



**Verified Carbon
Standard**

VALIDATION REPORT MILA RANO – SAFE WATER ACCESS FOR MADAGASCAR

AENOR

Document Prepared by AENOR INTERNACIONAL S.A.U.

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Summary:

The purpose of the project activity is to provide safe drinking water to households in rural communities of Madagascar, aiming to reduce the use and demand of fossil fuel and/or non-renewable biomass that would have been used to boil the water to purify water in the absence of the proposed project activity, by the construction of solar powered water supply systems.

The Project will construct 5 new boreholes with a solar powered pump in rural villages of the Region of Atsimo-Andrefana into Municipality of Behompy. The water taken by the solar pump is transferred to the tank, passing through a skimmer that provides chlorine purification, the chlorine pads are loaded into the skimmer every 30 days depending on the capacity of the skimmer which can be from 3 or 5 kg of chlorine. The use of the purified water is simple, people can get clean and safe drinking water that is safely stored in the water tank.

The purpose of the validation was the independent evaluation of the project's compliance with the VCS Standard v4.4 and ISO 14064-2 2019 and the requirements of the GHG program selected, also the validation applied a strategic and risk analysis required in the norm ISO 14064-3: 2019. The process was performed through a combination of desk review, communications with relevant personnel and an onsite audit.

During the validation 1 CL and 4 CARs were reported. All these issues were appropriately closed by means of corrections, more clear explanations, and other supported documents.

AENOR carried out a final validation report and deems with reasonable level of assurance that the project complies with all the validation criteria for VCS. The assessment team has no restrictions or uncertainties with respect to the compliance of the project with the validation criteria.

Hence, the audit team concludes that the net GHG emission reductions included in the project boundary at validation stage has been quantified in accordance with VCS rules. AENOR assessed the calculations and can confirm that the estimated GHG emission reductions are correct. The project expects the reduction of 64,953 tCO₂e for the renewable 7 years crediting period (31/05/2023 to 30/05/2030). The average annual GHG emission reductions is 9,279 tCO₂e/year. This is a grouped project.

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1 INTRODUCTION

1.1 Objective

The purpose of the validation audit activity was to conduct an independent assessment of the project in order to determine whether the project complies with the validation criteria, as set out in the guidance documents listed in Section 1.2 of this report.

1.2 Scope and Criteria

The scope of the validation audit is to validate the emission reductions of the proposed project activity in Madagascar against the Verified Carbon Standard, the identified methodology and associated tools, for the first renewable 7 years crediting period (31/05/2023 to 30/05/2030).

The objectives of this audit included a validation of the project calculated emission reductions with the Verified Carbon Standard requirements, besides the assessment of the additionality.

The scope was defined as follows:

- The project and its baseline scenarios.
- The physical infrastructure, activities, technologies and processes of the project.
- The GHG sources, sinks and/or reservoirs those are applicable to the project.
- The types of GHGs that are applicable to the project.
- The project crediting period.

In accordance with Section 4.1.8 of the VCS Standard, the criterion for validation was the VCS Version 4, including the following documents:

- VCS Standard v4.4
- VCS Program Guide v4.3
- CDM Methodology AMS-III.AV Low greenhouse gas-emitting safe drinking water production system (Version 08.00 of 12/06/2020)

The assessment was not performed against the most recent version of the relevant VCS documents, although the applied version is still valid.

1.3 Reasonableness of Assumptions

The assessment was conducted to provide a reasonable level of assurance of conformance against the defined audit criteria and the threshold for materiality with respect to the aggregate of errors, omissions, and

misrepresentations relative to the total reported GHG emission reductions and/or removals

shall be five percent for projects. Based on the audit findings, a positive evaluation statement reasonably assures that the project GHG assertions are materially correct and is a fair representation of the GHG data and information.

All the versions of the validation and verification report were subjected to an independent internal technical review before being submitted to the client to confirm that all validation activities had been completed according to the pertinent AENOR instructions required. The technical review was performed by a technical reviewer(s) qualified in accordance with AENOR's qualification scheme for VCS validation and verification.

Name	Role in the Team
Luis Javier Arribas Alonso	Lead auditor
Asis Arranz	Auditor
Sergio Rodrigo Santano	Auditor (trainee)
Richard Daniel Gonzales	Technical reviewer

1.4 Summary Description of the Project

The project will construct 5 new boreholes with a solar powered pump in rural villages of the Region of Atsimo-Andrefana into Municipality of Behompy. The water taken by the solar pump is transferred to the tank, passing through a skimmer that provides chlorine purification, the chlorine pads are loaded into the skimmer every 30 days depending on the capacity of the skimmer which can be from 3 or 5 kg of chlorine.

Two different water system designs will be installed with the following technical specifications:

	Technology set up 1 /39/40/	Technology set up 2 /37/38/41/
1 Water tank capacity	6 mc	4 mc
1 Submersible Solar Pump	Hmax 90-110 m flow rate 5,500 liters/hour 1000W / 110V	Hmax 90-96 m flow rate 3,500 liters/hour 750W / 90~240 240V
6 Solar panels	200 W 12 – 24V each panel	200 W 12 – 24V each panel

1 Load regulator	30 A	30 A
4 Solar batteries	200 Ah 12V	200 Ah 12V
1 water tower	Height 8m, Length 2.5m, and depth 2m	Height 8m, Length 2.5m, and depth 2m
Depth well	15 m	12-14 m

This way, people can get clean and safe drinking water that is safely stored in the water tank reducing the use and demand of wood and charcoal that would have been used to boil the water to purify water and as an associated benefit, the project directly helps reducing the rate of deforestation in the host country where most Malagasy households have no alternative to firewood and charcoal.

The technology applied is identified as Point of Use (POU) which means the system treats only the water intended for direct consumption, typically at a single tap or a limited number of taps.

The project activity is implemented in several villages and communities of in the region Atsimo-Andrefana, under the Tulear II district: Mahabo, Behompy, Ampasy, Ampihalia, Andranofoty

The geographical coordinates are the following:

Community	South coordinate	East coordinate
MAHABO	S 23°15'27.55"	E 43°50'21.96"
AMPASY	S 23°14'38.80"	E 43°51'11.98"
AMPIALIA	S 23°14'13.01"	E 43°51'17.20"
BEHOMPY	S 23°14'51.61"	E 43°51'20.80"
ANDRANOFOTY	S 23°13'42.62"	E 43°53'01.39"

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation was performed through a combination of document review, interviews with relevant personnel and onsite audit, as discussed in Sections 2.2 through 2.4 of this report. At all times, the project was assessed for conformance to the criteria described in Section 1.2 of this report. As discussed in Section 2.5, findings were issued to ensure that the project was in full conformance to all requirements.

The validation activities in which risks were assessed were the evaluations of the applicability, baseline scenario, additionality, leakage, monitoring system, safeguards, etc.

Based on these analyses and considering the requirements of the GHG program used, the following documents were checked.

The key Project information to review can be summarized as follow:

- Project proponent, developers/management team, local team onsite
- Stakeholders' consultation process & Public Comment Period
- Project rights and legal requirements
- Project communication
- Financial issues, Financial sustainability.
- Project conflicts, barriers, or difficulties.
- Additionality assessment
- Methodology used
- Baseline scenario, project scenario, leakage
- Ex-ante Quantification of emission reductions or removals
- Monitoring plan. Monitoring procedures. Monitoring Team & Equipment
- Review of operation and measurement records. Controls established to detect and correct any error or omission in monitoring parameters
- To examine the baseline data gathered from the determined baselines for the project's region, spreadsheets used to enter, and compile information required by the methodology
- To reproduce the GHG emissions reductions calculations (ex-ante) presented in the spreadsheet and crosscheck with the Project Description.

AENOR carried out a deep and meticulous review of the spreadsheets to verify the correct application of the methodology (formulae, equations, etc.) and checked that data required calculating the GHG emission reductions were appropriately provided. Based on the assessment carried out, AENOR confirms with a reasonable level of assurance that the claimed emission reductions are free from material errors, omissions, or misstatements.

AENOR confirms that sufficient evidence was presented for the ex-ante estimated net anthropogenic GHG emission reductions and that there is a clear audit trail that contains the evidence and records that validate the stated figure in this validation report since:

- Sufficient evidence available: The project participant has provided the 100% of data used in the calculations to achieve the final estimated amount of GHG emission reductions.
- Nature of evidence: The raw data were collected from reliable sources. They are detailed in the project documents and have been provided to the validation team and were checked during the interviews.
- Cross-checked evidence: AENOR cross-checked the collected information through interviews with stakeholders and reproducing calculations.

Hence, AENOR confirms that the stated figures in the PD are correct and confirms that is able to certify the ex-ante net anthropogenic GHG reductions based on verifiable and reliable evidence.

Describe the method and criteria, including the evidence-gathering plan, used for undertaking the validation.

As the technology applied by the project is identified as Point of Use (POU) which means the system treat only the water intended for direct consumption, typically at a single tap or a limited number of taps, in the ex-ante estimation considered by the validation, all population of the villages affected by the 5 new boreholes with a solar powered pump implemented by the project are considered as end-users.

Therefore, the audit team decided, for recollecting the necessary information on the pre-project situation, baseline scenario, technology implemented and other validation information, to visit the place where the safe water system of the first village (Behompy) was been installed, interviewed the project constructor. Other interviews with relevant stakeholders of the different villages affected by the project were interviews as is detailed below (Mayor of Behompy, villages chiefs of 3 of 5 villages, and 2 well of Committee representatives). Additionally, it was conducted a public meeting in Behompy community with numerous habitants of this community, and several households were visited to check that the common practise in the rural areas is to use firewood and three-stones fires. Other stakeholders as regional/national authorities and medias were interviewed too.

The scheduled visit to the villages of Ampasy and Ampialia were cancelled finally due to the high level of the river that must be crossed as consequence of the cyclone Freddy effects, as is detailed in the letter signed by the village chiefs of Ampialia and Ampasy and the Major of Behompy /26/.

The validation schedule, including key milestones (e.g., kick-off meeting, desk review, site visit) and corresponding dates, is detail below:

Tasks	Period
1. Publication of the project on Verra registry and start of the validation process.	18/01/2023
2. Desk review of documents	18/01/2023 – 28/02/2023
3. Follow-up actions (on-site inspection or remote; interviews; cross checks of information)	20/02/2023 – 24/02/2023

Tasks	Period
4. Findings, including CARs and CLs	27/02/2023 – 31/07/2023
5. Validation reports (after PP provides definitive documentation and the CARs and CLs are closed)	01/07/2023 – 29/09/2023
6. Technical review	02/10/2023 – 06/10/2023

2.2 Document Review

The Project Description submitted by the Project Proponent (PP) was reviewed against the approved methodology and against VCS requirements. Additional background documents related to the project design, baseline and additionality were also made available before and during the onsite visit in Madagascar.

To address the corrective actions and clarification requests that arose from the desk review and onsite visit, the PP revised the project description document version 1 (dated on 2 November 2022 and developed a final version 5 dated on 12 June 2024.

The supporting documents that were reviewed are all listed in Appendix I of this report. AENOR cross-checked and compared then with the relevant sections of the PD.

2.3 Interviews

The AENOR validation team conducted interviews with project developers during the onsite visit to confirm selected information and to resolve issues identified in the document review.

The following sampling for the selection of the stakeholder's group was carried out: at least one stakeholder interviewed per stakeholder group.

Interviews were carried out during the onsite visit on 20 February 2023, 24 February 2023. The PP sent a file with the names and position of all the stakeholders and AENOR made an independent selection of them.

Relevant stakeholders have been identified as:

- Project end-users. The opinion of these stakeholders was collected indirectly through the interviews with the community representants or chiefs due to the pure water is supplied at a common Pont of Use (POU) for all community inhabitants and not directly to each household.
- Project constructors: The constructor of the water systems. The constructor and his workers are directly influenced by the project activity.
- National and Local authorities: Community representants or chiefs of the rural municipalities where the project is being implemented. Regional or national authorities of environmental, public health, etc.

- NGOs. The PP directly cooperates with local NGO for the implementation and monitoring of the project activity.
- Media. Any national media that is interested in the project activity.

The list of the interviewed people is detailed below:

NAME	Role in the project	Date	DEPARTEMENT / AREA / Village / Place
Rita Valoroso	Consultant	20-25/2023	PP
Davide Enzo Bertapelle	CEO / Madaprojects SRL	20-25/2023	PP
Auguste Rahajason Romain	Local Partner / Aid4 Mada	20-25/2023	PP
Rambona Virgile Farezé	Mayor of Behompy	21/02/2023	Behompy
Fitahianjanahary	village chief of Behompy	21/02/2023	Behompy
Miarena Retonga	village chief of Ampasy	21/02/2023	Behompy
Patrice Franské	village chief of Ampialia	21/02/2023	Behompy
Ratsiavy Ambergent	Well of Committee of Ampialia	21/02/2023	Behompy
Raoavy Gabriel	Local security manager DINABE	21/02/2023	Behompy
Paul Deux Tsiambany	Well of Committee of Behompy	21/02/2023	Behompy
José Mbelson	water systems constructor ZANARAY	21/02/2023	Behompy
Rotovondrainy Edali	Head of the Region Antsimo Andrefana	22/02/2023	Tulear:
Christiana	Chief Division SRE (Service Regional de l'Environnement)	23/02/2023	Tulear:
RAVOLOLONJANAHARY Marcella	Journalist RTVS et TV M	23/02/2023	Tulear
Vita Sidison Dédé	Mayor of Tulear	24/02/2023	Tulear

It was invited to be interviewed during the onsite visit the Manager of ONG WHH, Emma Fanjambololona, but she did not be available, but she was notified of the audit visit and our email address to request or provide us any information related to the project activity.

As it was explained above, the opinion of the end users was collected indirectly through the interviews with the community representants or chiefs due to the pure water is supplied at a common Pont of Use (POU) for all community inhabitants and not directly to each household, but it was conducted a public meeting in Behompy community.

As is detailed above, the scheduled visit to the villages of Ampasy and Ampialia were cancelled due to the high level of the river that must be crossed as consequence of the cyclone Freddy effects, as is detailed in the letter signed by the village chiefs of Ampialia and Ampasy and the Major of Behompy /26/.

2.4 Site Visits

The objectives of the onsite inspections performed were mainly to cross check the description provided in the P.D related to the environmental conditions of the project area, but also:

- Ensure that the geographic area of the project, as reported in the PD is in conformance with Section 3.11.1 of the VCS Standard.
- Perform a risk-based review of the project area to ensure that the project conforms to all other requirements of the VCS rules and the methodology.
- Observe the PP's evidence and collect and record data in order to assess whether data collection techniques conform to the monitoring plan and related documentation and to evaluate data quality control systems.
- Select samples of data and information for validation in order to meet a reasonable level of assurance and to meet the materiality requirements of the project, as required by Section 4.1.2 of the VCS Standard.
- Perform a risk-based review of the project area to ensure that the project is in conformance the eligibility requirements of the VCS rules and the applicability conditions of the methodology.

The following table summarizes the activities carried out during the site visit.

Activity & Information	Date
Initial meeting - Introduction and scope of the validation process. - Confirmation of the on-site visit planning. - Clarifications related to monitoring procedures. - Introduction to carbon calculations.	20/02/2023
Visit to project area	21-24/02/2023

Activity & Information	Date
- Randomly selected installations (considering feasible access), in accordance with the data base provided by the project developer. - Baseline determination: Scope and methods	
Meetings with stakeholders - Comments and opinions about the project - Characteristics of the project - Stakeholder consultation	21-24/02/2023
Final meeting - Audit visit closure	24/02/2023

2.5 Resolution of Findings

A total number of 4 CARs and 1 CL were raised during this validation process.

All findings issued by the AENOR audit team for this validation process have been closed. In accordance with Sections 4.1.13 and 4.1.14 of the VCS Standard v4.4, all findings issued during the validation process, and the inputs for their closure, are described in Appendix II of this report.

2.5.1 Forward Action Requests

No FAR has been raised for the next verification event.

3 VALIDATION FINDINGS

3.1 Project Details

Project type, technologies and measures implemented, and eligibility of the project

The project is classified under sectoral scope 3 Energy demand, CDM Type III Energy Efficiency”

The project is eligible under the CDM AMS III.AV. Small scale Methodology: Low greenhouse gas-emitting safe drinking water production system, Version 08, includes the introduction of low GHG emitting water purification systems to provide safe drinking water and displace water boiling using non-renewable biomass or fossil fuels.

Prior to the implementation of the project activity, a public distribution network supplying safe drinking water to the project boundary does not exist.

The host country of the project is Madagascar which is an LDC. Therefore, the project activity does not fall under the excluded list of projects as prescribed under the table 1 of section 2.1.1 of the VCS Standard version 4.4.

The project activity is not an AFOLU project category although it is a Grouped Project activity.

AENOR has checked this information during the onsite visit, visiting the site where the first borehole with the solar powered pump was building, the different communities where the project will be implemented and through interviews with different stakeholders, such as the constructor, the chiefs of villages and other local authorities, national media, and end users. The audit team checked too the evidence provided to justify the technical features of the water purification systems to provide safe drinking water (SDW) /12/13/14/15/ and the calculation spreadsheets /2/, and considers it correct.

Project design, including eligibility criteria for grouped projects

The project activity is a Grouped Project activity, and all new project activity instances will be located in the same geographic area specified in the project description and will be installed the same technology, therefore, baseline scenario and demonstration of additionality specified in the project description will be applicable of all of them. As consequence, an only set of eligibility criteria have been established in accordance with the VCS Standard version 4.4:

Eligibility criteria	Compliance with the eligibility criteria
Meet the applicability conditions set out in the methodology applied to the project.	The PD includes in section 3.2. the applicability conditions set out in the methodology AMS-III.AV Low greenhouse gas emitting safe drinking water production systems (version 08.0), applied to the project activity instance VPA-001 and the future instances.
Use the technologies or measures in the same manner as specified in the project description	Section 1.4 of the PD clarifies that the project activity instance VPA-001 and the future instances will use the same water purification technology includes a low greenhouse gas emitting technology and no other project device is expected to be used. During the onsite visit, the audit team visited the site of the construction of the first borehole with solar powered pump and verified that it corresponded to the technology indicated in the PD.
Apply technologies or measures in the same manner as specified in the project description	Section 1.4 of the PD clarifies that the project activity instance VPA-001 and the future instances will use the same water purification technology includes a low greenhouse gas emitting technology and no other project device is expected to be used. During the onsite visit, the audit team visited the site of the construction of the first borehole with solar powered pump and verified that it corresponded to the technology

	indicated in the PD, and the technology used does not foresee the use of fossil fuels since it has a solar powered pump system and shall meet the minimum criteria indicated in the PD, such as the construction of the borehole in conjunction with a storage tower with capacity tank of 6 mc. Flow rate: from 3,500 to 5,500 l/hr. depending on the pump size. Pump powered by solar panels with energy storage batteries. Each unit must achieve water quality for drinking according to the national law Decree No. 2004-635 of 15/06/2004 which define the parameters for drinking water and that will be monitored annually once implemented the project, as is indicated in section 5.2 of the PD.
Are subject to the baseline scenario determined in the project description for the specified activity and geographic area	The geographic area is the country Madagascar, and the baseline scenario is assumed that fossil fuel and/or non-renewable biomass is used to boil water as means of water purification in the absence of the project activity. The project activity instance VPA-001 is implemented in the rural villages of Mahabo, Behompy, Ampasy, Ampihalia, Andranofoty, in the Region of Atsimo-Andrefana – Madagascar. This information described in the PD could be checked during the onsite visit, with the interviews of the different chiefs of villages and other local authorities and the end users.
Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	Section 3.2 of the PD includes as eligibility criteria that additionality of each project instance will be demonstrated by investment barrier analysis according to para 10 (a) of the methodological TOOL21 Demonstration of additionality of small-scale project activities, which is described in section 3.5 of the VCS PD for the project activity instance VPA-001.

Capacity limit	According to the criteria of project Type III, each project instance will have a maximum capacity of 60,000 tCO₂e/year throughout the project instance crediting period. The project activity instance VPA-001 satisfies the criteria. The estimated emission reductions are 9,279 tCO₂e/year. The audit team checked that this criterion is applied correctly in the VPA-01, checking the emission reductions spreadsheet /2/
Target group	Each project instance will target end users which includes households who use traditional cookstove to boil water. This issue was verified by the audit team during the onsite visit and checking the files of the baseline survey carried out for project activity instance VPA-001, confirming that the households are using traditional cookstove to boil water.
Conditions that avoid double counting of emission reductions	The PD includes in section 3.2. the conditions that each project instance will apply to avoid double counting of emission reductions once implemented. The audit team reviewed the beneficiary agreements signed by the CME with the representative of the villages who use the drinking water from the installed water system in the project instance and verified that it includes the transfer of the rights to the emission reductions to the CME /4/. Additionally, the water system constructor has signed an undertaking / 34/ accepting not claim credit for emission reductions.

Project proponent and other entities involved in the project

The project is proposed by “CARBON CREDITS CONSULTING SRL”. The other entity involved in the project is “MaDaProjects SRL”.

The audit team finds that contact and entity information provided in the PD conforms to the VCS requirements.

AENOR has checked this information with project description document /3/ and “Signed contract MDP - A4M Madagascar local partner 22-09-22” /32/

Ownership

PP has the project ownership in line with the Section 3.7.1 5) of the VCS Standard, and although beneficiaries will possess the ownership of the water purifier system, before installation of each project installations, beneficiaries enter into a contractual agreements with PP (Carbon rights assertions Ampasy, Ampialia, Andranofoty, Behompy, Mahabo) /4/ will be the proof that all the rights of the credits that may be generated by the operation of the water purifier system will be irrevocably transferred to both the parties (project proponent and project developer).

Therefore, the project ownership will be of Carbon Credits Consulting Srl who is the project proponent that has overall control and responsibility of the projects. The agreement signed with Madaprojects (the project developer) defines responsibilities within the two entities /27/.

The construction and the equipment costs of water system are paid by both the parties (project proponent and project developer) as per §4 of the signed agreement; the water to user's will be free supply.

According to §5 of the signed agreement Carbon Credits Consulting is the entity who has the responsibility to negotiate and sell the carbon credits will be generated by the project.

The municipality of Behompy has free land within the villages, the Chief of each village in the municipality, and the committee within each village, given the authorization and decided where to allow the construction of the wells. The authorization is signed by the Mayor of the municipality of Behompy (Municipality of Behompy – Authorization for available land /30/).

The audit team has checked during the onsite visit the contractual agreements with PP by the beneficiaries of the project /4/ and finds that the PP's project ownership is unconditional, undisputed and unencumbered, in accordance with VCS requirements

Project start date

The project start date is 31/05/2023, which corresponds to the date when the water system will start to provide safe drinking water. 25/07/2022 is the date when the construction contract is signed /31/

This event corresponds to the first activity: the earliest activity that leads the GHG reduction of the project. AENOR has checked with the submitted record, contractual agreements /4/ and construction contract /31/, that established date is appropriate and consistent. Then, in opinion of AENOR it is considered reasonable and correct based on the VCS requirements for start date established in Section 3.8 of the VCS Standard

Project crediting period

Project crediting period: 7 years, twice renewable for a total of 21 years.

Start date: 31/05/2023, End date: 30/05/2030.

According to Section 3.9.1 of the VCS Standard, the crediting period shall be either seven years (twice renewable for a total of up to 21 years) or ten years fixed. Therefore, the project activity is in line with the length of the crediting period and it has the option to renew two more times.

Project scale and estimated GHG emission reductions or removal

The project is classified as “project” according its scale (less than or equal to 300,000 tonnes of CO₂e per year), since it will reduce an average of 9,279 tCO₂e per year during the first crediting period.

AENOR has checked this against the spreadsheet with the ex ante estimation /2/ and deems the calculation correct.

Project location

The project activity is implemented in several villages and communities of in the region Atsimo-Andrefana, under the Tulear II district: Mahabo, Behompy, Ampasy, Ampihalia, Andranofoty.

The geographical coordinates are the following:

Community	South coordinate	East coordinate
MAHABO	S 23° 15'27.55"	E 43° 50'21.96"
AMPASY	S 23° 14'38.80"	E 43° 51'11.98"
AMPIALIA	S 23° 14'13.01"	E 43° 51'17.20"
BEHOMPY	S 23° 14'51.61"	E 43° 51'20.80"
ANDRANOFOTY	S 23° 13'42.62"	E 43° 53'01.39"

During the onsite visit, AENOR verified the location of the project activity, checking that it is consistent with the information included in the PD and maps provided by the PP /29/.

Conditions prior to project initiation

Regarding conditions prior to the project initiation, the PD describes properly the existing common practice by the households i.e., in absence of the project activity the equivalent amount of thermal energy generated using firewood and charcoal in three stone open fires or traditional inefficient stove Fatapera to meet the boiling water demand, and the historical overexploitation of wood from forests in Madagascar due to this common practice.

During the onsite visit, AENOR verified that project is being implemented in accordance with the description of the PD /3/ and reviewed through the beneficiaries' interviews conducted during the onsite visit that the conditions prior to project initiation correspond to the information included in the PD and described in the baseline survey report /20/ conducted by a third party (IEST – University of Tulear).

Project compliance with applicable laws, statutes and other regulatory frameworks

Section 1.14 of the PD provides information related the compliance with the applicable laws, statues and other regulatory frameworks. The main and relevant Laws are detailed, and its enforcement analysed in the PD. According to the information provided and assessed during the on-site visit, the project fulfils with laws mentioned in the PD as it could be verified during site visit through the interviews carried out to the national and local authorities. Thus, AENOR deems that project complies with applicable laws, statues, and other regulatory frameworks

Participation under other GHG programs:

Projects registered (or seeking registration) under other GHG program(s)

GHG removals generated by the project will not be used for compliance with binding limits to GHG emissions since such limits are not enforced in Madagascar, and there is no emissions trading program in place in the country.

The project has not been registered nor is seeking registration under other GHG program, nor has it been rejected by other GHG program.

AENOR has checked this against VERRA, GS and UNFCCC website, and deems correct that the GHG removals were not accounted for in another program.

Rejection by other GHG programs

The project has not been rejected by any other GHG program.

AENOR has checked this against VERRA, GS and UNFCCC website, and deems correct that the GHG removals were not accounted for in another program

Other forms of credit and supply chain (Scope 3) emissions”:

Emissions trading programs and other binding limits

The project is not included in an emission trading program or any other mechanisms that includes GHG allowance trading.

It could be verified during site visit through the interviews carried out to the national and local authorities and other stakeholders.

Other forms of environmental credit sought or received and eligible to be sought or received

The project has not sought or received other forms of environmental credit. It could be verified during site visit through the interviews carried out to the national and local authorities and other stakeholders

Issuance of public statement(s) to help prevent scope 3 emissions double claiming.

N/A because there is not involved other companies within the supply chain from reporting the emission reductions represented by the VCUs in their Scope 3 emission statements.

Email notification of the potential risk of Scope 3 emissions double claiming

N/A because there is not involved other companies within the supply chain from reporting the emission reductions represented by the VCUs in their Scope 3 emission statements.

Sustainable development contributions

The PD provides a summary description of the sustainable development (SD) contributions (due to the project activity, including an explanation of:

- how the project activity will result in the expected SD contributions and
- If the project activity contributes to achieving any nationally stated sustainable development priorities, including any provisions for monitoring and reporting same

The project proponent demonstrates in the PD that the project contributes to at least three SDGs (SDG 1, 3, 4, 5, 8, 13 and 15).

It could be verified during site visit through the interviews carried out to the different stakeholders and during the desk review, checking the different evidence provided and indicated in the footnotes of the PD /3/.

Additional information relevant to the project, including:

Leakage management for AFOLU projects

N/A. The project is not a AFOLU project.

Commercially sensitive information

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

AENOR after reviewing all applicable documentation and evidence indicated above, can assured that the project description is accurate, complete, and provides an understanding of the nature of the project.

3.2 Safeguards

3.2.1 No Net Harm

The project is not expected to generate negative environmental nor socioeconomical impacts.

3.2.2 Local Stakeholder Consultation

Section 2.2 of the PD summarize the relevant comments received and the response provided by the PP during the local stakeholder consultation conducted on 29/09/2022. All stakeholder input received during the local stakeholder consultation were identified in the “Stakeholder Consultation Report dated on 30/09/2022 /23/ that the audit team reviewed to assess that the project proponent took due account of all. All local stakeholder inputs were positive and were considered and answered by the PP appropriately.

The PD states different channels of on-going communication with the local stakeholders, that were informed during the local stakeholder consultation meeting. In particular the end users can directly refer to Water Committee available in each municipality where the safe drinking system is implemented, who has direct contact with the local referent of Madaprojects, as the other local stakeholder, according to the contact information provided during the local stakeholder consultation meeting /33/. The consultation meeting presentation was checked to verify that this information was provided, including the email of Madaprojects to receive any communication from the local stakeholders

Before and after installations, beneficiaries are continually consulted through the periodic visits in the home of the beneficiary

It could be verified during site visit through the interviews carried out to the beneficiaries and other local stakeholders, checking that they know well to the project, and that they had frequent contact with the local partners of the PP /32/. The audit team could also check different documentation related to the local stakeholder consultation process, such as the list of invitations /21/, the list of participants /22/, the meeting report /23/ and pictures of the meeting /25/. The conclusion of the audit team is that the requirements related to the local stakeholders' consultation have been applied correctly.

3.2.3 Environmental Impact

No environmental impact assessments are required for the project neither have been Identified as consequence of the project, as the audit team could check in the review of the applicable national laws /11/.

3.2.4 Public Comments

During the validation process no public comment was received by AENOR nor noticed from VCS Staff about the project.

3.2.5 AFOLU-Specific Safeguards

Not required because the project is a non-AFOLU project.

3.3 Application of Methodology

3.3.1 Title and Reference

- CDM Methodology AMS-III.AV Low greenhouse gas-emitting safe drinking water production system, version 08.0.
- CDM Methodology AMS-I.E Switch from non-renewable biomass for thermal applications by the user (version 13.0)
- CDM TOOL21 Demonstration of additionality of small-scale project activities (version 13.1)
- CDM TOOL30 Calculation of the fraction of non-renewable biomass (version 04.0)

- CDM TOOL33 Default values for common parameters (version 02.0)
- Standard: Sampling and surveys for CDM project activities and programme of activities (version 09.0)
- Guideline: Sampling and surveys from CDM project activities and programme of activities (version 04.0)

3.3.2 Applicability

The final PD states all evidence used to demonstrate each condition of the applicable methodology. Complete explanations are included in the PD. In opinion of AENOR, the evidence and explanations confirm the fulfilment of the project with the methodology. The assessment was carried out for each applicability criterion and included, among others, the review of evidence and sources provided in the PD and the compliance check of the local project setting with the applicability conditions in regard to baseline setting and eligible project measures as follows:

AMS-III.AV. Small-scale Methodology: Low greenhouse gas-emitting safe drinking water production system, Version 8	
Applicability condition	Compliance
This methodology comprises introduction of low greenhouse gas emitting water purification systems to provide safe drinking water (SDW). Water purification technologies that involve point-of use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at a school or a community center are included	According to the applied methodology the technology applied is identified as Point of Use (POU) which means the system treat only the water intended for direct consumption, typically at a single tap or a limited number of taps. The water taken by the solar pump is transferred to the tank, passing through a skimmer that provides chlorine purification. Therefore, the applicability condition is met correctly.
Soil filtration schemes (boreholes, wells) that include container disinfection (e.g. chlorination) may be applied. Project proponents shall demonstrate ex ante that rehabilitation and/or construction of the wells complies with relevant national and/or international standards and that measures are taken to ensure that water and well are not contaminated	Madagascar does not expect requirements for soil filtration schemes. The project construction will be done according to the construction best practice. At the time of water system commissioning the PP will provide the laboratory test of the post-treatment water to ensure the achievement with the requirements established by the national law.

AMS-III.AV. Small-scale Methodology: Low greenhouse gas-emitting safe drinking water production system, Version 8	
Applicability condition	Compliance
	The project considers the construction of 5 boreholes in conjunction with a storage tower with capacity tank of 6 mc. The audit team verified during the onsite visit through the interviews carried out to the national and local authorities that the construction of the boreholes complies with relevant national and/or international standards and that measures are taken to ensure that water and well are not contaminated. Therefore, the applicability condition is met correctly
Prior to the implementation of the project activity, a public distribution network supplying SDW to the project boundary does not exist	The audit team verified during the onsite visit through the visit of some villages and the interviews carried out to the national and local authorities that a public distribution network supplying SDW to the project boundary does not exist. Therefore, the applicability condition is met correctly
It shall be demonstrated based on laboratory testing or official notifications (for example notifications from the national authority on health) that the application of the project technology/equipment achieves compliance either with: (i) the Comprehensive Protection performance target as per “Evaluating household water treatment options: Health based targets and microbiological performance specifications” (WHO, 2011) and “International Scheme to Evaluate Household Water Treatment Technologies” (WHO, 2014); or (ii) an applicable national standard or guideline. Applicable national standard should be based on	The PD clearly describes this requirement and indicates that the laboratory test will be carried out according to the Decree no. 2003-941 /44/ and Decree no. 2004-635 /11/ by recognized national laboratories /42/ periodically during the crediting period, ensuring the achievement with the requirements established by the national law and the requirements of the methodology applied. Art. 14 of Decree no. 2003-941 establishes that the taking of water samples for the purpose of carrying out the analysis program must be carried out by agents of the Provincial Directorate of Health, by agents of one or more laboratories recognized by the State and

AMS-III.AV. Small-scale Methodology: Low greenhouse gas-emitting safe drinking water production system, Version 8	
Applicability condition	Compliance
laboratory efficacy testing that, at a minimum, includes quantitative microbial measures of pre- and post-treatment challenge waters that are representative of potential drinking water sources, and that includes measured reductions based on at least one pathogen class (bacteria, viruses, protozoa)	designated by the Ministry of Health or by agents of the sanitation services municipalities that actually carry out the verification of water intended for human consumption. Art. 6 indicates that Water intended for human consumption, instead of being made available to the user, must satisfy quality requirements relating essentially to physico-chemical and bacteriological parameters. Decree no. 2004-635 on water monitoring, control of water intended for human consumption and priorities for access to water resources , establishes: (a) organoleptic and physical parameters including bacteria, viruses, and protozoa and (b) the frequency of the analysis: at least 2 times a year in rural areas (1 in the dry season and 1 in the wet season) In addition, it is demonstrated that the applicability criterion of the Decree N. 2003-941 on water monitoring, the control of water intended for human consumption and the priorities of access to water resources that is met. For all the chemical element the law fix a threshold limit to be respected. Within the amendment the type and the limit of the pathogenic germs and germs indicative of fecal pollution have been changed into: total coliforms 0/100 ml, fecal streptococci 0/100 ml, thermo-tolerant coliforms (Ecoli) 0/100 ml, sulphite-reducing clostridium < 2/20 ml, anaerobic sulphite-reducing spores. This issue was clarified and checked by the audit team during the onsite visit through the interviews carried out to the national and local authorities. Therefore, the applicability condition is met correctly
In cases where the life span of the water treatment technologies is shorter than the	The PD identifies clearly measures to ensure that end users have access to replacement

AMS-III.AV. Small-scale Methodology: Low greenhouse gas-emitting safe drinking water production system, Version 8	
Applicability condition	Compliance
crediting period of the project activity, there shall be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality	purification systems of comparable quality in cases where the life span of the water treatment technologies will be shorter than the crediting period. The CME has the responsibility to contract the local partner for maintaining the operation of the water system for the whole crediting period. There is a contract in force within MADAPROJECTS and the company ZANARAY (the construction company) for the maintenance activities of the safe water drinking system during the project lifetime /47/48/. The purification system (the skimmer installed in the tank which purifies with chlorine) has a life cycle dictated by its wear and therefore simply by inserting chlorine tablets every 30 days the state of the same is checked and therefore in this case it will be replaced. On site, in each water tower, there is a 24-hour supervisor, responsible for small maintenance, and a permanent technician who checks the system every week; therefore, complying with the applicability requirements. /47/ The audit team verified that this requirement is included in the agreements signed with the communities by the project participant /4/. Therefore, the applicability condition is met correctly
It should be demonstrated that the project appliances use technologies that meet the technology standards as per applicability condition below, and that they deliver microbiologically safe drinking water	The PD describes clearly this requirement and indicates that the laboratory test will be carried out by recognized national standard periodically during the crediting period, ensuring the achievement with the requirements established by the national law and the requirements of the methodology applied.

AMS-III.AV. Small-scale Methodology: Low greenhouse gas-emitting safe drinking water production system, Version 8	
Applicability condition	Compliance
	This issue was clarified and checked by the audit team during the onsite visit through the interviews carried out to the national and local authorities. Therefore, the applicability condition is met correctly
The use of AMS-III.AV methodology under grouped project is legitimate if the leakage is estimated and accounted for as per the relevant provisions of AMS-I.E.	According to the paragraph 49(c) of the methodology AMS-I.E that is required by the methodology AMS-III.AV v08.0, a net to gross adjustment factor of 0.95 to account for leakages is multiplied to parameter By, in which case surveys are not required Therefore, the applicability condition is met correctly.
TOOL21 Demonstration of additionality of small-scale project activities (version 13.1)	The audit team has been able to review that the additionality of each project instance is demonstrated in accordance with the requirement of the tool, as is explained with more detail in section 3.3.5. below. Therefore, the applicability condition is met correctly.
TOOL30 Calculation of the fraction of non-renewable biomass (version 04.0)	VPA-specific fNRB value VPA-001 is calculated by a third party /45/46/ in accordance with the tool version 04,. Therefore, the applicability condition is met correctly.
TOOL33 Methodological tool “Default values for common parameters” (Version 02.0)	The default value of 4.0 kg of fuelwood (wet basis) per kg of charcoal (dry basis) for wood-to-charcoal conversion factor is applied correctly, as is required by the TOOL30 version 04.0. Therefore, the applicability condition is met correctly.

AENOR, based on records provided including spreadsheets calculations of the emissions reductions, has verified that applicability conditions of the different tools are complied. In conclusion, the project activity complies with the applicability conditions of the methodology, and any tools or modules selected by the PP.

3.3.3 Project Boundary

The PD identifies and describes the project boundary in accordance with the methodology applied to the project, the methodology AMS-III.AV, in this case, version 08.0. Therefore, the project boundary is the physical, geographical site of low greenhouse gas emitting technologies for water purification installed by the project activity and the household/institutional buildings where the consumers of safe water provided by the systems are located.

The greenhouse gases included in or excluded from the project boundary are identified in accordance with the methodology AMS-III.AV. version 08.0.

The emissions from use of fossil fuel and/or non-renewable biomass (NRB) in the baseline scenario due to CH₄ and N₂O gases contributes too small of a fraction of the emitted gas and is excluded to make a conservative estimate.

Taking into account the justifications, assumptions and supporting information provided and the design of the project, AENOR deems that project boundary is correctly defined and in compliance with the applicable methodology and VCS requirements.

3.3.4 Baseline Scenario

The PD identify the baseline scenario determined for the project in accordance with the methodology, as the use of fossil fuel and/or non-renewable biomass to boil water as means of water purification in the absence of the project activity.

During the onsite visit, AENOR verified with the interviews to the local authorities that, due the water scarcity of the municipality of Behompy, prior to the project, families do not have access to clean drinking water and the communities collect the water far from the villages where it is collected unsafe water because wells and rivers are contaminated with bacteria and viruses. There is no alternative to drinking the contaminated water unless they boil /36/ and the conditions prior to project initiation correspond to the continued use fossil fuel and/or non-renewable biomass (NRB) to boil water as means of water purification in the absence of the project activity, as it is demonstrated in the field survey conducted by the PP to confirm the baseline scenario and to establish the baseline biomass consumption. A sample households survey was conducted by a third party (IEST – University of Tulear) in rural municipality of Ampasy, Ampihalia, Andranofoty, Behompy, Mahabo, where the project instance will be implemented /20/. The information recollected in the baseline survey was consistent with the baseline scenario determined. This issue could be checked in the beneficiaries' interviews during the onsite visit.

The procedures for identifying the baseline scenario have been correctly followed according to the methodology and tool applied and the identified scenario reasonably represents what would have occurred in the absence of the project.

Thus, AENOR considers that the identified baseline scenario is correctly justified.

3.3.5 Additionality

According to the methodology AMS-III.AV version 08.0, the additionality is demonstrated following the “TOOL21: Demonstration of additionality of small-scale project activities”.

The project activity demonstrates the existence of an investment barrier, as consequence of the construction and equipment require capital. The project instance will alleviate these barriers since the PP assume all the related costs for construction, equipment and maintenance during the crediting period and the purified water will be free of cost /35/, which means no money shall be charged to users. Hence there is no financial return from the project other than revenue from the sale of GHG credits revenue, and the action is not financially viable without the support of revenues from sale of the verified carbon units.

During the onsite visit, the audit team could check in the interviews with the village chiefs and well of Committees and other authorities, that the information indicated in the PD is correct and the purified water will be free of cost and no money shall be charged to users.

3.3.6 Quantification of GHG Emission Reductions and Removals

The quantification of GHG emission reductions generated by the project has been carried out in accordance with the CDM methodology AMS-III.AV v08.0, and the emissions are calculated based on the energy demand for boiling water, and in case of displacement of NRB the baseline emissions are corrected for the fraction of the biomass that can be demonstrated to be non-renewable. Only purified water consumed for drinking purposes can be used in the baseline calculation.

The baseline emissions shall be calculated as follows:

$$BE_y = QPW_y \times m \times X_{boil} \times SEC \times \sum_i (BL_{fuel,i} \times f_i \times EF_{projected_fossil\ fuel,i} \times 10^{-9})$$

Where:

BE_y = Baseline emissions during the year y in (t CO₂e)

QPW_y = Total quantity of water purified by the project in year y (L)

m = Fraction of functional appliances that are providing the SDW (%).

X_{boil} = Fraction of the population served by the project activity for which the common practice of water treatment is or would have been water boiling. It is determined ex ante through surveys

SEC	=	Specific energy consumption required to boil one litre of water (kJ/L), to be calculated according to paragraphs below
$BL_{fuel,i}$	=	Proportions of baseline fuel type i (NRB and/or fossil fuels) used in the absence of the project activity (fraction)
f_i	=	Fraction of non-renewable fuel type i used in the absence of the project activity in year y . For biomass, it is the fraction of woody biomass that can be established as non-renewable biomass (f_{NRB}). If the baseline fuel is fossil fuel, the value to be applied is 1
$EF_{projected_fossil\ fuel,i}$	=	Emission factor of the fuel type i substituted (t CO ₂ /TJ)

The quantity of purified water in a year is indirectly monitored following the procedures described in the option 2.2. of the methodology, considering the population serviced by the project activity and an average volume of drinking water per person per day, as follows:

$$QPWy = P_y \times \min(QPWpp; 5.5) \times 365$$

Where:

P_y	=	Population who consumes the purified water serviced by the project activity in year y
$QPWpp$	=	Average volume of drinking water per person per day (L/person/day) determined ex ante of the crediting period through a baseline survey

As the quantity of purified water by the project activity exceeds the established cap, emission reductions cannot be claimed for the quantity of purified water above the cap established by the methodology of 5.5 L/person/day. The population who consumes the purified water service by the project activity is determined through population census of the area involved in the project instance implementation /1/.

According to paragraph 20 of the applied methodology, default values are applied to calculate the specific energy consumption required to boil one litre of water. Therefore, SEC can be calculated as follows:

$$SEC = [357.48 \text{ kJ/L}] / n_{wb}$$

The efficiency of the water boiling system being replaced is estimated ex ante according to the option (b) of Table 3 of the applied methodology, and the default value of 0.10 is applied because the replaced system or the system that would have been used is a three-stone fire or a conventional system for woody

biomass lacking improved combustion air supply mechanism and flue gas ventilation system that is without a grate as well as a chimney (fatapera). This issue was reviewed in the baseline survey report /20/ and during the onsite visit, where the audit team could check that all households used a three-stone fire or a conventional system for woody biomass.

The quantity of woody biomass is determined based on charcoal consumption and fuelwood consumption. According to the table 5 of the applied methodology and the tool30, the methodological TOOL33, version 2 shall be used to determinate the quantity of woody biomass, which establishes the default value for wood-to-charcoal conversion factor of 4 kg of fuelwood per kg of charcoal.

The value of fNRB is calculated by a third-party (EcoSolutions (Pty) Ltd)/45/46/ in accordance with the version 4 of the TOOL30, that was the version available in that moment. On the other hand, the PP provided to the audit team, the third-party report and the calculation spreadsheet, where is possible to verify that the equations of the TOOL30 v.04.0 have been used in the calculation as is shown below:

$$f_{NRB} = NRB / (NRB + RB)$$

Where:

fNRB = Fraction of non-renewable biomass in the applicable area in the relevant period (fraction or %)

NRB = Quantity of non-renewable biomass consumed in the applicable area in the relevant period (tonnes/year)

RB = Quantity of renewable biomass that is available on a sustainable basis in the applicable area in the relevant period (tonnes/year)

The quantity of non-renewable biomass consumed in the applicable area (NRB) has been determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB$$

Where:

H = Total consumption of woody biomass in the applicable area in the relevant period (tonnes/year)

The total consumption of woody biomass (H) is calculated using the following equation, accounting for all consumption within the applicable area (not only wood fuel but also timber and industrial consumption):

$$H = HW \times N + CE + NE$$

Where:

HW = Average consumption of wood fuel per household, including fuelwood and charcoal, in the applicable area in the relevant period (tonnes/household)

CE = Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of woody biomass in ovens, boilers etc.) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

NE = Commercial woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

N = Number of households consuming wood fuel within the applicable area in the relevant period (number)

The project considers null the values of CE and NE.

The quantity of renewable biomass available in the applicable area (RB) is estimated using the following equation:

$$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i}))$$

Where:

$MAI_{forest,i}$ = Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas in the relevant period (tonnes/ha/yr)

$MAI_{other,i}$ = Mean Annual Increment of woody biomass growth per hectare in sub-category i of other land areas in the relevant period (tonnes/ha/yr)

$F_{forest,i}$ = Extent of forest in sub-category i in the relevant period (ha)

$F_{other,i}$ = Extent of other land in sub-category i in the relevant period (ha)

$P_{forest,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (in sub-category i) in the relevant period (ha)

$P_{other,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other land areas (in sub-category i) in the relevant period (ha)

i = Sub-category i of forest areas and other land areas

- $fNRB = 0.71$
- $NRB = 12,832,301 \text{ t/yr}$
- $RB = 5,190,344 \text{ t/yr}$
- $H = 18,022,645 \text{ t/yr}$

The calculation of fNRB was carried out by EcoSolutions (Pty) Ltd. /45/46/, following the guidance of the tool, determined a value of 71 %. The fraction of non-renewable biomass (fNRB) for Madagascar is estimated at the country level according to the requirements of the Methodological TOOL30 version 4.0.

As consequence of the estimated NRB value is more than 10% of the value calculated as per the product of biomass and deforestation rate, the report /45/ provides the justification for the higher value for NRB. This report was used prior to the method used in the new calculation method developed by the PP, using the aforementioned entity.

In this new determination, it is identified:

- The sources and vintage of data used for calculation.
- Section 3 of the report explains how the total woody biomass consumption (H) has been calculated as per section 3.1 of the tool 30 v04.0.
- Box 1 of section 2 of the report indicates the equation of the tool and section 4 describes how RB has been calculated as per Section 3.2 of the TOOL30, v.04.0;
- The comparison of the calculated value of fNRB against the values for fNRB reported in relevant scientific literature (including the minimum requirements as per para. 6-a-i of the TOOL30) is described in page 8 and 9 of the report and in the pages 36 and 37 of the PD.
- The cross-checks performed as required by para.13 of the TOOL30, v.04.0 is described in pages 8 and 9 of the report, including the justification for the higher value. as the fNRB value was estimated at the national level, the value of estimated NRB has been compared with the product of:
 - Total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha);
 - most recent available observed annual rate of deforestation (ha/yr),
- Data from the 2019 Refinement of the 2006 IPCC guidelines were used for the calculation of MAIs.

The PP contracted other third party to carry out the determination of the parameter fNRB according to the Tool 30 version 04.0. The spreadsheet with the calculation (Madagascar_Madaprojects Srl SB_National fNRB CDM Tool30 v4.0 2022_Calculation sheet_19 Jan 2024/46/) and the report (Madagascar_Madaprojects Srl SB_National fNRB CDM Tool30 v4.0 2022_Report_19 Jan 2024/45/) are provided. Section 4 of the PD has been updated properly, including the information necessary related to the determination of the fNRB according to the tool 30 version 04.0 and including the reference to the spreadsheet with the calculation and the report where are provided additional information.

The methodological tool stipulates that the difference between total woody biomass consumption and available woody biomass growth constitutes the non-renewable biomass (NRB). The resulting fNRB value is different from the range of fNRB values reported in peer-reviewed literature that used the woodfuel Integrated Supply/Demand Overview Mapping (WISDOM) method While direct comparisons between the WISDOM and CDM methodologies are not always appropriate because of their different approaches, certain factors can still contribute to variations in the fNRB estimates between the two methods.

This study for Madagascar uses 2022 population data, updated 2022 FAO Forest Products statistics were used, the approach used in this study to determine the accessible forest areas for wood harvesting yields different estimates than in the comparison study. Moreover, in the present study, more recent data on

global administrative zones, roads, protected areas and tree cover change was used to determine accessibility. The calculation of MAIs in this study involved using a weighted average based on the forest area of three categories — primary forests and secondary forests above and below the age of 20 years. Data from the 2019 Refinement of the 2006 IPCC guidelines were used. This approach often yields higher MAIs and may lead to higher estimations of RB and, subsequently, lower estimations of NRB and fNRB. The calculated fNRB value of 0.71 indicates that the consumption of woody biomass from the accessible forest in Madagascar is above the country's capacity to renew the supply sustainably.

Based on the technology applied for the grouped project, as described in section 1.10 of the project description, the pumps will be supplied by renewable energy through solar panels, therefore there is no project emissions to be considered.

The project activity applies CDM Methodology AMS-III.AV (version 08.0). According to the para 21 of the methodology, where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I.E Switch from non-renewable biomass for thermal application by the user (version 13.0). According to §49(c) of the AMS-I.E methodology version 13.0., it is allowed the use of a net gross adjustment factor of 0.95 in lieu of conducting a survey to account leakage emissions.

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂/yr)

PE_y = Project emissions in year y (t CO₂/yr)

LE_y = Leakage emissions in year y (t CO₂/yr)

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
31/05/2023-31/12/2023	5,466	0	0	5,466
01/01/2024-31/12/2024	9,279	0	0	9,279
01/01/2025-31/12/2025	9,279	0	0	9,279
01/01/2026-31/12/2026	9,279	0	0	9,279
01/01/2027-31/12/2027	9,279	0	0	9,279

01/01/2028-31/12/2028	9,279	0	0	9,279
01/01/2029-31/12/2029	9,279	0	0	9,279
01/01/2030-30/05/2030	3,813	0	0	3,813
Total Estimated net GHG Reductions or Removals for Project Activity				64,953

AENOR deems that values are correct and consistent with the sources.

The values and estimates presented in the PD are considered reasonable based on the documentation reviewed, further references and the result of the interviews during the onsite visit.

The PD describes in an appropriate way with evidence and justifications how the project activity fulfils with the applicability conditions of the methodologies and tools applied, and all relevant assumptions and data are listed in the project description, including their references and sources.

All estimates of the baseline emissions can be replicated using the data and parameter values provided in the project description, checking that the calculations of the baseline emissions, project emissions, leakage and net GHG emission reductions are in accordance with the methodologies and tools applied.

Based on the information reviewed, it can also be confirmed that the sources used are correctly quoted and interpreted in the PD and supporting documents. All assumptions and data indicated in the PD and all relevant sources were checked and confirmed.

In essence, the methodology was correctly applied following the requirements. All values in the PD are considered reasonable in the context of the proposed VCS project activity. Data sources are quoted correctly. Hence, the calculation of baseline emissions, project emissions and the estimated net GHG emission reductions are considered correct.

3.3.7 Methodology Deviations

Not applicable as there are no methodological deviations for this project activity.

3.3.8 Monitoring Plan

The monitoring plan presented in the PD complies with the requirement of the methodology. The assessment team checked all parameters presented in the monitoring plan against the requirements of the methodology and associated tools were followed.

The list of parameters available at validation and the values used was also checked by AENOR and it is deemed complete and consistent with calculations and assumptions considered. The following table summarizes the data/parameters available at validation:

Data/ Parameter	Description	Value	Source	Assessment procedure and result
QPW _{pp}	Average volume of drinking water per person per day	7.32	Literature	The PP has estimated through ex ante survey the value 7.32, higher than the maximum value of 5.5 litres per person per day established by the methodology.
LS	Lifespan of water treatment technologies	Not available	Manufacturer does not provide information related to the lifespan of the system	As conservative approach, the PP considers that the life span of the water treatment technologies is shorter than the crediting period of the project activity, and the PP describes in the PD that the units will be replaced or repaired in order to continue claiming emission reductions, taking the necessary measures in place to ensure that end users have access to replacement purification systems of comparable quality.
η_{wb}	Efficiency of the water boiling systems being replaced	0.10	Default value of option (b) of the methodology AMS-AV.III	The audit team verified during the onsite visit, and reviewed the survey report that the replaced system or the system that would have been used is a three-stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system that is without a grate as well as a chimney (fatapera)

Data/ Parameter	Description	Value	Source	Assessment procedure and result
$BL_{fuel,i}$	Proportions of baseline fuel type i (NRB and fossil fuel)	49% (wood) 51% (charcoal)	Estimated ex ante through baseline survey	The audit team reviewed the survey report and the survey database and the values were correct.
f_i	Factor to determine amount of non-renewable fuels	0,71 (71%)	Third party study/calculation C4 EcoSolutions (Pty) Ltd – Calculation of the fraction of non-renewable biomass (fNRB). 19/01/2024. Madagascar_Madaprojects Srl SB_National fNRB CDM Tool30 v4.0 2022_Calculation sheet_19 Jan 2024.xlsx /45/46/	The calculation of the parameter has been carried out in accordance with the tool 30 version 4.0.
$EF_{projected_fossilfuel}$	Emission factor of fossil fuels projected to be used to substitute non-renewable woody biomass by similar consumers	73.2	Default regional value Sub-Saharan Africa defined in table 2 of methodology AMS-I.E version 13	The audit team checked that that value used to calculations is consistent with the value of the table 2, due to the fuel displaced is NRB.
X_{boil}	Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling	100%	Estimated ex ante through baseline survey	The audit team reviewed the survey report and the survey database and the values were correct.

The list of parameters to be monitored is the following:

- P_y : Population who consumes the purified water serviced by the project activity in year y . Annual surveys will be conducted to check the number of persons who consume the purified water supplied by functional project SDW system, as is required by the methodology. The exante value of 24,879 used for the estimation of the emission reductions is obtained from Third Party Population Census Report_19072022 /1/

- QPW_y : Quantity of purified water in year y. This parameter is calculated, based on the equation 3 of the methodology AMS-AV.III.
- m : Fraction of functional appliances that are providing the SDW. Annual surveys and microbiological testing will be conducted to ensure the conditions established by the table 11 of the methodology.
- Check for SDW public distribution network: Annual check if there is a public distribution network supplying SDW is installed. Annual surveys will be carried out to check if SDW is made available through a public distribution network during the crediting period.
- Quality of safe drinking water: The quality of the safe drinking water. Annually, analysis by recognized third party laboratory will be carried out to verify the compliance with the parameters established by the national law of human consumption water and the SDW standards described in paragraph 4(b) of the methodology AMS-AV.III.

In order to assess the leakages, according to AMS-I.E. version 13, paragraph 49(c) is applied to project activity which allow the use of a net gross adjustment factor of 0.95 in lieu of conducting a survey to account leakage emissions.

The procedures described in section 5 of the PD were reviewed by the AENOR team and cross-checked against the applicable methodology and associated tools and were reproduced by the monitoring team on the field during the site visit. The audit team found to be in compliance with methodological requirements, and good practice as defined.

In the opinion of the AENOR team, all necessary parameters required by the selected methodology are contained in the monitoring plan. They are clearly described, and the means of monitoring detailed in the plan comply with the requirements of the methodology. Tables in section 5 of the PD detail the different data variable to monitor along with the data unit, recording frequency, purpose of data, QA/QC, etc. Thus, the monitoring plan is in compliance with the applicable methodology

The procedures followed to carried out the surveys are also detailed in section 5 of the PD and are in accordance with the CDM guidelines. Equations for the estimation of the sample size /24/ have been checked by the audit team.

In opinion of the AENOR assumptions considered for surveys procedures are reasonable and credible and consistent with calculation. Thus, AENOR deems it correct.

After the review of evidence provided by the PP, the interview and communications with PP, AENOR confirms that monitoring arrangements described in the monitoring plan are feasible within the project design and that the means considered for the implementation, including data management, quality and assurance control procedures, are sufficient to ensure that the GHG net anthropogenic reductions achieved resulting from the proposed VCS project activity can be reported ex post and verified. Therefore, in opinion of the AENOR team, the PP will be able to implement the monitoring plan.

3.4 Non-Permanence Risk Analysis

This requirement is not applicable to the project activity because it is not an AFOLU project.

4 VALIDATION OPINION

AENOR has performed the validation of the grouped project “MILA RANO – SAFE WATER ACCESS FOR MADAGASCAR” and has verified that the project is in compliance with the Verified Carbon Standard version 4.4 without qualifications or limitations, with the level of assurance required by VCS, and in accordance with ISO 14064-3; 2019.

The validation process was performed on the basis of all issues and criteria of VCS. The conclusions of this report show that the project is in line with all criteria applicable for the validation, as it was described in the Project Description Document, version 5 dated on 12/06/2024, for the crediting period from 31/05/2023 to 30/05/2030, prepared by the project proponent, as responsible of the information included in it, associated documentation.

The objectives, scope and criteria used to compile and assess the GHG statement have been the review of the Project Description Document, version 5 provided by the PP and additional documents related to baseline and monitoring methodology of the project; and the subsequent background investigation, follow up interviews and review of comments by parties have provided AENOR with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarized as follows:

- The project is in line with all criteria of the VCS Standard v4.4.
- The project additionality is sufficiently justified in the PD.
- The Monitoring Plan is transparent and adequate.
- The analysis of the baseline emission, project emissions and leakage has been carried out in a transparent and conservative manner
- The project is likely to achieve estimated GHG emission removals.
- The data and information supporting the GHG statement were hypothetical, projected and/or historical in nature, depending on the parameters and the case, but they have been always obtained from official and recognized source.

The validation conclusions are of the estimate determined in the GHG statement based on assumptions that may change in the future, and the actual results may differ of forecast of future emission reductions/removals. However, in AENOR`s opinion, with the information available in the moment of the validation, the project meets all relevant requirements for the validation of the project for the first 7 renewable crediting period from 31/05/2023 to 30/05/2030, with an average annual GHG emission reductions is 9,279 tCO₂e/year.

Validated GHG emission reductions and removals in the above period:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2023 (31/05/2023-31/12/2023)	5,466
2024	9,279
2025	9,279
2026	9,279
2027	9,279
2028	9,279
2029	9,279
2030 (01/01/2030-30/05/2030)	3,813
Total estimated ERs	64,953
Total number of crediting years	7
Average annual ERs	9,279

Date: 31 July 2024


Luis Javier Arribas Alonso

Validation Leader

APPENDIX I: LIST OF EVIDENCE PROVIDED

- /1/ Population Census Report of 19072022*
- /2/ Emission reductions calculation_rev.4*
- /3/ Project document version 5 dated 12 June 2024*
- /4/ Carbon Rights Assertions of Ampasy, Ampialia, Andranofoty, Behompy and Mahabo.*
- /5/ Calculation of the SubNational Non-Renewable Biomass fraction (fNRB) using CMD methodology (Calcul de la fraction infranationale de la biomasse non renouvelable (fNRB) à l'aide de la méthodologies CDM – Université de Toliara (June 2022))*
- /6/ Madagascar Energy Situation - Madagascar Energy Situation - energypedia*
- /7/ Madagascar Action Plan*
- /8/ Clean Cooking Alliance – Accelerating clean cooking as nature-based climate solution*
- /9/ Madagascar Forest Information and Data (mongabay.com)*
- /10/ Study of Forest Cover Change Dynamics between 2000 and 2015 in the Ikongo District of Madagascar Using Multi-Temporal Landsat Satellite Images (researchgate.net)*
- /11/ Decree No. 2004-635 15/06/2004*
- /12/ Technical sheet 24429E201-05 - ASTRAPOOL*
- /13/ Solar-Pump-Catalog*
- /14/ Technical specification solar pump*
- /15/ Picture of solar pump 5500*
- /16/ Global Health Risk Factors: Air Pollution – A. Kofi Amegah Global Health Risk Factors: Air Pollution | SpringerLink*
- /17/ The global health observatory – Period 2019 Ambient and household air pollution attributable death rate Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution (per 100, 000 population) (who.int).*
- /18/ United Nations – Water and gender <https://www.unwater.org/water-facts/water-and-gender>*
- /19/ UNEP – Review of woodfuel biomass production and utilization in Africa, 2019*
- /20/ Baseline survey report of 01/08/2022*

- /21/ Invitation letter for stakeholder consultation meeting*
- /22/ List of participant stakeholder consultation meeting held on 29/09/2022*
- /23/ Stakeholder Consultation Report version 0 of 30/09/2022*
- /24/ Sample size - Baseline survey July 2022.xls*
- /25/ Pictures of the local stakeholder meeting*
- /26/ LETTRE DU MAIRE DE LA COMMUNE RURALE DE BEHOMPY*
- /27/ Agreement between CARBON CREDITS CONSULTING SRL and MADAPROJECTS, signed on 22/03/2022*
- /28/ Declaration EnvMin_ FNRB*
- /29/ Maps with the distances between the different villages*
- /30/ Municipality of Behompy – Authorization for available land*
- /31/ Construction works contract between Zanary Sarl and Madaprojects Srls – 25/07/2022*
- /32/ Partnership contract between Madaprojects and AID4MADA NGO signed on 22/09/2022*
- /33/ SCM - Safe drinking project_29092022 Cookstoves project_27092022 (Stakeholder consultation meeting presentation)*
- /34/ AFFIRMATION DES DROITS CARBONE*
- /35/ Agreement between Madaprojects and Mayor of Behompy rural communities*
- /36/ Water quality in Madagascar*
- /37/ Technical details ANDRANOFOTY*
- /38/ Technical details_AMPASY*
- /39/ Technical details_AMPIALIA*
- /40/ Technical details_BEHOMPY*
- /41/ Technical details_MAHABO*
- /42/ DECRET N° 2022-211 Portant accréditation du laboratoire « IEST»*
- /43/ Water committee*

/44/ *DECRET N ° 2003- 941 relatif à la surveillance de l'eau, au contrôle des eaux destinées à la consommation humaine et aux priorités d'accès à la ressource en eau*

/45/ *Madagascar_Madaprojects Srl SB_National fNRB CDM Tool30 v4.0 2022_Report_19 Jan 2024*

/46/ *Madagascar_Madaprojects Srl SB_National fNRB CDM Tool30 v4.0 2022_Calculation sheet_19 Jan 2024*

/47/ *CONTRAT MADA PROJECTS.*

/48/ *SWDS Maintenance.*

APPENDIX ii: findings

Corrective Action Requests (CAR)

CAR ID:	01	Date: 27/02/2023
Description of CAR		
The spreadsheet does not include the calculation of the different steps to obtain the emission reductions, the baseline emissions and the leakage.		
Project Participant response		Date: 24/04/2023
The emission reduction spreadsheet is updated accordingly. All the formula and steps used for calculation are now available.		
Documentation provided by the Project Participant		
Emission reductions calculation_safe drinking_rev.1_24042023.xlsx		
VVB Assessment		Date: 10/07/2023
The spreadsheet shall be updated in accordance with the current version of the methodology AMS-I.E version 13.0		
The final emission reductions in year y shall be rounded conservatively.		
Project Participant response		Date: 17/07/2023
The spreadsheet is updated in accordance with version 13 of the AMS.I.E.		
Documentation provided by the Project Participant		
2 - Emission reductions calculation_safe drinking_rev.2_17072023 .xlsx		
VVB Assessment		Date: 31/07/2023
The final version of the spreadsheet includes the calculation of the different steps to obtain the emission reductions, the baseline emissions and the leakage and the final emission reductions in year y have been rounded conservatively.		
Therefore, the CAR is closed.		

CAR ID:	02	Date: 27/02/2023
Description of CAR		
The spreadsheet and the PD do not identify the proportions of baseline fuel type i used in the absence of the project activity (BLfuel,i) for wood and charcoal, in accordance with the information provided in the survey report.		
Project Participant response		Date: 24/04/2023
The emission reduction spreadsheet is updated accordingly. According to the baseline survey the proportion of wood and charcoal is distinctly calculated and applied for baseline emissions calculation.		
Documentation provided by the Project Participant		
Emission reductions calculation_safe drinking_rev.1_24042023.xlsx		
VVB Assessment		Date: 10/07/2023
The proportions of baseline fuel type I used in the absence of the project activity (BLfuel,i) for wood and charcoal, shall be determined applying the information from the latest version of AMS-I.E. of the wood-to-charcoal conversion factor.		
Project Participant response		Date: 17/07/2023
Version 13.0 of the AMS-I.E is applied. It refers to methodological tool TOOL33 and the updated default wood-to-charcoal conversion factor is used. ER spreadsheet and PD are updated accordingly.		
Documentation provided by the Project Participant		
Emission reductions calculation_safe drinking_rev.1_24042023.xlsx VCS-PD_GP Mila Rano safe water access for Madagascar_rev. 2_17072023.docx		
VVB Assessment		Date: 31/07/2023
The final version of the spreadsheet and the PD identify the proportions of baseline fuel type i used in the absence of the project activity (BLfuel,i) for wood and charcoal, in accordance with the information provided in the survey report, and in accordance with the latest version of AMS-I.E. Therefore, the CAR is closed.		

CAR ID:	03	Date: 27/02/2023
Description of CAR		
The PD has not been completed in accordance with the instructions of the template as is detailed below: - The format of letter and dates is not correct in some sections. - Numeration of some sections. - Section 1.1 does not include an estimate of annual average and total GHG emission reductions. - Section “Sustainable Development contributions” does not identify clearly the sustainable development (SD) contributions, and How they will be achieved, and does not include any provisions for monitoring and reporting of the project contributions, in accordance with the information included in the SD VISTa PD.		
Project Participant response		Date: 24/04/2023
PD version 01 of 23/04/2023. The PD is updated accordingly: - The format and the numeration of sections is compliant with the VCS template. - Section 1.1. includes the estimated total GHG for the first crediting period and the annual average. - Section 1.7 is update accordingly. The SDGs discussed in the SDVISTa Project description, have been reported. The supporting evidence are the same provided for SDVISTa.		
Documentation provided by the Project Participant		
VCS-PD_Grouped project Mila Rano safe water access for Madagascar_rev. 01_23042023.pdf		
VVB Assessment		Date: 10/07/2023
The updated PD is correct, and it has been completed in accordance with the instructions of the template. Therefore, the CAR is closed.		

CAR ID:	04	Date: 27/02/2023
Description of CAR		
The PD has the following mistakes: - The estimated emission reductions indicated in the eligibility criteria is not consistent with the value provided in section of “Net GHG emission reductions and Removals” and in the spreadsheet.		

- Section “Ownership” indicates that all the rights of the credits that may be generated by the operation of the water purifier system will be irrevocably transferred to CME whereas the beneficiary agreements define as ownerships of the emission reductions to the project participant (PP) and project developer (PD). - Section “Compliance with laws, statutes and other regulatory frameworks” indicates that there is no applicable local or regional law in the host country with relation to water purifiers projects although other sections refer the national law Decree No. 2004-635 of 15/06/2004 which define the parameters for drinking water as applicable to the project.	
Project Participant response	Date: 23/04/2023
PD version 01 of 23/04/2023. The PD is updated accordingly: - Eligibility criteria (capacity limit), updated with estimated emission reductions as per the ER spreadsheet calculation. - Section 1.7 Ownership is updated providing the correct responsibilities of the Project proponent and Project developer. - Section 1.14 is updated accordingly.	
Documentation provided by the Project Participant	
VCS-PD_Grouped project Mila Rano safe water access for Madagascar_rev. 01_23042023.pdf	
VVB Assessment	Date: 10/07/2023
The updated PD is correct, and all information included is consistent. Therefore, the CAR is closed.	

Clarifications (CLs)

CL ID	01	Date: 27/02/2023
Description of the CL		
The PD shall provide evidence of the following issues: - Carbon Credits Consulting Srl is the parent company and the project proponent (PP) of the project activity, and they have the legal right to control and operate the project activity. - The construction and the equipment of water system will be purchased directly by the PP and PD. - Technical specifications of the technology set up 1, specially of the flow rate of the Submersible Solar Pump Hmax 110 m. - Provide the authorization of the civil works of each tower and the criteria defined by the Environmental Ministry to select the best location of the different holes - Manufacturer's specifications of the life span of water treatment technologies.		
Project Participant response		Date: 23/04/2023
The PD is updated accordingly: - Section 1.7 Ownership, Ownership is updated providing the correct responsibilities of the Project proponent and Project developer. - The construction and the equipment costs of water system are purchased and by both the parties as per §4 of the signed agreement. - Technically specification is updated according with the manufacturer's technical sheet. - Geophysical study and authorization is provided.		
Documentation provided by the Project participant		
- Technical specification solar pump (Technical specification solar pump.pdf; Solar-Pump-Catalog.pdf; Picture of solar pump 5500.jpeg). - Authorization by the Environmental Ministry (LETTRE D'AUTORISATION MINISTERIELLE.pdf; ETUDES GEOPHYSIQUE DES TERRAINS D'IMPLANTATION A BEHOMPY.pdf). - VCS-PD_Grouped project Mila Rano safe water access for Madagascar_rev. 01_23042023.pdf		
VVB Assessment		Date: 10/07/2023
The evidence provided are adequate and provide the information required. Therefore, the CL is closed.		

Forward Action Request (FAR)

FAR ID	XX	Date: DD/MM/YYYY
Description of the FAR		
N/A		
Project Participant response		Date: DD/MM/YYYY
Documentation provided by the Project Participant		
VVB assessment		Date: DD/MM/YYYY