distributed in between 03-April-2020 to 30-May-2020, details are referred to the CPA database under the ER sheet.

⁴ During the 1st & 2nd CDM verification, this project activity (i.e CPA #09) was not included as it was not commissioned. Therefore, CDM Verification I & II not applicable in this case.

1.3 Sectoral Scope and Project Type

Sectoral scope	03 - Energy demand
Project activity type	Type II - Energy efficiency projects with maximum output of 60 GWh (electrical) or 180 GWh (thermal) per year

1.4 Project Proponent

Organization name	Korea Carbon Management Ltd.
Contact person	Mr. Thomas Winklehner
Title	Chief Executive Officer
Address	9F, N'deavor Tower, 45, Seocho--dearo 74--gil, Seocho--gu, Seoul, 06626, Republic of Korea
Telephone	+82 2 3487 6050
Email	info@korea-carbon.com

1.5 Other Entities Involved in the Project

Organization name	Not applicable
Role in the project	Not applicable
Contact person	Not applicable
Title	Not applicable
Address	Not applicable
Telephone	Not applicable
Email	Not applicable

1.6 Project Start Date

Project start date	03-April-2020
Justification	As per section 3.8 of the VCS Standard (v4. 2 ⁵), the project start date of a non-AFOLU project is the date on which the project began generating GHG emission reductions or removals. The project activity is a non-AFOLU project and first cookstove under the project has been started operating from 03-April-2020. Thus, the project start date is considered as 03-April-2020. ⁶

1.7 Project Crediting Period

Crediting period	☒ Ten years, fixed
Start and end date of first or fixed crediting period	03-April-2020 to 31-March-2030 (Inclusive of both dates)

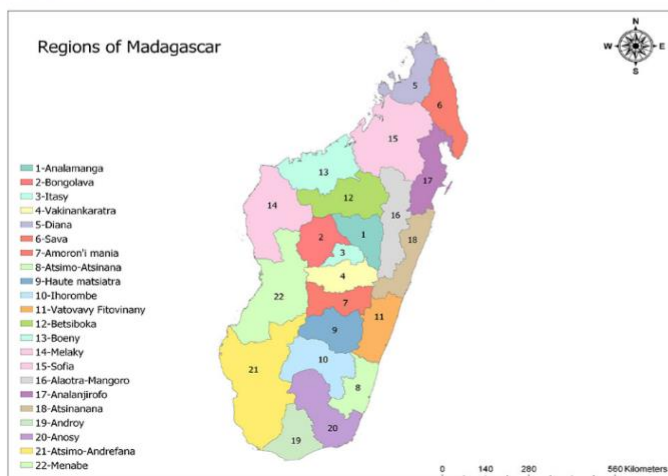
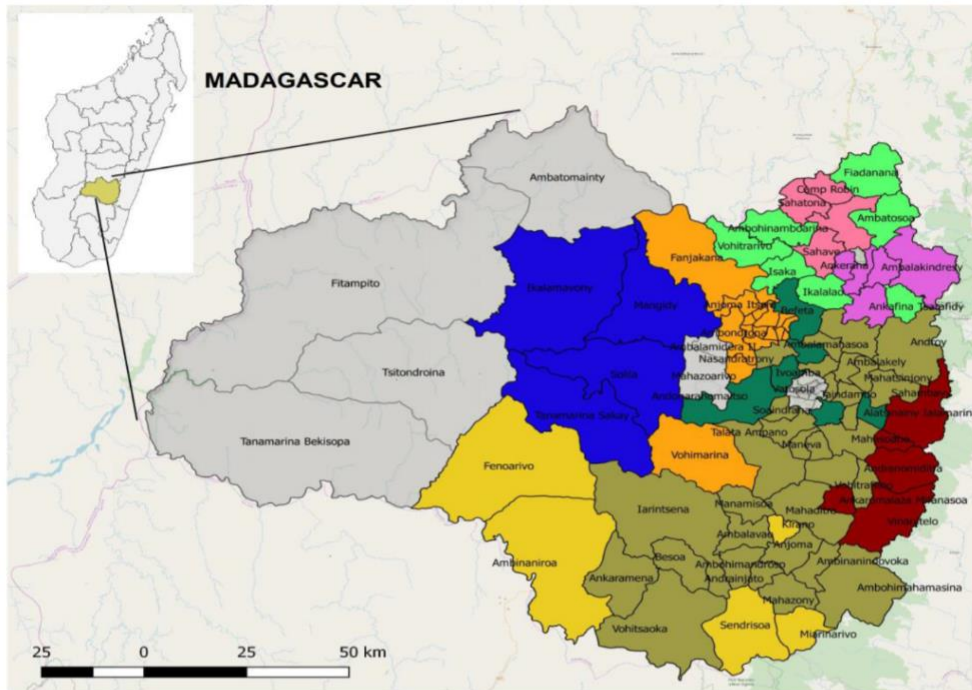
⁵ The applicable version at the time of this project validation/registration was referred to version 4.2, however current applicable version has been referred now.

⁶ Cookstove distribution database.

1.8 Project Location

The project activity has been implemented in households across several villages in the region of Haute Matsiatra, of Madagascar. The exact list of beneficiaries, respective villages, districts etc. shall be provided to the VVB in the CPA distribution database; however, the representations of the project locations are included in the map below.⁷

The coordinates of the Chief town of the project region (Haute Matsiatra):
Latitude: 21 ° 23' 35.20" S and Longitude: 47 ° 14' 42.72" E



⁷ This cookstove project is developed as a single project activity, it is not an instance or not a grouped project activity; hence it doesn't consist multiple instances. Hence, only a single geodetic coordinate reference is given under this section to specify the geographic spread, whereas location details of each ICS included under the CPA database.

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	AMS II.G EB 97 Annex-11, valid from 01/11/2017	Energy efficiency measures in thermal applications of non-renewable biomass"	9.0 ⁸
Tool	Tool 30 (EB 97 annex 9)	Calculation of fraction of non-renewable biomass	01 ⁹

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☒ Yes ☐ No

The project activity has already been registered under Clean Development Mechanism (CDM) of UNFCCC, under Kyoto Protocol. This project is a Component Project Activity (CPA) under a registered Programme of Activities (CDM-PoA). The details are as follows:

CDM-PoA Registration number: 10443

Title: Madagascar Improved Cookstove Project by KCM

Weblink: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/KUFLHQD3N8E5W2BIMRAVTGJX014S76/view

CPA Reference number: 10443-P1-0009-CP1

Title: Madagascar Improved Cookstove Project by KCM-Wood#CPA-W-009

Weblink: https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/345ZFABDN68H2K1GMJUOPYLSTR7I9E/view

Regarding GHG credits claim under CDM:

This project activity has claimed Certified Emission Reductions (CERs) under CDM as a part of the CDM-PoA till 31-December-2020¹⁰; however no further verification has been conducted under

⁸ <https://cdm.unfccc.int/UserManagement/FileStorage/F3ISTOABY87UK5DVNJ69XW4MR2OLZP>

⁹ <https://cdm.unfccc.int/UserManagement/FileStorage/F3ISTOABY87UK5DVNJ69XW4MR2OLZP>

¹⁰ https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/KUFLHQD3N8E5W2BIMRAVTGJX014S76/view (the status of issuance of CERs till 31-December-2020 can be checked from the serial number Block end: MG-5-942524-2-2-0-10443)

CDM. The monitoring period from “01-January-2021 to 31-December-2022” (Inclusive of both dates) had been considered under VCS 1st verification, the 2nd consecutive verification with the start of monitoring period from 01-January-2023 and ends on 30-September-2023 (Inclusive of both dates) and monitoring period from 01-October 2023 to 30-April-2024 (Inclusive of both the dates) has been considered as 3rd verification under VCS. Hence, there is no double accounting¹¹ of emission reductions for the current monitoring period.

1.10.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☒ Yes ☐ No

The project activity has already been registered under Clean Development Mechanism (CDM) of UNFCCC, under Kyoto Protocol. This project is a Component Project Activity (CPA) under a registered Programme of Activities (CDM-PoA). The details are as follows:

CDM-PoA Registration number: 10443

Title: Madagascar Improved Cookstove Project by KCM

Weblink: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/KUFLHQD3N8E5W2BIMRAVTGJX014S76/view

CPA Reference number: 10443-P1-0009-CP1

Title: Madagascar Improved Cookstove Project by KCM-Wood#CPA-W-009

Weblink: https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/345ZFABDN68H2K1GMJUOPYLSTR7I9E/view

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

The project activity and the GHG emission reductions are not included in any emission trading program or any other mechanism that includes GHG allowance trading.

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☒ Yes ☐ No

¹¹ An official declaration has been submitted to VVB confirming the same.

The project activity has been registered as a CPA under a CDM-PoA (Ref. 10443) and GHG emission reductions and removals generated by the project will not be used for any compliance under any programs or mechanisms, except CDM. The project activity has already received the 'Letter of Approval' (LoA) from Host Country Designated National Authority (DNA).

The project activity under VCS shall not claim emission reductions for the same period that has been/will be covered under CDM as a part of the registered PoA. Thus, there will not be any possibility of double accounting⁵ of emission reductions.

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes

☒ No

The project activity includes portable cookstoves which are locally manufactured. This includes some goods & services from manufacturers, suppliers, implementers etc. (i.e. third parties). However, there are no specific or identified/measured/disclosed Scope-3 inventory emissions in the supply chains of the manufacturing unit. Hence there is no potential risk of any double accounting or claiming of such scope-3 emissions across the projects. These can be further referred from the statements¹² submitted by the manufacturing entity involved in the project

1.12 Sustainable Development Contributions

Contribution to Sustainable Development¹³:

The SDG contributions achieved via this project activity are mostly derived from the outcomes and the associated benefits of the project, which are included under the table below. However, there are no specific Nationally Stated SD priorities of Madagascar, therefore SDGs identified and reported under this section can not be directly linked with any national priorities but essentially establish interconnectedness and linkages.

In this regard, UNDP SDG Push Insight Report¹⁴ for Madagascar can be referred; the following SDG linkages are listed:

- 7.2: By 2030, significantly increase the share of renewable energy in the global energy mix

¹² Copies of the declarations/statement received from ICS manufacturer and local implementing partner submitted to VVB .

¹³ However, PP has documented activities related Sustainable development related contributions at organization level. Also, the project has generated local jobs. Many skilled and unskilled workers are from local regions, local vendors and contractors are being benefitted with regular works related to project. The supporting documents are submitted to VVB for further reference.

¹⁴ <https://sdgpush-insights.undp.org/reports/mdg#:~:text=Madagascar%20has%20set%20itself%20the,more%20dynamic%20and%20diversified%20economy.>

- 8.2: Achieve high levels of economic productivity through diversification, technological upgrading and innovation, including a focus on high value-added and labour-intensive sectors
- 13.2: Incorporate climate change actions into national policies, strategies and planning
- 16.6: Develop effective, accountable and transparent institutions at all levels

The table below shows the associated SDGs in the project within which SDG 7, 8 & 13 (with specific target indicators within the SD goals) are also covered; thus the project has direct and indirect contributions to these nationally highlighted SD indicators as per UNDP.

However, the project contributes to sustainable development can be summarized using the following aspects.

- **Social well-being:** The economy of the local people will be improved by low wood/charcoal consumption in the ICSs. This would provide them cost saving as well as time saving. The project activity resulted in improving the air quality by creating less smoke and this would also result into less deforestation in the local area.
- **Economic well-being:** The economy of the local people will be improved by low wood/charcoal consumption in the ICSs. This would provide them cost saving as well as time saving.
- **Technological well-being:** The project makes use of efficient environmentally safe technology for cooking with less Green House Gas (GHG) emission. The successful operation of project activity would lead to promotion of cookstove projects and would encourage other entrepreneurs to participate in similar projects.
- **Environmental well-being:** The project is using ICSs for cooking. There is GHG emission from this project activity. Combustion of wood/charcoal in the proposed project does not result in net increase in GHG emissions of CO₂. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

In summary, the project activity has resulted into the reduced emissions which could have been emitted in absence of project activity i.e. traditional three stone stoves. Thus the project activity primarily contributed in reducing deforestation, reduction in cooking time and improving the ambient air quality, followed by all other co-benefits demonstrated under the table below. The explanation, relevance, claim and their supporting evidence for each SDG are properly discussed under the table below and supporting documents are submitted for further reference.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	1.1	User defined indicator under SDG 1.1: Strengthen financial conditions of local people to reduce risk of low income vulnerability against the poverty line, according to national definitions	Implemented activities to increase	There is no additional contribution to the two categories during the current monitoring period: Contribution type A: direct local employment. Contribution type B: financial benefits (i.e. gain in their household incomes) due to saving in fuel cost as well as provision for new income opportunities due to saving in cooking time with project ICS. Here, no additional contribution realized for type A. However, under the contribution type B the gain in household income or the positive impact received on household income is a regular and continuous process which will prevail across the monitoring periods. But there is no direct measurement of such benefits, mostly such contributions are subjective, specific to number of households and function of time. Hence, this is a conservative approach not to claim additional gain during the current monitoring period.	The cumulative contribution across all the VCS monitoring period is equal to the total contribution over the project lifetime. The cumulative values are (i) 156 resources under contribution A. 17 dedicated people are locally employed at this CPA level and more than 156 people are associated with this project at shared responsibility level attributed to this project activity, thus total contribution claim till the current monitoring period is considered as 173 (i.e. 17+156) [Whereas overall employment achieved across various functionality at programme level is 748, which is not considered under this project activity being conservative]. And (ii) under B total contribution remains as 13,752 households/beneficiaries. However, this attribute (SDG indicator) will be a continuous process across the lifetime of the project which will ensure more number of positive impacts in coming time as and when required.

2)	3.0	User defined indicator under SDG 3 : The number of families that received emergency relief during a global pandemic	Implemented activities to increase	There is no additional contribution during the current monitoring period.	The overall contributions/support received across the project lifetime is the same as that of the values accounted till the previous Monitoring Period. Thus, total contributions are considered as 2,000 Population within the project boundary of this specific project activity who received support during the global pandemic. And about 7,068 MGA (equivalent to US \$2020) of contributions by means of support to essentials included the following: (i) Food supplies, (ii) Medicines and (iii) awareness campaigns.
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3)	3,9	3.9.1 Mortality rate attributed to household and ambient air pollution.	Implemented activities to decrease	Positive impacts created across 13752 households included under the project activity. Due to clean and energy efficient cooking device implemented at project level, it released less smoke hence reduces the fine particulate matter (PM2.5) emitted during the cooking practice; thereby improving overall health outcomes attributed to household and ambient air pollution and reducing burdens of airborne diseases. This directly impacts on health of the households, especially because all Malagasy kitchens are in-house, and cooking is always done inside the house. Thus, this health benefits resulted from reduction in PM2.5, can be directly attributed to mortality rate, which is also evident from the computation method published¹⁵ under this indicator 3.9.1 This claim is further supported by the “Madagascar Death Rate 1950-2023” statistics which published¹⁶: (a) The death rate reported in the country during 2020 to 2023 is 5.906 to 5.571, (b) The death rate reported in 2015 was 6.587, in 2010 is 7.523 and further compared to year 2000 that reports 10.591, This value is further on higher side as we view historic trend, Hence, this claim can be further justified with the basis of national statistics. Nevertheless, such effects are better visible/realizable in long run.	Same as current project contributions. Overall attributes: reduce the fine particulate matter (PM2.5) emitted during cooking thereby improving overall health outcomes and reducing burdens of disease.
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¹⁵ https://data.unicef.org/sdgs/goal-3-good-health-wellbeing/#tab-mnch_airpol_mr-16

¹⁶ <https://www.macrotrends.net/countries/MDG/madagascar/death-rate>

4)	4.0	Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	Implemented activities to increase	Current contribution is accounted as: At community level: (i) 6 trainings during the current Monitoring period Regular/ periodic trainings on ICS & cook practice imparted which sufficiently covers the households in the project region. Contributed to community-level exposure and awareness of climate change, sustainable development, health, and nutrition well-being, through informal training on these topics and related to the operation of the improved cookstoves. At team & admin level: (i) 3 trainings during the current Monitoring period Such trainings help bringing both qualitative employment for staff as well as helps gaining continuous and lifelong learning opportunities for all.	More than 10 trainings across the lifetime of the project, accounted till the current monitoring period¹⁷. Overall attributes: Total contribution reported under VCS verifications is 10 Trainings. (i) 4 trainings were reported under previous monitoring period and (iii) 6 trainings during current monitoring period. All these trainings are contributing to community-level exposure and awareness of climate change, sustainable development, health, and nutrition well-being, through informal training on these topics and the improved cookstove. The staff training includes both technical and managerial based learnings.
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¹⁷ Previous trainings were conducted during the 1st VCS verification. Also, previously trainings imparted was accounted as part of PoA level verification during CDM till 31 Dec 2020, hence earlier contributions are not considered here, which is a conservative approach,

5)	5.4	User defined indicator under the SDG indicator 5.4.1: Proportion of time spent by female on unpaid domestic and care work, within the project boundary (i.e. location), to be reported from survey in terms of: (i) At least 50% of female beneficiary of the total project beneficiary (i.e. households) impacted, (ii) At least 50% improvement in time spent (i.e. improvement resulted from time saved due to project ICS) in domestic work as compared to baseline conditions	Implemented activities to decrease	Current contribution is imparted to (i.e. realized by) 100% female (i.e. attributed to 13,752 women in households) across the project region. Thus, SDG indicator is correlated & reported with the claim as follows: - Target Gender (proportion by sex): Female - Age category: adult - Impact on targeted beneficiary coverage: 100% - Impact on proportion of time spent (i.e. improvement resulted from time saving): by 50% (these results are further explained below) Explanation/Rational: as the target statement of this particular SDG expresses “recognizing and valuing unpaid care and domestic work” which can be achieved through the functional indicators such as “time spent on unpaid domestic & care work, which are majorly associated with (i) drudgery of fuelwood collection, (ii) household cookings, (iii) cleaning activities (iv) passive loss of time in healthcare due to health issues with indoor smoke with baseline open fire cooking practice, etc. The traditional cooking methods (i.e. baseline) often required long hours collecting firewood and preparing meals, burdens that predominantly fall on “women” in the household in rural Madagascar. Thus by sex, age & location the proportion of time spent on such activities was always higher for “women”, in fact about cent percent in most of the cases. Therefore, saving in time at project level is directly proportional to the reduction in proportion of time spent by women on unpaid domestic activities, hence contribution is relative (not expressed in any absolute term) and expressed in terms of number of this gender (i.e. woman) got benefitted at project level. Further, this unpaid labor limits their time for productive works including possibility of passive income-generating activities, personal well-being etc. Therefore, due to the project activity, each and every woman in the household experiencing	Total contributions since start of the project are expressed in relative terms which can be considered as: (i) Achieved 50% decrease in proportion of time spent by women in domestic work, and (ii) positive impact is distributed (i.e. by location) across the project area covering 100% of the female beneficiary (i.e. at least 13,752 women which is equal to 100% of target beneficiary of this indicator). Overall attributes¹⁸: Here, the value reported is conservative as only one woman per household is considered to have this positive impact. However, in practical more than one person per family is getting positively impacted due to reduced drudgery, specifically for women and children, as time saved through reduction of time spent collecting fuelwood and cooking time.
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			reduction in drudgery, specifically for women and children, as time saved through reduction of time spent collecting fuelwood and cooking time due to efficient ICS technology. Such claims are further supported from the measured outcomes (as can be referred from the SDG Reports (SDG Sampling Survey & Focus Group Discussion reports)) can be statistically reported as follows: (a) 98% of the surveyed population confirmed that they achieved more than 75% improvement compared to baseline scenario in their livelihood. And the key indicators reported are direct savings in fuel cost, saving in wood collection time and overall cooking time, etc. which led to more earning opportunities for households). (b) Similarly, the remaining 2% of the population also reported the same benefits in the range of 50% improvement as compared to baseline conditions. Thus, conservatively the claim is limited to '50% decrease in proportion of time spent by women' and it is evident from the actual ground scenario (as also established in the survey) that a significant portion of time spent earlier on unpaid domestic work (e.g cooking, drudgery etc.) is now reduced with the ICS and directly impacts on overall livelihood.	
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¹⁸ In order to establish and count such claim/contributions PP has conducted a detailed SDG related survey in 2021. This survey covered 90 households as survey samples and results were documented both in survey forms and in the form of an official report. This document is referred as supporting for such contributions claimed under the project. Similarly, Focus Group Discussions (FGDs) were conducted at project level and overall outcomes are positive that refers to the indicators considered here under the SDGs. Additionally, SD related parameters were also evaluated during each sampling survey (i.e surveys conducted in year 2022 & 2024) resulted into positive outcome.

6)	7.1	User defined indicator under 7.1.2 Proportion of population with primary reliance on clean cooking practices, to be reported from project database in terms of: “to achieve minimum 75% of the total project beneficiaries (i.e. out of total of 13,752 households) with access to operational project ICS type ‘SoaRehitra’ in each reporting period”	Implemented activities to increase	13,752 households (equivalent to 13,752 kitchen) received access to clean technology of “SoaRehitra” which is an energy efficient cooking device that reduces the consumption of non-renewable biomass in the region. And during the current monitoring period entire 100% of households (i.e., equivalent to 13,752 kitchen) were found operational with SoaRehitra ICS. This contribution can also be referred and verified from the Survey Parameter “N”, which resulted in 100%.	Same as current project contributions. Overall attributes: 100% of the project beneficiaries (i.e. 13,752 households) are having access to ICS SoaRehitra which are operational till date for regular cooking. Increase access to clean cooking technology with ICS installations in 13,752 Madagascar households which are covered under the project lifecycle.
7)	8.8	8.8.1 fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status	Implemented activities to decrease	1) Zero occupational injuries, zero mortality during the monitoring period. The contribution is supported from the monthly record statement related to health & safety and occupational hazards. 2) Additionally, regular trainings are imparted (as reported under the SDG #4 above). This also ensures that there is adequate awareness to achieve such health safety requirements. Conducted regular training programs (#4+) at the ICS manufacturing sites and also regular trainings at household level and at team/staff level during the reporting period to ensure occupational health and safety practices for workers and users etc.	Zero fatal & non-fatal occupational injuries reported across the project lifetime. Total contribution achieved over the project lifetime is equal to the contributions monitored and reported as on 30-April-2024 which are counted as number of training sessions and zero occupational injuries & fatality. Such monitoring, training, awareness etc. are managed via local implementing partner in Madagascar.

8)	13.0	13.0 Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	13.0: Achieved reduction of 19,372 tCO ₂ e emissions during the current monitoring period.	Total contributions are considered to be equal to 117,149 tCO ₂ e which are aggregated value of VCS monitoring period 1 st , 2 nd and 3 rd .								
	13.1	(Ref. Reduction in emissions as compared to baseline scenario i.e. open fire) 13.1 strengthen resilience and adaptive capacity to climate related hazards and natural disasters.		13.1: All the beneficiaries of the households (equals to 13,752) is receiving resilience building capacity towards climate change and related hazards. In this regard, Training Framework ¹⁹ of Tandavanala is referred which specifically prescribes outcomes of trainings correlated with adaptive capacity measures. In this regard methods, guidelines and standard referred towards Training, Resilience and Adaptive Capacity are as follows: (a) Andragogy Method (internal reference) (b) ILO Guidelines (external reference) (c) IPCC, Fourth Assessment Report, Section 6.6.4 Adaptive capacity (d) Adaptive capacity index (2010) - ClimAfrica WP4 Also, to substantiate the adaptive capacity, following adaptive measure has been considered for reference: (i) Reduction in fuelwood at households which is an indicator for resilience against deforestation. This can be linked with the target of “100% operation of ICS at households”; and i) it has been achieved through regular training and spot checks at project level.	<table><tr><th>Period:</th><th>Impacts (in tCO₂e)</th></tr><tr><td>1st VCS MP</td><td>72,260</td></tr><tr><td>2nd VCS MP</td><td>25,517</td></tr><tr><td>3rd VCS MP</td><td>19,372</td></tr><tr><td>Total =</td><td>117,149</td></tr></table> However, overall contribution over the lifetime of the project is expected to be more as the project is in continuous operation. However, the same will be achieved over the upcoming monitoring periods of the project. Overall attributes claimed: The project contributes to emission reduction from the replacement of baseline cooking practice/stoves with an energy efficient ICS called “SoaRehitra”. The claim of total ER achieved across the lifetime so far is limited till the current monitoring period only. Also, the resilience development practices will be a continuous process across the lifetime of the project.	Period:	Impacts (in tCO ₂ e)	1 st VCS MP	72,260	2 nd VCS MP	25,517	3 rd VCS MP	19,372
Period:	Impacts (in tCO ₂ e)												
1 st VCS MP	72,260												
2 nd VCS MP	25,517												
3 rd VCS MP	19,372												
Total =	117,149												

				which are as per training framework. The sampling survey and spot check monitoring practices ensured that 100% ICS are operational across the project.	
9)	15.1 15.3	15.1.1 Forest area as a proportion of total land area 15.3.1 Proportion of land that is degraded over total land area.	Implemented activities to increase (15.1) Implemented activities to decrease (15.3)	Considered equivalent to the f_{NRB} value, which is 96.6%. Rational: The project impact is continuous and contribution achieved at the project level is equivalent to the land area which may produce the equivalent volume of firewood that is now saved at project level.	Same as current project contributions. It will be a continuous process and impact shall be achieved & realized over the lifetime of the project. Overall attributes: Reduction in deforestation rate owing to the consumption of woody biomass from forests surrounding the communities and reducing pressure on forest reserves.

¹⁹ The copy of the Training Framework and Andragogy Method report submitted for reference.

1.13 Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	The stakeholder's identification starts by listing all the people or groups who might have an influence over or be impacted by the project. The local village committees and village officials were considered as the key informants and focus groups who know best about the local residents 1) Local residents around project area 2) Traditional stove users 3) Users of an ICS 4) Field assistants 5) A charcoal stove user 6) NGO representatives
Legal or customary tenure/access rights	ICS is a completely voluntary activity and households in participating villages are free to choose whether they take part or not. This is a free cookstove distribution project. SoTherefore, project does not involve or disrupt any legal or customary tenure/access rights to the territories and resources (including IPs, LCs, Customary Rights holders etc.).
Stakeholder diversity and changes over time	The project activity targets households in rural communities with no previous ICS access. ICS are distributed free of cost to users. The project activity is fully implemented with a total of 13,752 numbers of households which were covered under this project. All these beneficiaries are homogenous in nature based on their social, economical and cultural practices. Therefore, there is no concern of diversity and change over time within the stakeholders. Also, in terms of

	project level inclusion there is no variation, each household received one ICS of same type within the project boundary.
Expected changes in well-being	1. Direct local employment 2. financial benefits (i.e. gain in their household incomes) due to saving in fuel cost as well as provision for new income opportunities due to saving in cooking time with project ICS. 3. reduce the fine particulate matter (PM2.5) emitted during cooking thereby improving overall health outcomes and reducing burdens of disease and attributed to low mortality rate in long run 4. Due to the project activity, each and every woman in the household experiencing reduction in drudgery, specifically for women and children, as time saved through reduction of time spent collecting fuelwood and cooking time due to efficient ICS technology 5. The project contributes to emission reduction from the replacement of baseline cooking practice/stoves with an energy efficient ICS called "SoaRehitra". 6. Reduction in deforestation rate owing to the consumption of woody biomass from forests surrounding the communities and reducing pressure on forest reserves.
Location of stakeholders	The project activity targets households in rural communities in the project region ²⁰ where households did not have previous ICS access. ICS are distributed free of cost to users. The project activity is fully implemented with a total of 13,752 numbers of households which were covered under this project. Each household received one ICS.
Location of resources	The project activity includes portable cookstoves which are locally manufactured. This includes some goods & services from manufacturers, suppliers, implementers etc. The project activity targets households in rural communities with no previous ICS access. ICS are distributed free of cost to users. The project activity is fully implemented with a total of 13,752 numbers of households which were covered under this project. Each household received one ICS.

²⁰ Here project region refers to all the areas (i.e. villages in different municipality zones, across districts and region) that encompass the entire population of 13,752 households. These can be referred from the ICS database.

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	In order to have a ongoing communication and consultation between the CME and stakeholder groups, CME take quarterly feedback and inputs from stakeholders via local team of Tandavanala and adapt management accordingly. The CME has also placed a grievance register onsite which is available & accessible at the Tandavanala office, wherein, the stakeholders can put down his/her feedback. Additionally, the grievance mechanism also include various points of contacts through which one can submit his/her grievance or any feedback. This flow chart of communication can be referred in the first page of the grievance register. Any input to the register is reviewed and if found genuine will be addressed. However, there was no grievance related input has been reported within this monitoring period. Therefore, no action was required to undertake
Date(s) of stakeholder consultation	13-June-2018
Communication of monitored results	A hard copy of all the project related documents is maintained with local office in the host country which is accessible to all the stakeholders associated with the project, especially end-users. Considering that the project documents are very technical and will be difficult for the end-users to comprehend, a non-technical summary detailing the project activities and its outcomes is also available at the local office in the host country. During the distribution of the project stoves, enhanced focus is laid on verbally communicating the information about accessibility of project documents among implementing partners, staff, and local community members. In addition to verbal communications, a dedicated helpline number is provided to the end-users through which they can contact the ground staff to access the project documents. Further, PP/ CME also posts these reference documents on its website offering open access to all the stakeholders. An effort is also made to ensure that end- users understand the process of accessing these documents on website by providing them verbal communication. Therefore, it can be concluded that all the project documents including the results of monitoring for the monitoring period under assessment, has been made accessible to all stakeholders.
Consultation records	All the information collected during the stakeholders consultation has been stored in the electronic database

	available with PP and the same were approved and confirmed during the registered CDM process it is updated on ongoing basis. These records database will be made available at the project office of Tandavanala for to the VVB to at verification verify at any point of time.. Hard copies of the stakeholders' consultation documents kept onsite. All original documents stored in the main office of the CME. A backup of the stakeholder consultation database also stored on an electronic medium by the PP. All data of stakeholders consultation will be kept for two years after the end of the crediting period or the last issuance of VCUs for the project activity, whichever is later. The project participant has established a record keeping system and if any feedback/complain received shall be recorded and remedy to same will be done with information to concern person/entity.
Stakeholder input	Consultations with local stakeholders are essential steps in implementing a project. Different stakeholders participated in interactive training and demonstration sessions led by the project proponent and implementation partners. These sessions gave the participants details on the benefits of improved cookstoves, the advantages for the environment and human health, how to use ICS, and maintenance. PP welcomed any inquiries/ input about stoves from the stakeholders throughout the consultation. All the stakeholders' input recored in the registered book. Details pertaining to the Local Stakeholder's Consultation will be provided to the VVB during the verification process.

2.1.3 Free, Prior, and Informed Consent

Consent	FPIC does not apply to the project activities since they do not infringe on or otherwise concern land rights. In addition, ICS is a completely voluntary activity and households in participating villages are free to choose whether they take part or not.
Outcome of FPIC	Not Applicable .

2.1.4 Grievance Redress Procedure

Grievances received	Resolution and outcome
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There was no grievance related input has been reported within this monitoring period.	Beneficiaries and stakeholders have CME's contact information and the understanding that they should contact the organization with any problems, questions, or grievances. Each beneficiary receives business card with the office phone number and location. The CME has also placed a grievance register onsite, wherein, the stakeholders can put down his/her feedback and the same if found genuine will be addressed.
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2.1.5 Public Comments

Summary of comments received	Actions taken
<i>Any cost associated with cookstove for beneficiaries?</i>	Free distribution of ICS by Korea Carbon Management
Who is providing fund for the project?	This Project will get register under VERRA-VCS Framework for carbon financing to source the fund under this project.
For how many person's food can get cooked at once with this cookstove?	4 to 5 people food can get easily cooked at once with the help of this cookstove
What are the benefits of the Cookstoves?	The cookstove will produce very less smoke which will further reduce the impact of several diseases. This will also reduce the quantity of biomass wood usage and the impact of overall global warming. The project will create direct employment for the local people.

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

Korea Carbon Management Ltd. (KCM) is the Project Proponent of this Project. This project activity is being implemented and managed via local NGO Tandavanala and further supervised, coordinated and monitored by WeAct Pty Ltd. All these three entities are experienced in this sector. While KCM and WeAct is managing similar projects globally, Tandavanala is implementing similar projects in the country since last many years. This can be further referred from the CDM PoA (10443) and their CPAs which were managed by these entities since 2018.

2.2.2 Risk assessment

As part of risk assessment, PP has implemented policy²¹ measures in place to monitor and address if any risk is identified during the course of the project. The policy documents are submitted to VVB for further reference and summary of the risk assessment is included below:

	Risk identified	Mitigation or preventative measure taken
Natural and human-induced risks to stakeholders' wellbeing	"No risk identified"	Not applicable. Currently no mitigation or preventive measures are required as project has not faced any such risk. Project is continuously operational since 2019 and there was no such risk across the project.
Risks to stakeholder participation	"No risk identified"	Not applicable. ICS is a completely voluntary activity and households in participating villages are free to choose whether they take part or not. Thus, the project does not pose any risks to stakeholder participation. Also, the PP is ensuring open and transparent dialogue with the stakeholders through continuous input in the form of grievance or feedback input mechanism.
Working conditions	"No risk identified"	Not applicable as no risk is identified, whereas there is reduction of the workload as a result of reduced time for collecting the firewood, which can be used more productively for other income generating activities.
Safety of women and girls	"No risk identified"	Not applicable. There is no safety related risks identified in the project. Instead, the safety & security of the households, especially for women & children are enhanced due to this project as frequency of fuelwood collection is significantly reduced. Also, the project leads to prevention of fire hazards in the household kitchen and the improved cooking stove technology is environmentally safe.
Safety of minority and marginalized groups, including children	"No risk identified"	Not applicable. The project leads to prevention of fire hazards in the household kitchen and the improved cooking stove technology is environmentally safe.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials and	"No risk identified"	Not applicable. The project activity does not release any noise, any discharge to water and does not lead to generation of any waste, hazardous materials etc. which can be verified from the operational condition of the project.

²¹ There are different policy measures developed by PP and implemented via local representative Tandavanala. The copies of these policies and monitoring practices are submitted for reference.

chemical pesticides and fertilizers)		Instead, project brings positive impact related to air based impacts. The Project improved health conditions of ICS users due to improved indoor air quality (reduction in Indoor Air Pollution from wood smoke). Due to clean and energy efficient cooking device implemented at project level, it released less smoke hence reduces the fine particulate matter (PM2.5) emitted during the cooking practice; thereby improving overall health outcomes attributed to household and ambient air pollution and reducing burdens of airborne diseases. This directly impacts on health of the households, especially because all Malagasy kitchens are in-house, and cooking is always done inside the house. More information is already reported under the SDG 3.9.
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2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified	Mitigation or preventative measure(s) taken
Discrimination	Not identified	Not applicable as no instances of discrimination have been reported or identified within the project (inclusive of staff and contracted workers employed across the project). However, PP has ensured no discrimination through the implementation of comprehensive policies and training aimed at preventing and promptly addressing such issues. PP believes that discrimination in all its forms (gender, race, religion, sexual orientation, or other habits) and sexual harassment and assault have no place within the company and the policies reflect the same.
Sexual harassment	Not identified	Not applicable as no instances of any sexual harassment have been reported or identified within the project (inclusive of staff and contracted workers employed across the project).

		However, PP has ensured no discrimination through the implementation of comprehensive policies and training aimed at preventing and promptly addressing such issues.
Gender equity in labor and work	Not identified	Not applicable as no instances of any inequalities have been reported or identified within the project (inclusive of staff and contracted workers employed across the project). PP supports diversity, inclusion, and equity with attention to vulnerable populations, including women and female children. PP prohibits any form of discrimination, harassment, or assault, all being grounds for dismissal of employment, termination of the contract, an immediate discreet investigation of the reported incident, and where warranted, reports to the applicable authorities. In this regard the existing policies can be referred.
Forced Labor	Not identified	Not applicable as no instances of any forced labour have been reported or identified within the project (inclusive of staff and contracted workers employed across the project). Also, the local implementing partner Tandavanala is a registered national entity who operates and follows all required practices, hence there is no chance of engaging any forced labour. Additionally, as mentioned under the footnote #21 PP has implemented policy measures to ensure that project is safeguarded from any such risk factors.
Child Labor	Not identified	Not applicable as no instances of any child labour have been reported or identified within the project (inclusive of staff and contracted workers employed across the project). Also, the local implementing partner Tandavanala is a registered national entity who operates and follows all required practices, hence there is no chance of engaging any child labour. Additionally, as mentioned under the footnote #21 PP has implemented policy measures to monitor regularly and ensure that project is safeguarded from any such risk factors.

Human trafficking	PP abides by the labour laws in the countries where it operates and contract individuals, the project proponent, and implementing partners welcome any beneficiary who requests project services and is committed to the stated terms and conditions of project participation. The project does not use victims of human trafficking, forced labor, and child labor.
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2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	Not applicable. Not applicable as no instances of any human rights violation or concern has been reported or identified within the project (inclusive of staff and contracted workers employed across the project). Also, the local implementing partner Tandavanala is a registered national entity who operates and follows all required practices, hence there is no chance of encountering any risk or violation to human rights. Additionally, as mentioned under the footnote #20 PP has implemented policy measures to monitor regularly and ensure that project is safeguarded from any such risk factors. Thus, due care was taken to abide with all possible practice throughout the monitoring period and no complaint was received in connection with dereliction of rights of the staff working for the PP in the said project.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	Not applicable as no instances of any concerns related to indigenous people and their cultural heritage has been reported or identified within the project. Also, the local implementing partner Tandavanala is a registered national entity who operates and follows all required practices, hence there is no chance of disrupting any aspects of indigenous people and their cultural heritage.

Additionally, as mentioned under the footnote #20 PP has implemented policy measures to monitor regularly and ensure that project is safeguarded from any such risk factors.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	Not applicable. The project activity has not encountered risks related to protecting and preserving the property rights of IPs, LCs, and customary rights holders, and also no impact on protecting legal or customary tenure/access rights to territories. This is because the project is only limited to distribution, implementation and operation of ICS which improves the overall cooking condition and helps achieving various sustainable benefits. Thus, no direct or indirect risk with Property Rights. Additionally, as mentioned under the footnote #20 PP has implemented policy measures to monitor regularly and ensure that project is safeguarded from any such risk factors.

2.3.5 Benefit Sharing

Summary of the benefit sharing plan	The benefits sharing plan is not applicable as project activity doesn't incur any risk related to property rights, as explained in the previous section. Additionally, the project activity is completely based on free distribution of ICS to the households where ICS were received by beneficiaries free of any cost with full ownership of the ICS. Also, there are regular monitoring, training, hand holding support being given to the households and help achieving various SD benefits for long run.
Benefit sharing during the monitoring period	NA.

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure taken during the monitoring period
Impacts on biodiversity and ecosystems	"No risk identified"	Contribute an estimated reduction in removal of woody biomass from forests surrounding the communities thereby leading to an increase in above-ground biomass in these forests.
Soil degradation and soil erosion	"No risk identified"	The ICS and its usages has no effect on soil degradation and soil erosion. The ICS is a portable device which is used inhouse as replacement to old cooking practices.
Water consumption and stress	"No risk identified"	The ICS and its usages does not include any water consumption, these ICS are portable devices which are used inhouse as replacements to old cooking practices, Hence, no direct or indirect impact on water consumption and relates stress.

2.4.1 Rare, Threatened, and Endangered species

Species or habitat	Not applicable. The project ICS are portable devices which are used inhouse as replacements to old cooking practices. Hence, project is not implemented in any area which may cause negative impact to habitats for rare, threatened, or endangered species.
Areas needed for habitat connectivity	Not applicale.

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
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N/A	N/A	N/A	N/A
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Existing invasive species	Mitigation measures to prevent spread or continued existence of invasive species
N/A	N/A

2.4.3 Ecosystem conversion

Not Applicable. The project activity is related to energy efficiency only, it does not related to ARR, ALM, WRC or ACoGS project types.

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	N/A	N/A

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The CPA 09 under the current monitoring period, have been implemented by KCM in line with the validated management system. CME has been prescribed as nominated entity to adhere to a series of responsibilities as per validated system. The responsibility of CPA Manager has been taken up by the carbon credit professionals associated with CME and local team managed by a local NGO “Tandavanala”, whereas, a local entity “Madagascar EcoVision TsinjoHarena” is the manufacturer and seller of the project ICS who are locally coordinating and supporting the CME and CPA Managers to implement the projects on ground. The carbon credit Managers nominated by KCM closely works with the NGO team to ensure adherence to the all responsibilities and requirements prescribed for CPA Manager/Consultant.

Similarly, the ground team of Tandavanala takes care of the operational responsibilities of the team including data collection, field, on site visits, awareness and training activities etc. under the direct supervision of carbon credit managers under CME.

The project promotes energy efficient improved cooking stove (ICS) which directly reduces fuelwood consumption, which are non-renewable biomass having higher emission factor. As an associated benefit, the project directly helps reducing the rate of deforestation in the host country where the use of fuelwood is significant as 92% of the total energy used by Malagasy households comes from forests.

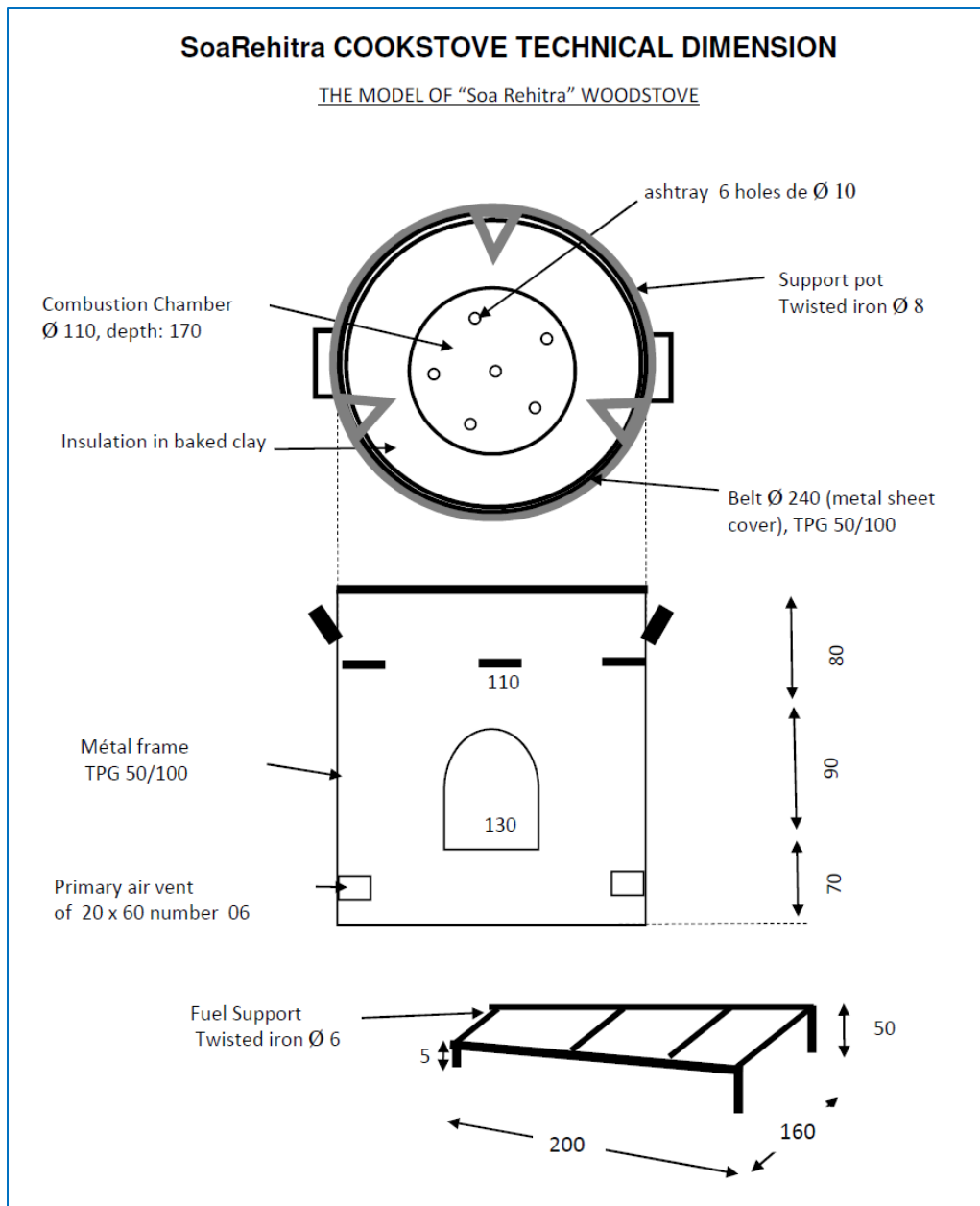
Technology:

The ICS implemented in this project activity is the SoaRehitra improved cookstove, distributed to rural households using fuelwood for cooking. The particular ICS technology is a single pot improved cookstove made of clay liner baked to high standards and insulated with outer metal sheet, which are commonly available in Host Country. It's joined with a mortar of high quality, which holds together the clay liner and metal sheet. In particular, the design made have higher pressure than the atmosphere, hence raising the airflow rate in the improved cook stove tunnel, as it is heated at the bottom. This way, the top point of the improved cook stove experiences more pressure and heat.

As per water boiling test conducted by National Agency i.e. National Industrial and Technical Research Center the SoaRehitra stove is projected to have a lifespan of at least 5.5 years and thermal efficiency of 32.2% (as per WBT results, however applied values are adjusted as per operational vintage of the ICS).

SoaRehitra stoves is being manufactured by trained artisans and the processes is managed by representative who have experience in working with clay and manufacturing different types of cook stoves. It is anticipated that the stove manufacturing process creates significant employment to the artisan and increase income, which has been realized during the monitoring periods.

The SoaRehitra stove allows for significant savings of firewood compared to traditional stoves and is especially suitable for the cooking habits of the people in the target region. Its design ensures efficient combustion of fuel and cleaner fire and therefore uses considerably less fuel as compare to traditional stoves. This means speedy cooking, time and fuel savings, cleaner pans, kitchen walls and indoor atmosphere.



Improved SoaRehitra stove has nominal power of around 5kW and delivers the same energy output as thermal energy supplied in the baseline scenario with traditional stone fire. As per the research from Aprovecho Research Centre, a three stone stove (open fire) has an output of 7.5kW a 5L Portable rocket stove with skirt (improved cook stove) has an output of 5.0kW, which is well below the threshold. Energy flows from conventional woody biomass to households are therefore maintained, but the same amount of energy as used in the baseline scenario is gained from a relatively smaller amount of biomass. The baseline scenario is equal to the current practice i.e.

in absence of the proposed project activity the equivalent amount of thermal energy generated using firewood to meet cooking energy demand.



3.2 Deviations

3.2.1 Methodology Deviations

There are no methodological deviations applied during this monitoring period.

3.2.2 Project Description Deviations

There are no project description deviations applied during this monitoring period.

3.3 Grouped Projects

This section is not applicable to the project activity as the project is not a grouped project activity.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$B_{old,i,j}$
Data unit	tonnes/year
Description	Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j
Source of data	Survey Report conducted by CEDII (Regional Center of Documentation and Information)
Value applied	4.39
Justification of choice of data or description of measurement methods and procedures applied	The annual quantity of wood that would have been consumed in absence of the project activity will be calculated as below: $B_{old,i,j} = B_{old,HH} / N_{d,HH}$ Where, $B_{old,HH}$ was determined through survey at the time of validation and $N_{d,HH}$ is a monitoring parameter
Purpose of Data	Calculation of Baseline Emissions
Comments	CME plans distribution of only one ICS per households hence $B_{old,i,j}$ equals $B_{old,HH}$

Data / Parameter	$B_{old,HH}$
Data unit	tonne/household/year
Description	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device
Source of data	Survey Report conducted by CEDII (Regional Center of Documentation and Information)
Value applied	4.39
Justification of choice of data or description of measurement methods and procedures applied	Based on field survey by the dedicated expert team of third-party surveyor CEDII, determined the annual quantity of woody biomass have been used per person in absence of the project activity. The survey was conducted as per the requirements of AMS-II.G, non-binding survey questionnaire for baseline fuel consumption pattern; and in line with the Sampling Guidelines.
Purpose of Data	Calculation of Baseline Emissions
Comments	The value is fixed ex-ante

Data / Parameter	η_{old}
Data unit	%
Description	Efficiency of the system being replaced (Traditional Cooking Stoves)
Source of data	Default value as per applied methodology AMS-II.G version 09.0
Value applied	10
Justification of choice of data or description of measurement methods and procedures applied	The default value of 10% is used, as the replaced system is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, i.e. without a grate or a chimney.
Purpose of Data	Calculation of Quantity of woody biomass that is saved in tonnes per device
Comments	The value is fixed ex-ante

Data / Parameter	$NCV_{biomass}$
Data unit	TJ/Tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	Default value as per applied methodology AMS-II.G version 09.0
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	Default value as per applied methodology AMS-II.G version 09.0
Purpose of Data	For calculation of emission reduction
Comments	The value is fixed ex-ante

Data / Parameter	$EF_{projected_fossilfuel}$
Data unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data	Default value as per applied methodology AMS-II.G version 09.0
Value applied	63.7

Justification of choice of data or description of measurement methods and procedures applied	This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO ₂ /TJ) and 91 per cent for LPG (63.0 t CO ₂ /TJ)
Purpose of Data	For calculation of emission reduction
Comments	The value is fixed ex-ante

Data / Parameter	L_y
Data unit	Fraction
Description	Leakage adjustment factor
Source of data	Default value as per applied methodology AMS-II.G version 09.0
Value applied	0.95
Justification of choice of data or description of measurement methods and procedures applied	As per the methodology AMS-II.G version 09.0, $B_{old,i,j}$ can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.
Purpose of Data	For calculation of emission reduction
Comments	The value is fixed ex-ante

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	Sub national survey report conducted by "The Regional Center of Documentation and Information (CEDII)"
Value applied	0.966
Justification of choice of data or description of measurement methods and procedures applied	The f_{NRB} calculation has been referred in line with the para 39(a) of the applied methodology which prescribes that "conduct local studies to determine the local f_{NRB} value (sub national values) as per the methodological tool "Calculation of fraction of non-renewable biomass". Thus, the value has been established from sub national survey report conducted for the project region and this value will be fixed ex-ante. The f_{NRB} value has been calculated using the equation 1, 3, 5 & 6 of the methodological tool 30:

	“calculation of fraction of non- renewable biomass” Version 01 (version applied in the registered PD). The calculation of the fNRB value has been submitted in an excel sheet and also report is submitted. The survey had been conducted and values & calculations are reported by an independent third party (CEDII) which was further approved by the host country DNA. The supporting documents are submitted to DOE.
Purpose of Data	For calculation of emission reduction
Comments	The value is fixed ex-ante

Data / Parameter	Life span
Data unit	Number of years
Description	The operating lifetime of the project device
Source of data	Lab test report by National Agency
Value applied	5.5
Justification of choice of data or description of measurement methods and procedures applied	The value is taken from third party certified test reports conducted for SoaRehitra portable stove performed by experienced professional under “THE NATIONAL INDUSTRIAL AND TECHNOLOGICAL RESEARCH CENTER” (under Ministry of Higher Education and Scientific Research, Madagascar).
Purpose of Data	For calculation of baseline emission
Comments	The value is fixed ex-ante

4.2 Data and Parameters Monitored

Data / Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Stove distribution database and survey records
Description of measurement methods and procedures to be applied	The total number of appliances by type and age deployed during period y is tracked in the Project Database of the project, which is updated regularly. All appliances distributed will be recorded for installation date and recipient /location. The distribution date for each appliance listed in the Project Database. Sampling Frame: Project Database as defined by distribution date, appliance type, serial number, and end-user information. Sample Size and Desired Precision: it refers to the PoA-DD, Part II, Section I.7.2. Sample Method: it refers to the PoA-DD, Part II, Section I.7.2. The number of stoves still operating will be determined based on representative sampling. The total number of operational stoves shall be calculated as the fraction of stoves of type i and age a found operational in the sampling survey multiplied by total number of stoves of type i and age a in the project database.
Frequency of monitoring/recording	At least once every two years
Value monitored	13,752
Monitoring equipment	Based on sampling survey
QA/QC procedures to be applied	CME maintains a distribution record to calculate this parameter. The CME supervises the activities of project implementer (i.e. the local team of Tandavanala), and provides requirements related to training, guidelines and templates to facilitate accurate testing and record keeping. In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves of type i and age a.

Purpose of the data	Calculation of baseline emission
Calculation method	As per sampling method.
Comments	All data sources are maintained as transparent and verifiable. It is assumed ex-ante that there is only one project stove being used per household for calculating $B_{old,i,j}$ therefore, ex-post sampling based monitoring shall also include assessment of presence of multiple operational project stoves in a sampled household. The number of project stoves in the CPA0009 shall be adjusted accordingly to claim emissions reduction only for one operational project stove per household to ensure equivalence with the baseline established. Here 'project device is SoaRehitra. The total ICS number in CPA0009 applicable under the current monitoring period are submitted under the ER sheet and net operational ICS numbers (which is 100%) in CPA0009 are considered for ER calculation. Total ICS = 13,752

Data / Parameter	$\eta_{new,i,j}$
Data unit	%
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	WBT conducted by a third party on operational ICS post commissioning and during distribution, for each ICS type (Refer to 'additional comments' section for more details)
Description of measurement methods and procedures to be applied	Water Boiling Test (WBT) on randomly selected Households from the database, selected as per sampling size calculation. Such WBT is conducted after commissioning/distribution of ICS, in order to estimate the operational efficiency of ICS for the 1st year of operation. The value has been considered as ex-ante fixed for same ICS type for the year 1. Thereafter, the yearly loss in efficiency of ICS is calculated as per para 27 (a) of the applied methodology, AMS-II.G Version-09.0 and respective vintage wise efficiencies have been determined.
Frequency of monitoring/recording	(i) Recorded at the time of commissioning/distribution (ii) Adjusted for the loss of efficiency per annum as per para 27 a) of AMS- II.G. version-09.0.

Value monitored	For SoaRehitra ICS: (i) 31.50% (value considered for ICS in 'vintage period 1') (ii) 29.41% (adjusted value considered for ICS in 'vintage period 2' as per para 27(a) of the applied methodology) (iii) 27.32% (adjusted value considered for ICS in 'vintage period 3' as per para 27(a) of the applied methodology) (iv) 25.23% (adjusted value considered for ICS in 'vintage period 4' as per para 27(a) of the applied methodology) (v) 23.14% (adjusted value considered for ICS in 'vintage period 5' as per para 27(a) of the applied methodology)
Monitoring equipment	Not applicable as applied . However, the initial WBT result was based on WBT conducted by third party agency, equipment used are thermometer, weighing scales, moisture content meters etc. as listed in the third-party report.
QA/QC procedures to be applied	The value is used from the third-party report, hence not required.
Purpose of the data	Calculation of baseline emission
Calculation method	Water Boiling Test (WBT) on randomly selected Households from the database, selected as per sampling size calculation. Such WBT is conducted after commissioning/distribution of ICS, for each ICS type, in order to estimate the operational efficiency of ICS for the 1st year of operation. The value has been considered as ex-ante fixed for same ICS type for the year 1. Thereafter, the yearly loss in efficiency of ICS is calculated as per para 27 (a) of the applied methodology, AMS-II.G Version-09.0 and respective vintage wise efficiencies have been determined.
Comments	If any sample stove is found to be operating below the 20% efficiency, the proportionate number of stoves of that type included in the CPA will be considered to be non-operational and not accounted for ER calculation. For ICS type "SoaRehitra", the operational efficiency was tested during the first monitoring period on a batch of operational ICS (through a sampling WBT, conducted by a third-party agency) to measure the η_{new} value for ICS operational in the year 1. This value was 31.5% which is conservative as compared to the value estimated at the time of validation and CPA inclusion (i.e. 32.2%).

	Therefore, the final value considered for ICS type “SoaRehitra” for the 1st vintage is 31.5%. Please refer to the spreadsheet “ICS-efficiency” under the ER sheet; it includes the detail calculation of ICS efficiencies for both the ICS models and calculation of yearly adjustment as per para 27(a) of the methodology. Note: During the current monitoring period, the ICS were found to be conservatively under the 4th & 5th Vintage period of operation. Hence, efficiency value considered for calculation is specific to the value derived for all the vintage periods.
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Data / Parameter	Date of commissioning of batch j
Data unit	Date
Description	To establish the date of commissioning, the Project Participant opted to group the devices in “batches” and the last date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch
Source of data	Stove distribution database
Description of measurement methods and procedures to be applied	As per revised PoA-DD (versions 05, dated 05-March-2022) and the revised CPA-DDs (which are included corresponding to the 4th monitoring period under CDM), for each batch the date of distribution of first and last ICS will be recorded and the last date shall be used as date of commissioning for that batch. The ICS under the program are continuously being manufactured, uniquely numbered and continuously distributed; hence each ICS under the CPAs are being continuously recorded in the database and total number of ICS distributed in a particular month is considered as a batch for the purpose of emission reduction calculation. More details are provided under “Additional comments” and batch wise commissioning dates are included under the ER sheet.
Frequency of monitoring/recording	Recorded at the time of commissioning/distribution of first ICS of the batch
Value monitored	To be referred from the ER calculation sheet
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of the data	Start Date
Calculation method	As per sampling method

Comments	The record to be kept for crediting period + 2 years. In order to be conservative in emission reduction calculation, CME has considered the last date of distribution of a particular month as the date of complete commissioning of the stove batch distributed for that particular month (here a batch is referred to as total numbers of stoves distributed in a particular month). Therefore, start date of accounting of emission reductions for stoves distributed in a particular month has been considered as the next day of the last date of stove distribution for that month. Whereas, for the purpose of identification of ICS numbers vintage-wise, the year fraction for each ICS has been calculated from the date of its distribution. Therefore, this is a conservative approach both for the purpose of ER calculation and calculation of yearly efficiency as per para 27(a) of the applied methodology. The details related to date of accounting of stoves are of provided in the ER calculation sheet. In the current monitoring period, the total numbers of stoves are already distributed prior to the start of the current monitoring period. Hence entire ICS population is included as batch for ER calculation and for the purpose of vintage year determination respective commissioning dates of the monthly batches are considered.
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Data / Parameter	$\mu_{Y,i,j}$
Data unit	Fraction (or %)
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Stove distribution database and Sample Survey Records
Description of measurement methods and procedures to be applied	As per sampling method A sampling monitoring survey has been conducted on calculated sample size as per the sample plan and in line with the provision given under the page 14 of the applied methodology to record usages consumption level in lieu of continued baseline stoves. The option 2 of the page 14 of the methodology has been referred while conducting the sampling survey as baseline devices are three stone fire across all the households. As per the methodological requirements, the survey was designed to capture the cooking habits and stove usage of households for the identified samples, including quantification of use of baseline devices. Thus, number of meals cooked with project ICS, fulfilment of cooking needs, etc. were captured and also in case of samples where baseline stoves were identified their usages detail were recorded.

	Since this parameter is a proportion (i.e. fractional value), the sampling result has been expressed as a proportional value. Thus, the Fractional value derived based on sampling survey has been considered as “ μ ” and the value has been used in the main equation (eq 1) for required adjustment to account number of baseline stoves still operating. Please refer to the sampling survey sheets for the results derived from the survey and also the ER sheet for application of the values.
Frequency of monitoring/recording	At least once in two year
Value monitored	100%
Monitoring equipment	NA
QA/QC procedures to be applied	In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves of type i
Purpose of the data	To calculate baseline emission
Calculation method	As per sampling method
Comments	The record to be kept for crediting period + 2 years. The value has been derived from the sampling survey data sheet.

Data / Parameter	N _{d,HH}
Data unit	Fraction
Description	Number of project devices distributed per household
Source of data	Stove distribution database records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	Recorded at the time of commissioning/distribution of project devices
Value monitored	1
Monitoring equipment	NA
QA/QC procedures to be applied	The procedure will be developed in electronic system to record number of ICS provided to particular household
Purpose of the data	To calculate baseline emission
Calculation method	NA
Comments	The record to be kept for crediting period + 2 years

4.3 Monitoring Plan

As per the provision of the registered PoA (#10443), the sampling is considered at PoA level for all the CPAs to be covered under a particular Monitoring Period, hence a PoA level sampling is generally conducted by CME. However, under VCS each CPA is treated as an independent project, hence in this regard, there were CPA level sampling surveys conducted by the CME, viz. (i) one during Dec 2022 to March 2023, (ii) followed by a recent biennial sampling in January 2024. All these two sampling surveys can be applied to the current monitoring period and hence the conservative results from the sampling survey²² has been referred for this project activity for the purpose of all the monitoring parameters attributed to the Sampling Monitoring plan. However, overall consideration of the monitoring plan is demonstrated below for reporting purposes.

The monitoring plan is designed to monitor the parameters listed in Section 4.2 “Data & parameters monitored” above, which are required for calculation of the actual GHG emission reduction achieved by the CPA using ex post sampling survey. The share of operating stoves and the continued use of pre-project devices will be determined based on sampling procedures as outlined below. The CME will be responsible for conducting the sampling surveys and maintaining a database with all operating stoves.

No monitoring for leakage through competitive uses of biomass is required, as the parameter $B_{old,i,j}$ is multiplied by 95% to account for leakage.

The sampling plan is the following:

Sampling design;

Representative sampling will be undertaken as part of the Sampling Plan (however by grouping and sampling across all the beneficiaries under each CPA) that is designed in line with the requirements of the “*Sampling and surveys for CDM project activities and programme of activities*”, version 04.

- (i) **Objective and Reliability Requirements:** The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the monitoring period. As per Sampling Standard, parameter values shall be estimated by sampling in accordance with the requirements in the applied CDM methodologies separately and independently for each of the CPAs included in the PoA

²² biennial sampling survey approach is followed and results from the latest sampling survey (i.e. survey conducted during Dec 2022 to March 2023 and January 2024, as per 95/10 level) can be applied conservatively. Here during both the sampling survey the results found are the same, hence the applied values are conservative and any of the surveys can be referred under the current MP. In this regard, PP has considered and referred the recent survey of Jan 2024 and reported under this section.

For further reference, footnote #6 of 'Sampling Standard' can be considered which refers to "General guidelines for SSC CDM methodologies" and its respective para 26, 27 & footnote #4 prescribes that the survey results may be used for the period 12 months after the survey date, on top of using the results for the period prior to the survey date, resulting in up to 24 months period to which the survey results may be applied to, irrespective of when the monitoring reports are uploaded

except when a single sampling plan covering a group of CPAs is undertaken applying 95/10 confidence/precision for the sample size calculation. This is consistent with the approach in the approved methodology to aim at higher confidence/precision when the sampling/survey effort is undertaken less frequently.

In cases where survey results indicate that 90/10 precision or 95/10 precision are not achieved, the lower bound of the 90 per cent or 95 per cent confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision). The project activity has been treated as single frame and 95/10 confidence/precision has been considered for a biennial²³ sampling.

Monitored Parameter:

$N_{y,i,j}$	Number of project devices of type i and batch j operating during year y
$\mu_{y,i}$	Adjustment to account for any continued use of pre-pre-project devices during the year y

ii) Target Populations:

- The target population for the proportion of ICS still in operation ($N_{y,i,j}$) of this POA are all households in the POA database which are using fuel wood in ICS distributed under the POA for cooking.
- The target population for pre-project appliances ($\mu_{y,i,j}$) is the set of old stoves still in use under CPAs database.

iii) Sampling Frame

As per the registered PoA-DD and CPA-DD, referring to the “Sampling Frame” section it can be checked that there were two sampling frames prescribed to ensure the homogeneity of the CPAs included for a single sampling plan. The Sampling was conducted at POA-level by grouping the targeted CPAs, based on two separate frames for two different types of ICS models. However, under VCS each CPA is treated as an independent project hence sampling frame is considered at CPA level. For the current CPA there is only single ICS type and implemented homogenously, hence a single sampling frame has been considered which is applicable for both the parameters:

²³ biennial sampling survey approach is followed and results from the latest sampling survey applied under the current MP (i.e. survey conducted during January 2024 as per 95/10 level, as justified under the footnote 21).

For further reference, footnote #6 of 'Sampling Standard' can be considered which refers to "General guidelines for SSC CDM methodologies" and its respective para 26, 27 & footnote #4 prescribes that the survey results may be used for the period 12 months after the survey date, on top of using the results for the period prior to the survey date, resulting in up to 24 months period to which the survey results may be applied to, irrespective of when the monitoring reports are uploaded.

- (i) proportion of ICS in operation ($N_{y,i,j}$)
- (ii) Adjustment to account for any continued use of pre-project devices during the year ($\mu_{y,i,j}$)

Sampling frame for proportion of ICS in operation ($N_{y,i,j}$) The sample frame refers to all the information sources on the Database. There are two primary mechanisms for data collection: the Registration Process for newly distributed/installed ICS and the Monitoring Survey (which includes a household questionnaire and visual inspection of ICSs) that will be used throughout the lifetime of the PoA. The detailed information collected from Registration Process is used to populate the stoves Database and the Monitoring Survey follows “*Sampling and Surveys for CDM Project Activities and Programme of Activities*”, version 04.

In line with applied approved methodology AMS-II.G version 09.0, as installing data logger is not practical and if any use of pre project devise can be monitored in a common survey with other monitoring parameters; therefore, a random sub- sample within the common survey can be taken to determine continued use of old cookstoves and its proportional usage by including suitable questionnaire.

There will be two situations:

- 1) project ICS are completely discarded
- 2) the old stoves used along with project ICS.

Hence in first case it will be simple multiplication of fraction of total number of project ICS displaced by old cookstoves by total number of cookstoves in CPA, to achieve precise results based on survey result sample size calculation can be repeated.

However, for second case, surveys may be conducted if the use of data loggers to record the continued operation of baseline devices is demonstrated to be not practical, for example when the baseline device is the three-stone fire. The surveys should be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to determine the frequency of usage of both the project devices and baseline devices. For example, if there were 3 pre-project devices per household and it was determined during the survey that use of one of them continues during the crediting period then a conservative adjustment factor of 0.66 is applied for the relevant monitoring period. Another example would be the case where there was only one pre-project device per household and its use during the project period continues along with the project stove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.75. Where a more precise data is available i.e. the thermal

capacity of the project and pre-project devices and respective utilization hours, a weighted average adjustment factor may be used.

iv) Sampling Method

The sampling method for monitored parameters $N_{y,i,j}$ and $\mu_{y,i,j}$ is Simple Random Sampling and samples will be randomly selected from the primary sampling units as illustrated above. To ensure a random selection of ICS, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its unique ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

To determine the parameters, sampling will involve the following approaches (outcome in brackets):

$N_{y,i,j}$: Visual inspection of the premises to see if ICS is operational and in use. Interview with end user if required to verify that ICS is still in use (Yes/No)

$\mu_{y,i,j}$: Pre project device only is in use then fraction to be used to calculate total number, however if pre project device is used along with project ICS, proportion of usage of each will be determined by cooking habits evaluated by survey questionnaire during the monitoring period.

Using the formulas in the section “Sample Size” below, the CME will randomly sample the required number of ICS from the primary sampling units. It is important to note that for $\mu_{y,i,j}$ where partial usage of both old stoves and project ICS are observed, for each household under sample cooking habits must be taken into consideration.

v) Sample size

For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision for biennial and 90/10 confidence/precision for annual sampling.

The procedure to determine the sample of households will ensure that they adequately represent the broader project population, minimizing sampling error. Using, a 95 per cent confidence level, and a 10 per cent margin of error, random samples will be selected from each Primary Sampling Unit. There are two parameters that will be estimated through sampling: the number of stoves still in operation during the monitoring period as determined by the monitoring survey ($N_{y,i,j}$), and the continued use of old stoves, ($\mu_{y,i,j}$).

In line with AMS-II.G version 09.0, both can be sampled in a single survey with a random sample of households using the above described confidence/precision levels depending on annual or biennial monitoring frequency. Since both the parameters $N_{y,i,j}$ and $\mu_{y,i,j}$ requires results and application in proportion/percentage, therefore sample size consideration is prescribed as 'proportion value parameter' for sampling.

As per registered sampling plan, in line with Guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 07.0 Appendix 1 paragraph 5, there are different ways available to obtain the estimates of the parameter of interest:

- (a) Refer to the result of previous studies and use these results;
- (b) In a situation where information from previous studies is not available, a preliminary sample as a pilot could be conducted and use that sample is used to provide the estimates;
- (c) Use best guesses based on the researcher's own experiences.

For the registration/inclusion purpose of CPA-DD, option C shall be applied. For the first monitoring period, values from a pilot shall be applied. For the following monitoring periods, the estimates shall be adjusted taken into account the results of the previous monitoring period(s) or the result from recent sample survey, which is conducted during January 2024. Since the current monitoring period falls under the applicability period of the biennial sampling conducted during December 2022-February 2023; and also of the recent January 2024 hence here both the options (a) and (c) can be referred.

Thus, both the sampling parameters considered based on 'proportion value', hence to estimate the sample size for parameters $N_{y,i,j}$ and $\mu_{y,i,j}$ the following equation is used:

$$n \geq \frac{1.96^2 N \times p (1 - p)}{(N - 1) \times 0.1^2 \times p^2 + 1.96^2 \times p (1 - p)}$$

Where:

n = Sample size

N = Population size (Total number of households/ICS)

p = Expected proportion

1.96 = Represents the 95% confidence required (In the case of 90% confidence, 1.645 shall be used)

0.1 = Represents the 10% relative precision

The following assumptions are made to exemplify the sample size calculation for parameters: $N_{y,i,j}$ and $\mu_{y,i,j}$.

The CME distributed 13,752 ICS under the current project activity. Hence, population size, N, is taken as 13,752 households/ICS.

It is expected at least 90% of ICS will be operational, hence the expected proportion p for $N_{y,i,j}$ is taken as 0.9.

Sample size calculation:

The calculation of the required sample size for both the parameters in the first monitoring period is illustrated below considering a 95/10 level of confidence and precision (i.e. for biennial monitoring). In all cases a conservative approach is taken, however if for any parameter the required 95/10 confidence/precision is not met then the CME will randomly select an additional sample and collect further data from this sample to ensure the pooled data meet or exceed the required thresholds.

Alternatively, as per the provision of Sampling Standard the lower bound or the upper bound (whichever is conservative) of the 90 per cent or 95 per cent confidence interval of the parameter value may be chosen. Parameter $N_{y,i,j}$ and $\mu_{y,i,j}$: Based on the above assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated as:

$$n \geq \frac{1.96^2 \times 13752 \times 0.9 (1 - 0.9)}{(13752 - 1) \times 0.1^2 \times 0.9^2 + 1.96^2 \times 0.9 (1 - 0.9)}$$

Which comes out to be $n \geq 42.55$

N = 43

Therefore, in this case a minimum sample size of 43 is to be sampled from each primary sampling unit for both the parameters. In case the resulting sample size to achieve the desired confidence/precision levels is smaller than 30 ICS, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. As justified under the footnote #21, the recent sampling survey (i.e. survey conducted during January 2024) has been referred under the current monitoring period. The final sample size considered is 50 after adding some samples under the provision of oversampling, as explained below.

Consideration of sampling & oversampling:

As per the provision of registered sampling plan, the CME may choose to use the same samples to monitor more than one parameter, this is because parameters have same units (i.e. proportion/fraction). Sampling more than one parameter within the same sample (household) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter. Oversampling is strongly encouraged, not only to compensate for any attrition, outliers or nonresponse associated with the sample, but also to prevent a situation at the analysis stage where the required reliability is not achieved and additional sampling efforts would be required. The sample size shown above

will be adjusted upwards to account for non-responses, CME shall determine the appropriate non-responses rate based on previous experience. In this regard, oversampling is considered as part of the registered monitoring plan. However, based on prior experience of sampling it has been realized that responses from min. required samples are generally achievable. Hence, oversampling may not be a mandatory requirement but as part of standard sampling practice followed by CME about 15% additional samples are considered as over samples in the sample size under this project.

Outcome: Both the parameters $N_{y,i,j}$ and $\mu_{y,i,j}$ have been selected across the minimum required and randomly selected 50 samples, as stated above. Similarly, in order to pre-define the samples the online randomizer was used to randomly select samples. All these selected samples were recorded (screenshots of the online randomizer) at the time of sample selection and same are reported under the sampling result sheets for cross check.

Thus, the particular parameters were surveyed and tested based on the above samples sizes and selected randomly from the stove database, hence CME had interviewed all sampled households to check for the fraction of operational ICS ($N_{y,i,j}$) and the presence of baseline devices (i.e. additional check for the parameter $\mu_{y,i,j}$ for backup reference purposes). Thus, for these two monitoring survey parameters ($N_{y,i,j}$ & $\mu_{y,i,j}$), data collection was done for total 50 randomly selected samples. Subsequently, results are calculated and presented for the parameters. The results are calculated and presented for all the calculated sample sizes for each parameter in line with the sampling method and sample size estimated.

The detail calculation, sample equations, results, etc. are submitted in final Sampling Survey sheets. The summary of the sampling results and formulae used calculation and reliability check etc. are also included in the Appendix 2 of the MR below, which can be further cross checked from the sample survey sheet, records of survey, sampling survey report etc.

Other elements of monitoring plan >>

The Monitoring Plan applied in this PoA involves a number of key elements that ensure that the CME have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating Emission Reductions following AMS-II.G. version 09.0 on the basis of the amount of non-renewable biomass saved by the ICS in the project activity. The key elements are the following:

- Project database management
- Spot Checks of ICS
- Sample Plan for the Monitoring Survey
- Data Quality, Consistency and Duplication Checks

- Monitoring Reporting

Project Database Management:

The information collected by the CME/CPA implementer will be stored in the electronic database available with CME and it will be updated on ongoing basis by trained staff. The database will be sortable by the information collected as per Registration Process and will be made available to the VVB at verification. The CME/CPA implementer will verify accuracy and completeness and confirm that there is no double entry of serial numbers in the database. The CPA implementer will identify any discrepancy and the correct information will be entered into the database.

There are two possible replacement cases: (a) replacement due to any damage, (b) replacement end the end of operational life of the ICS. In case a replacement stove is being issued to a customer already registered on the project database (example: case (a)), a new registration will not be required. The replacement stove will be recorded in the project database in such a way that it is clear that the replaced stove ceases to be included in the CPA; and the replacement stove is associated with the customer's details as a replaced stove. In case of new stove which is given as replacement at the end of life of the current ICS (e.g. case (b)), the same is included in the CPA as a new stove with a new serial number and will be treated as re-distribution.

All partners will be required to conform with CPA implementation and monitoring systems designed by CME under services agreements signed with CME which will cover the above-mentioned role and responsibilities.

All technical staff responsible for installation and maintenance of the stoves will be trained in terms of the understanding the requirements of CDM on the monitoring system. The technical, operational and maintenance trainings provided for the personnel will be described in each monitoring report.

Spot Checks of ICS Installed:

Trained field staff will continually randomly select households included in the database and visit them to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (e.g. change in the address of a user) will be updated on the database, and in the case, ICSs are found to be no longer in use, they will be clearly marked as such and excluded from emission reductions calculations. The spot check will be performed during first year of operation of the CPA, wherein for each CPA random selection of household will be done through central database system, afterwards a team will visit to each household selected and will confirm the information as per registered database. In case any change in information the same will be updated and an action will be decided based on changes observed. These spot checks will also be used as part of sample required establishing the ICS in operation and if any use of pre-project devices along with ICS.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

According to paragraph 17 of methodology AMS-IL.G, version 09.0, emission reductions would be calculated as:

$ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y$
i = Indices for the situation where more than one type of project device is introduced to replace the pre-project devices.
j = Indices for the situation where there is more than one batch of project device
ER_y = Emission reductions during year y in t CO ₂ e
$ER_{y,i,j}$ = Emission reductions by project device of type i and batch j during year y in t CO ₂ e
LE_y = Leakage emissions in the year y

Now,

$$ER_y = B_{y,saving} \times N_{y,i,j} \times f_{NRB,y} \times \mu_{y,i,j} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Determination of $B_{y,savings,i,j}$

In line with para 18 of applied approved methodology AMS-IL.G version 09.0, four option given to determine $B_{y,saving,i,j}$. Here CME has chosen option three i.e. Water Boiling Test (WBT) with corresponding formula given below:

$$B_{y,savings,i,j} = (B_{old,i}) * L_y * (1 - \eta_{old}/(\eta_{new,i,j})).$$

The baseline saving shall be determined as:

$$B_{old,i,j} = B_{old,HH} / N_{d,HH}$$

(Here $N_{d,HH}$ = Number of project devices per household (number). This value is currently 1)..

5.2 Project Emissions

There is no project emission associated with this project activity. Also, as per the provision of the applied methodology, the project emission calculation is not applicable. Hence, the equations in the methodology do not calculate any project emissions.

5.3 Leakage Emissions

Leakage emission has been referred in line with the para 29 of the applied methodology.

To account for leakage a net to gross adjustment factor of 0.95 has been applied in line with the methodology which is also prescribed as the choice in the registered CPA-DD and therefore the B_{old} has been multiplied by a net to gross adjustment factor to account for leakages.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

According to paragraph 17 of methodology AMS-IL.G, version 09.0, emission reductions would be calculated as:

$$ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y$$

Where:

i = Indices for the situation where more than one type of project device is introduced to replace the pre-project devices.

j = Indices for the situation where there is more than one batch of project device

ER_y = Emission reductions during year y in tCO₂e

$ER_{y,i,j}$ = Emission reductions by project device of type i and batch j during year y in tCO₂e

LE_y = Leakage emissions in the year y :

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCU (tCO ₂ e)	Removal VCU (tCO ₂ e)	Total VCU (tCO ₂ e)
01-October-2023 to 31-December-2023	8,367	0	0	8,367	0	8,367
01-January-2024 to 30-April-2024	11,005	0	0	11,005	0	11,005
Total	19,372	0	0	19,372	0	19,372

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
01-October-2023 to 31-December-2023 (Includes both dates)	9,565	8,367	-12,52%	The actual emission reductions achieved during the current monitoring period is on lower side as compared to ex-ante estimate. This is mainly because of lower year fraction and adjusted efficiency for the operational vintage of the ICS
01-January-2024 to 30-April-2024 (Includes both dates)	12,581	11,005	-12,52%	
Total	22,146	19,372		

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Not Applicable

APPENDIX 2: < SUMMARY OF THE SAMPLING SURVEY >

Details of the Sampling Survey:

The results of the biennial sampling survey conducted during January 2024 has been applied for the current monitoring period. The details are summarized below:

For parameter $N_{y,i,j}$ & $\mu_{y,i,j}$:

Sampling Survey was conducted across the randomly selected samples at CPA level, in line with the registered sampling plan. All sample households were interviewed with pre-designed questionnaires to check and record the presence of project ICS, usage pattern, fulfilment of cooking needs with project ICS, etc.

As per calculated sampling size (i.e. based on 95/10 confidence/precision), a total of 50 samples were surveyed for both the parameters $N_{y,i,j}$ and $\mu_{y,i,j}$. All these samples were randomly selected from the CPA database to consider a representative and unbiased sample selection to derive the results. The project ICS were found to be operational without any issue. The regular cooking needs are fulfilled with using the project ICS.

The input of the sampling survey, results derived from the sampling survey and reliability check are presented under the sampling sheet and also summarized:

N_y : Usage Rate	100.00%	%
Population Size	13,752	number
Sample Size	50	number
Proportion for Usage Rate	1.00	Fraction
Standard error of proportion for Usage Rate	0.00	
Precision for Usage Rate	0.00	%
Result for Usage Rate	Acceptable	--

μ_y : (Adjustment fraction)	100.00%	%
Population Size	13,752	number
Sample Size	50	number
Proportion for Usage Rate of baseline device	1.00	Fraction
Standard error of proportion for Usage Rate	0.00	
Precision for Usage Rate	0.00	%
Result for Usage Rate	Acceptable	--

Also, for the parameter μ_y : as per applicability of the methodology (version 09), page 14:

- If the pre-project devices are decommissioned and no longer used, as determined by the monitoring survey its value is 1.0.

- ii) If both the project devices and pre-project devices are used together, measurement campaigns shall be undertaken.
- iii) Surveys may be conducted if the use of data loggers to record the continued operation of baseline devices is demonstrated to be not practical, for example when the baseline device is the three-stone fire.
- iv) Example - the case where there was only one pre-project device per household and its use during the project period continues along with the project stove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.75. Where a more precise data is available i.e. the thermal capacity of the project and pre-project devices and respective utilization hours, a weighted average adjustment factor may be used.

The sampling survey was designed and conducted following the above reference and confirmed that (ref. sampling survey sheets) the Project ICS are being regularly used in all households to meet daily cooking requirements. The detailed presentation of sampling frame, sample size calculation, sample selection, sampling data, calculation of results and precision check etc. are demonstrated in the sampling sheets.